



HIV INTEGRATED BEHAVIORAL AND BIOLOGICAL SURVEILLANCE SURVEYS AMONG PEOPLE WHO INJECT DRUGS

CHIANG MAI, THAILAND-2019



■ INVESTIGATORS AND INSTITUTIONAL AFFILIATIONS

Country Thailand AIDS Commission (CXAC)

Principal Investigator 1 :

Dr. Dusita Phuengsamran, Institute for Population and Social Research, Mahidol University, Nakorn Pathom, Thailand, responsible for protocol development, supervision on protocol implementation

Principal Investigator 2 :

Assistant Prof. Dr. Apinun Aramrattana, Department of Family Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand, responsible for protocol development, supervision on protocol implementation

Co investigators :

Dr. Muhammadfahmee Talek, Faculty of Nurse, Prince of Songkla University, Pattani, Thailand
Niphon Darawutthimaprakorn, Institute for Population and Social Research, Mahidol University, Nakorn Pathom, Thailand

Kanittha Thaikla, Research Institute for Health Sciences, Chiang Mai University, Chiang Mai, Thailand
Porntip Khemngern, National AIDS Management Center, Department of Disease Control, Ministry of Public Health, Thailand

Survey Team Members

Field Study Team Members

Research Institute for Health Sciences, Chiang Mai University, Chiang Mai, Thailand

Kanittha Thaikla	Field Research Assistant and Field Supervisor
Chalathon Chanpunya	Nurse
Sutthida Wongchai	Coupon, Data Manager
Passpong Paramasiri	Field Management, Interviewer
Kannika Hanghan	Interviewer
Sutarinee Puksin	Interviewer
Suwimol Sukumolchan	Interviewer

Thanyarak Chiang Mai Hospital, Chiang Mai, Thailand

Montira maytha	Counselor, Nurse
----------------	------------------

Laboratory Team (CL)

Warunee Jitaree	Clinical laboratory Manager
Sirikwan Dokuta	Clinical laboratory Assistant manager
Panida Yodkeeree	Clinical laboratory Supervisor
Chamaiporn Naprom	Medical Technologist
Sunisa Butphet	Medical Technologist

Funding and institutional involvement

This study, including formative research, was funded by Bureau of AIDS, TB and STIs, with UNAIDS technical assistance and support of preparation of the study protocol, the RDS training, analysis and preparation of a final report.

Technical Assistance and Report preparation

Technical Assistance during data collection and analysis and preparation of the report were provided by Lisa G. Johnston, Independent Consultant, (lsjohnston.global@gmail.com, www.lisagjohnston.com) with funding from UNAIDS.

Acknowledgements

We would like to thank all of those who participated in this survey, as well as the Clinical Laboratory Coupon Manager and data analysts of Research Institute for Health Sciences, Chiang Mai University. They have all contributed to accomplishing this survey. We sincerely acknowledge their contribution.

ABBREVIATIONS/ACRONYMS

HIV	Human Immunodeficiency Virus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HTC	HIV Testing and Counseling
IBBS	Integrated behavioral and biological surveillance
MMT	Methadone Maintenance Treatment
MoPH	Ministry of Public Health
NHSO	National Health Security Office
NGO	Non-Governmental Organization
OST	Opioid substitution treatment
PEP	Post exposure prophylactic
PrEP	Pre exposure Prophylactic
RDS	Respondent Driven Sampling
STI	Sexually Transmitted Infection
UNAIDS	Joint United Nations Programme on HIV/AIDS
WHO	World Health Organization



■ EXECUTIVE SUMMARY

Background

This report presents findings of an HIV integrated behavioral and biological surveillance (IBBS) survey conducted in May and June 2019, among people who inject drugs (PWID) in Chiang Mai, Thailand. While the HIV prevalence in Thailand is just over one percent in the general population according to UNAIDS, prevalence has been found to be much higher among people who inject drugs (PWID). An HIV IBBS survey conducted in 2011 found HIV prevalence to be 20.5% among PWID, almost two times higher than that found among males who have sex with males (11.9%) and almost ten times higher than that found among female sex workers (1.7%). The primary objective of the survey is to provide information on the prevalence of HIV infection and associated risk factors among PWID to inform programmatic and policy responses and provide a baseline from which to monitor epidemic trends.

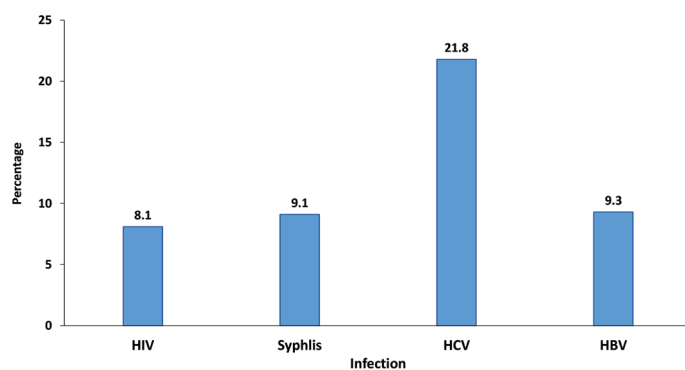
Methods

This surveillance survey used respondent-driven sampling (RDS) to obtain a sample of 300 PWID in Chiang Mai. Eligible persons were male or female, injected drugs for non-medical purposes in the past six months, aged 15 years and above, living in Chiang Mai and being of Thai nationality. RDS is a chain-referral sampling method specifically designed to obtain probability-based samples of ‘hidden’ and hard-to-reach populations that are socially networked. After providing informed consent, respondents completed an interview and provided blood specimens for HIV, syphilis, hepatitis B (HBV) and hepatitis C testing (HCV). Proportion estimates and corresponding 95% confidence bounds were adjusted for respondents’ probability of recruitment and differential network sizes and were calculated using RDS Analyst (www.hpmrg.org).

Findings

The majority of PWID were male, above the age of 24 years (73%), had ever attended school, single and earned an income. Most PWID reported ever using Heroin and/or amphetamines and injecting drugs for 11 years or more. Among those injecting in the previous month, 83% reported sharing a needle or syringe during their last injection. Just under one third reported ever overdosing and three quarters reported trying to give up drugs in the previous six months. The majority of PWID had sexual intercourse in the previous year, especially with regular partners, followed by casual partners. Sixteen percent sold sex in the previous year. PWID were least likely to use a condom with their regular partner and most likely to use a condom with a partner they paid. However, only 50% used a condom at last sex with a paying partner. Only 20% of PWID had an HIV test in the previous 12 months and received their test results or know their test result and only 16% ever had an HCV test.

Table: Biological test results



Eight percent of PWID are living with HIV, 9% have active Syphilis, 22% are living with HCV and 9% are living with HBV. Eleven percent of females who inject drugs are living with HIV, compared to 7% of males; 7% of females are living with Syphilis, compared to 10% of males; 5% of females are living with HBV, compared to 10% of males; and , 23% of females are living with HCV, compared to 21% of males.

Conclusion

The availability of ‘PWID friendly’ HTC settings, with spaces accessible only to females, separate from males who inject drugs, should be scaled up. comprehensive treatment and harm reduction programs should include engaging psychiatric, psychological and mental health care, social services (for housing and job skills/employment and, other specialist health care (such as services for HIV, HCV, TB and other infections). Additional expansion of outreach and NGO drop-in services are needed to ensure PWID have access to a full range of harm reduction services.



TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
BACKGROUND	3
METHODS	3
FINDINGS	3
CONCLUSION	4
TABLE OF CONTENTS	5
BACKGROUND	7
SPECIFIC OBJECTIVES	8
METHODS	8
RESPONDENT DRIVEN SAMPLING (RDS)	8
SAMPLE SIZE CALCULATION	9
RECRUITMENT PROCESS	9
STAFFING	10
BIOLOGICAL TESTING AND PROVISION OF TEST RESULTS	10
DATA MANAGEMENT AND ANALYSIS	10
POPULATION SIZE ESTIMATION	11
MULTIPLIER CALCULATION	11
SS PSE	11
LIMITATIONS	11
USING THESE DATA TO BUILD KNOWLEDGE	12
FINDINGS	12
OVERVIEW: PWID	12
SOCIO-DEMOGRAPHIC CHARACTERISTICS	13
DRUG USE BEHAVIORS	14
General profile of PWID	14
First drug use	15
Drug use in past six months	16
Injection drug use behaviors-Ever and past month	18
Injection drug use behaviors-Past six months	18
Overdose	20
TREATMENTS FOR PWID	21

SEXUAL RISK	22
Sexual intercourse	22
Sexual partner types	23
Condom use	25
Males who have sex with males	26
PRISON AND DETENTION	26
SEXUALLY TRANSMITTED INFECTIONS	27
HIV TESTING AND TREATMENT	28
HIV PREVENTION	30
HEPATITIS TESTING AND TREATMENT	32
PREP AND PEP	32
STIGMA AND DISCRIMINATION	32
HIV, SYPHILIS, HBV AND HCV PREVALENCE	34
HIV, Syphilis, HBV and HCV Prevalence by sex	35
HIV, Syphilis, HBV and HCV Prevalence by age group	35
POPULATION SIZE ESTIMATIONS	36
SERVICE MULTIPLIER	36
SUCCESSIVE SAMPLING POPULATION SIZE ESTIMATION	36
ALL POPULATION SIZE ESTIMATIONS	36
DISCUSSION AND RECOMMENDATIONS	36
CONCENTRATED HIV EPIDEMIC AMONG PWID IN CHIANG MAI.	36
HIGH PREVALENCE OF HEPATITIS C INFECTION.	37
LOW SCREENING FOR STI; SYPHILIS INFECTION	37
PWID IN CHIANG MAI ARE FREQUENT AND LONG TERM INJECTORS.	37
FEW PWID HAVE RECEIVED OST	38
FEMALES AT HIGH RISK OF HIV	38
CONSUMPTION OF DIFFERENT TYPES OF DRUGS.	38
PWID SHARE SYRINGES AND NEEDLES AND OTHER INJECTING EQUIPMENT.	39
HIGH RISK SEXUAL PRACTICES	39
HIV TESTING AMONG PWID IS LOW.	39
HCV TESTING AMONG PWID IS LOW.	39
PREP AND PEP	39
ACCESS TO HIV PREVENTION	40
PWID POPULATION SIZES OF PWID	40
SUMMARY OF KEY RECOMMENDATIONS	40
APPENDICES	42

■ BACKGROUND

According to Thailand's National AIDS Strategy, the country aims to End AIDS by 2030 through three goals and targets: (1) reduce new HIV infections fewer than 1,000 cases per year, (2) reduce AIDS-related deaths fewer than 4 000 cases per year, and (3) reduce HIV and gender related discrimination by 90%. To effectively design HIV/AIDS policies and interventions, reliable estimates and trends of HIV and sexually transmitted infections (STI) prevalence and related behavioral, social, and environmental factors that affect HIV and STI transmission among key populations most likely to acquire or transmit HIV in Thailand are needed. Currently, the estimate HIV prevalence among the general population in Thailand is about 1.1%, the highest in the South East Asia region. Thailand's commitment to accelerating an end to AIDS and achieving HIV infection rates below 1,000 cases per year by 2030 is challenged by persistently high HIV infection burdens and substantial service access gaps in key populations most likely to acquire or transmit HIV, including people who inject drugs (PWID). Based on seizures, the most abused illicit drug in Thailand is reported to be tablet methamphetamine (Yaaba); crystallized methamphetamine (Ice), heroin, ketamine and cannabis are smuggled through Thailand to the third countries.

As of 2014, there are an estimated 42,652 PWID in Thailand, among which one quarter are in Bangkok, with an estimated HIV prevalence of 20.5%; this is almost two times higher than that found among males who have sex with males (11.9%) and almost ten times higher than that found among females sex workers (1.7%). Sixty one percent of PWID reported having an HIV test and receiving their results in the past year. Hepatitis C (HCV) prevalence among PWID is reported to be 60-70%. Although, 95% of PWID have reported using clean needles and syringes during their last injection, most were accessing their needles and syringes from pharmacies and friends, rather than from outreach services.

Government efforts to provide services to PWID are improving. Thailand is one of the only countries in Asia which allocated domestic resources for methadone maintenance treatment (MMT) as well as drug use treatment. In 2016, the National Health Security Office (NHSO) alone reported 6,400 people on MMT; data from other health insurance agencies are not available. Publicly funded needles and syringes has been contentious. However, the government implemented a pilot harm reduction program in 19 provinces in 2014. This was scaled up to 36 provinces in 2017¹. In addition, the Ministry of Public Health (MoPH) provided policy directions ordering all hospitals to provide voluntary drug dependence treatment and rehabilitation services². For HCV, interferon-based HCV treatment is reimbursable by the NHSO. Nevertheless, there are multiple challenges in ensuring universal diagnosis and treatment among PWID. There are also ongoing challenges around adherence and ensuring that PWID can access multiple services to address their other health needs ranging from hepatitis and other co infections, ongoing substance use (particularly the use of amphetamines and benzodiazepines), mental health issues and criminalization.

There is little information about the HIV prevalence and risk behaviors among PWID in Chiang Mai. Chiang Mai is a major city in the mountainous northern region of Thailand. The city is situated near the 'Golden Triangle', a major source of opium production in the past, and more recently an entry route for both heroin and methamphetamine from bordering countries. The last survey of PWID conducted in Chiang Mai in 2009, found HIV prevalence to be 10.9%.³ Given PWID high-risk behaviors and the efficient transmission

1 See Order of the National Command Centre for Combatting Drugs No. 2/2017.

2 MoPH 0228.13/32744, 17 October 2016

3 Prybylski D, Manopaiiboon C, Visavakum P, Yongvanitjit K, Aramrattana A, Manomaipiboon P, et al. Diverse HIV epidemics among people who inject drugs in Thailand: Evidence from respondent-driven sampling surveys in Bangkok and Chiang Mai. *Drug Alcohol Depend.* 2015;148:126–35.

of HIV through the sharing of needles, syringes and other injecting paraphernalia, actionable and representative data an HIV IBBS survey was conducted in Chiang Mai in May and June, 2019. This survey used a peer to peer recruitment method, respondent driven sampling (RDS), to sample socially networked PWID. This report presents findings from this survey as well as population size estimations calculated through service multiplier and successive sampling population size estimation techniques.

■ SPECIFIC OBJECTIVES

Specific objectives of the survey were to measure the prevalence of HIV and syphilis and associated risk behaviors (sexual and injecting), among PWID in Chiang Mai. Additional survey objectives included:

- Measuring Syphilis, Hepatitis B (HBV) and HCV.
- Measuring key socio-demographic characteristics.
- Quantifying alcohol and non-injection and injection drug use.
- Assessing the use of and access to HIV and STI related and health programs;
- Assessing the knowledge of and attitudes towards HIV/AIDS.
- Evaluating stigma and discrimination in health care settings.
- Measuring STI occurrence and treatment seeking behaviors.
- Evaluating knowledge of and access to prevention services.
- Estimating the size of the PWID population.
- Strengthening the research capacities of national teams.
- Developing recommendations to guide programs and expand services and identify means to increase PWID programs coverage and uptake.
- Establishing evidence to increase resources available to and organizations that serve PWID.

■ METHODS

Respondent Driven Sampling (RDS)

This HIV IBBS survey used RDS to sample PWID. RDS is a variant of a chain referral sampling method which, when implemented and analysed properly, yields data representative of the populations from which the samples were gathered^{4,5}. Several theoretical and mathematical techniques borrowed from various disciplines are used to develop a sampling frame and to mitigate several well-known biases generally associated with chain referral methods. RDS is specifically designed to sample hard-to-reach and hidden populations that form social networks such as PWID. Recruitment in RDS is initiated with a few purposefully selected members of the study population referred to as “seeds”. After enrolling and completing the steps in the survey, each seed is given a fixed amount (usually no more than three) of uniquely numbered coupons with which to recruit peers (other eligible PWID) into the survey. These recruited peers who also enrol in and complete the survey steps are considered the first wave of respondents. Each respondent in the first wave who enrolls in and completes the survey steps is then provided a fixed number of coupons with which to recruit their peers into the survey. Successive waves of recruitment, ideally resulting in long recruitment chains of respondents, continue until the sample size is reached.

4 Heckathorn DD. (1997) Respondent-driven sampling: A new approach to the study of hidden populations. *Sociological Problems*. 44 (2), 174-199.

5 Heckathorn, DD. (2002). Respondent driven sampling II: deriving valid population estimates from Chain-Referral samples of hidden populations. *Sociological Problems*, 49(1), 11-34.

Each respondent is asked their social network size which is developed based on the survey eligibility criteria and sets up the probability of each recruit's selection into the sample. Self-reported social network sizes are considered the sampling frame which is used to produce weights for deriving estimates. Weights are applied inversely whereby those with larger social network sizes (the ability to recruit more participants and normally overrepresented in a standard snowball sampling method) are provided relatively less weight and those with smaller social network sizes are provided relatively more weight. Furthermore, data are analysed with mathematical modelling of the recruitment process (social network ties of recruits-recruiters) to generate relative inclusion probabilities. The recruitment process of who recruited whom is monitored through the unique numbers on each participant's recruitment coupon. The unique coupon numbers also ensure respondents' anonymity by linking each respondent to their questionnaire and biological test results, thereby avoiding the need to collect names, addresses or other personal information. When all methodological and theoretical requirements are fulfilled, RDS yields estimates of population parameters upon which inferences can be made about characteristics and behaviors of the network of the population sampled.

Sample Size Calculation

Because the IBBS is supposed to be conducted repeatedly (every few years), the sample size calculation was based on the prediction of a change over time in a specific variable of interest using the following formula: $n = D ((z\alpha + z\beta)^2 (p_1q_1 + p_2q_2) / (p_2 - p_1)^2)$.

This survey used the indicator of 30% for the percent of PWID estimated to have received HIV test and learned their results in past year to detect a 15% change over time between this survey and round three of the IBBS (i.e., an increase in HIV testing from 30% [p1] to 45% [p2]). In addition, the sample size was calculated using an alpha ($Z\alpha$) of 1.65 (the value used for a confidence level of 95%), a beta ($Z\beta$) of 0.84 (the value used for a power of 80%) and a design effect (D) of two (Table 1). The final sample size was calculated to be 325.

Table 1. Definitions for the sample size calculation formula to survey PWID

Formula term	Calculation
D (design effect)	2
p1 (baseline)-Proportion at baseline	0.30
p2 (final evaluation) Proportion expected in the next round	0.45
Z α (95%)-standard error associated with a level of confidence of 95%)	1.64
Z β (80%)-level of power in for the analysis	0.84
n (sample size)	325

Recruitment Process

The survey began with three seeds, selected to recruit diverse eligible PWID from their social networks. Each seed received three uniquely coded coupons which were used to recruit their peers into the survey. Respondents who presented a valid recruitment coupon to the survey site were screened

for eligibility and provided informed consent for a face-to-face interview, HIV pre-test counseling and a blood extraction for HIV, syphilis, HBV and HCV testing. Interviews were conducted in Thai by trained interviewers and took approximately 45 minutes to complete. The questionnaire collected data on socio-demographic characteristics, sexual and drug risk behaviors, HIV transmission, HIV and STI signs and symptoms, HIV knowledge, stigma and discrimination, information on respondents' social network sizes, as well as access to and utilization of HIV and STI related services. Following the interview, each respondent received up to three coupons to use to recruit eligible peers. Respondents received a primary compensation of 300 Baht for transportation costs and a secondary compensation worth 100 Baht for each eligible recruit who completed the survey. Survey completion consisted of completing the behavioral questionnaire and the biological testing. No personal identifying information was collected. To ensure confidentiality, respondents' questionnaires and biological tests were identified using a unique study identification number provided on the recruitment coupons.

Staffing

All staff members were trained for five days on their staff roles and responsibilities, seed selection and respondent recruitment, the ethical consent process, coupon and respondent tracking, incentive compensation, administration of the behavioral questionnaire, collection of biological samples, biological sample processing and transport and provision of biological test results and referrals. Staff members comprised a team of six persons: one field supervisor, one screener/coupon manager, three interviewers, and one nurse.

Biological testing and provision of test results

Pre and posttest counseling and the blood draw were conducted by the nurse. Participants received their HIV, syphilis, HBV and HCV test results on the same day of enrollment, with confirmatory tests available one week later. Participants with positive test results were referred for appropriate care and treatment.

■ DATA MANAGEMENT AND ANALYSIS

Data were entered daily and stored into three databases: 1) to monitor recruitment progress, track coupon numbers; 2) to store data from the biological test results; and, 3) to store data from the behavioral survey. Double entry procedures, data cleaning and quality control were conducted, and final datasets were merged and underwent consistency checks. Data were formatted and coded in SPSS and Microsoft Excel before being transferred to RDS Analyst (www.hpmrg.org). Convergence and bottlenecks were assessed on several key variables. Population proportions and 95% confidence intervals were derived using the successive sampling estimator⁶ and adjusted for differential recruitment and social network sizes.

6 Gile KJ, Handcock MS. Respondent-driven sampling: an assessment of current methodology. *Sociol Methodol*. 2010;40(1):285–327. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3437336&tool=pmcentrez&rendertype=abstract>

■ POPULATION SIZE ESTIMATION

The PWID population sizes in Chiang Mai were estimated using the service multiplier method ⁷ and the successive sampling population size estimation (SS-PSE) ⁸ technique. Service multipliers use service data consisting of the unique counts of PWID who received a service during a specific six-month period prior to initiating the RDS study. The second multiplier was enumerated during the RDS survey by asking each respondent whether they had exposure to the service at least one time during the same six-month period.

The assumptions for the multiplier are:

- Two overlapping data sources (specific to the group being counted)
- Population being counted must have non-zero probability of inclusion in both sources
- One data source (i.e. the survey) must be random and include the group in the multiplier
- Second data source (multiplier) need not be random but must be specific to group estimated
- No individual accounted for more than once in the multiplier
- Two data sources must be independent of each other
- Limited in- and out-migration

Multiplier Calculation

The number of PWID who accessed the service was used as a numerator (M) and the proportion who reported accessing the service was used as the denominator (P). The formula to calculate the size of the population is: $N = M/P$

Where:

N=Estimated Size

P=Proportion of PWID in survey who reported accessing the service.

M=Number of PWID reported by services to have accessed the service.

SS PSE

The SS-PSE method uses each participants' social network size data gathered during the RDS survey to quantify population sizes by assuming that the network size distribution of successive waves reflects a depletion of the population. The estimates use a Bayesian framework (i.e., quantifies uncertainty about unknown quantities by relating them to known quantities) incorporating information about a "guess" or prior knowledge of the size of the sampled population. The Bayesian framework also allows the computation of probability intervals.

■ LIMITATIONS

This survey was subject to several limitations. Because behavioral data were self-reported in a face-to-face interview, social desirability bias may have resulted in the underreporting of risky sexual practices and drug use behaviors. In order to prevent double-enrolment and ensure all respondents met eligibility criteria, recruits attending the survey sites were screened by a trained screener with experience working with the PWID population. PWID who tried to enrol in the survey and were found to have already

7 UNAIDS. Guidelines on Estimating the Size of Populations Most at Risk to HIV. Accessed on August 15, 2012 at: whqlibdoc.who.int/publications/2010/9789241599580_eng.pdf.

8 Handcock MS, Gile KJ, Mar CM. Estimating hidden population size using Respondent-Driven Sampling data. *Electron J Stat.* 2014;8(1):1491–521. Available from: <http://projecteuclid.org/euclid.ejs/1409619420>; Johnston LG, McLaughlin KR, Rhilani HE, Latifi A, Toufik A, Bennani A, et al. Estimating the size of hidden populations using respondent-driven sampling data: Case examples from Morocco. *Epidemiology.* 2015;26(6).

participated or who were found to be ineligible, had their coupon taken away by a staff member and were asked to leave the premises. Although the estimates presented here may be considered representative of the network of the population from which respondents were recruited, the small number of values for certain variables may limit the ability to derive accurate estimates. In some cases, confidence intervals are too wide for meaningful interpretation. Further, as analysis in RDS Analyst depends on the integrity of recruitment chains to adjust estimates, missing values may distort adjusted proportion estimates.

■ USING THESE DATA TO BUILD KNOWLEDGE

Estimates and confidence intervals presented here should represent the network of the population. For some variables, the confidence intervals are very wide or cannot be computed. Estimates with wide or no confidence intervals should be interpreted with extreme caution. Data from IBBS, using any sampling method should be triangulated with other relevant data from sentinel surveillance, HIV testing and counseling (HTC) centers, non-governmental organizations (NGO) working with high risk populations, one time studies and mapping and other qualitative exercises to build the most optimal understanding of how HIV is affecting PWID. In addition, these data should be used, along with other data, to model epidemic trends in the country.

■ FINDINGS

Overview: PWID

Over the course of six weeks, beginning in May 24, 2019 to June 28, 2019, 300 PWID in Chiang Mai (including 3 seeds) enrolled in the HIV IBBS survey. The maximum number of waves reached in the recruitment chains was eleven. Seeds are identified in the recruitment graph as larger squares and only have arrow leading away from them rather than towards them and represent HIV status (black is positive) (Figure 1) and sex (black are female) (Figure 2).

Figure 1. Recruitment graph of HIV status among PWID (n=300), three recruitment chains.

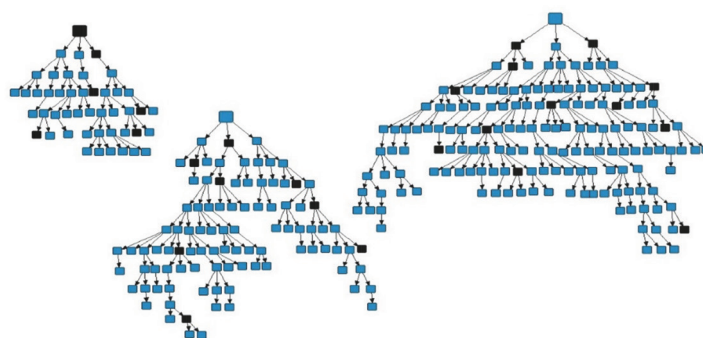
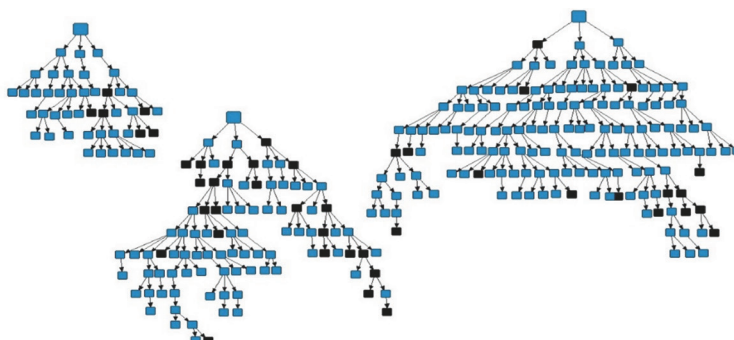


Figure 2 Recruitment graph of sex among PWID (n=300), three recruitment chains.



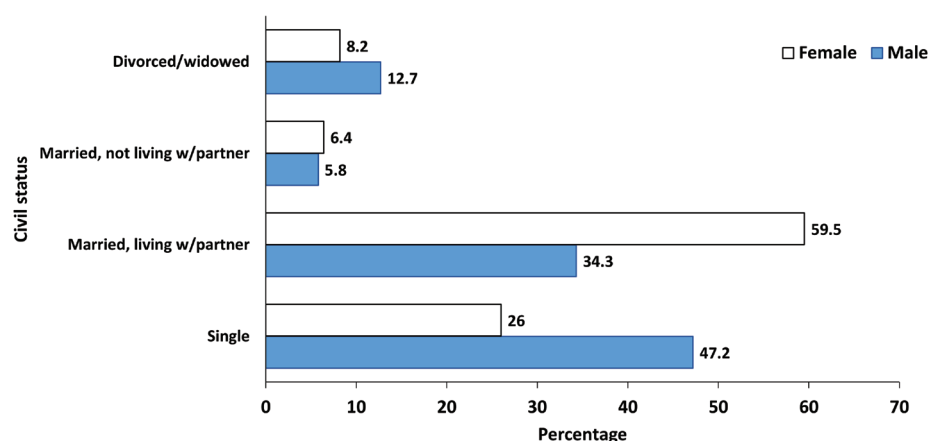
Socio-demographic characteristics

The majority of PWID were male, above the age of 24 years (73%), had ever attended school, single and earned an income (Table 2). The mean age was 34.5 (median: 34; range: 15 to 68); 11% were adolescents. Of those who ever attended school, only 19% had a high school diploma or equivalent and of those who earned an income the majority earned between 5,001-10,000 Baht. A significantly higher percentage of females (59%, CI: 46.2, 72.9) are married, living with a partner, compared to males (34%, CI: 29, 39.6) (Figure 3).

Table 2. Sociodemographic characteristics, PWID, Chiang Mai, 2019

	Chiang Mai n=300	
	n	95% CI
Sex		
Male	255	83.6 (78.9, 88.4)
Female	45	16.4 (11.6, 21.1)
Age group		
15-19	32	10.6 (3.1, 17.9)
20-24	49	16.13 (10.8, 21.4)
25-34	70	24.2 (18.8, 29.6)
35-44	88	29.8 (23.8, 35.8)
45-54	40	12.6 (8.5, 16.8)
55+	21	6.8 (3.4, 10.2)
Ever attended school		
Yes	225	75.6 (70.2, 81.1)
Education Level		
Primary level	100	45.1 (38.3, 52)
Secondary level	75	38.8 (28.2, 39.5)
High school diploma or equivalent	45	19.2 (13.9, 24.4)
Bachelor's degree and above/College	5	1.9 (0.4, 3.3)
Current relationship status		
Single, never married	128	43.9 (39.0, 48.7)
married/ living together	120	38.3 (33.9, 42.8)
married/ living separately	17	5.9 (3.3, 8.4)
Divorced/widowed	35	11.9 (8.3, 15.6)
Earn any income		
	221	73.6 (68.6, 78.8)
Amount earned in THB/Month (of those who earn any income)		
<5,000	40	18.6 (13.3, 24.0)
5,001-10,000	136	61.4 (54.7, 68.0)
10,001-20,000	38	17.3 (12.5, 22.2)
>20,000	6	2.7 (0.6, 4.7)

Figure 3. Current relationship status among males and females who inject drugs, Chiang Mai



Drug use behaviors

General profile of PWID

Most PWID reported ever using Heroin, also known as “Putaw”, (82%), Amphetamines, also known as “Yabaa”, (77%), followed by lesser substances of marijuana (54%) and alcohol (41%) (Table 3). Most PWID injected drugs for 11 years or more (Mean 6.8 years, median 4; range <1 year-36). Only 20% of PWID reported injecting within the previous 48 hours and almost half injected between one and six months before enrolling in the survey. The mean number of times PWID reported injecting on the last day they injected was 3.9 (Median: 4, range: 1-12). Of the 131 (41.2%, CI: 35.5, 47) PWID who injected drugs in the past week, the mean number of days injecting was 3.9 (Median: 3, range: 1-7) and the mean number of times was 10.7 (Median: 10, range: 1-22).

Table 3. Types of drugs ever used

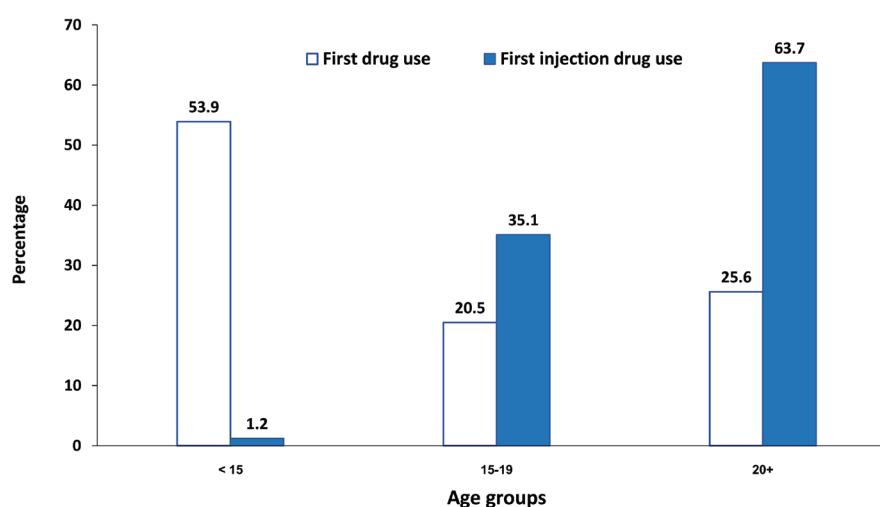
	Chiang Mai n=300	
	n	95% CI
Types of drugs ever used		
Heroin	250	82.2 (77.4, 87)
Diazepam (valium)	17	5.3 (3.2, 7.3)
Amphetamine	232	77.1 (73, 81.2)
Suboxone	2	0.6 (0, 1.2)
Methadone	123	39.5 (33, 46)
Codeine	15	4.4 (2.4, 6.4)
Ketamine	15	5.2 (2.7, 7.8)
Methamphetamine	90	28.8 (24.4, 33.3)
Amitriptyline	6	1.5 (0.5, 2.5)
LSD	8	2.6 (0.4, 4.8)
Benzodiazepine (alprazolam)	60	18.2 (14, 22.3)
Marijuana (<i>Hash, Ganja, cimeng</i>)	164	53.7 (48.5, 58.9)
Alcohol	119	40.8 (34.9, 46.6)
Fentanyl	7	2.6 (0.8, 4.4)
Gorilla (synthetic marijuana/cannabinoids)	11	3.2 (1.5, 5)
Opium/Morphine	110	34.2 (28.4, 40.1)
Leaf (special drug in Thailand)	51	17.5 (13.8, 21.2)

	Chiang Mai n=300	
	n	95% CI
Length of time injecting in years		
6 months to year	68	22 (17.6, 26.3)
1 to 5 years	8	2.7 (1, 4.5)
6 to 10 years	69	23.8 (19.1, 28.5)
11+ years	154	51.5 (46.2, 56.8)
Last time injected drugs		
Today	23	6.5 (4.2, 8.9)
Yesterday	42	13.5 (9.5, 17.5)
2-7 days ago	67	21.7 (17.3, 26)
8-30 days ago	42	13.1 (9.6, 16.7)
1-3 months ago	85	30.8 (25.6, 35.9)
4-6 months ago	40	14.4 (9.6, 19.1)

First drug use

Just over half of PWID reported first using drugs when they were below the ages of 15 years, whereas 64% reported first injecting drugs when they were 20 years or older (Figure 4). The mean age at first injection drug use was five years older than the mean age of first drug use (25.3, median: 23; range: 13 to 68 and 20.6, median: 18; range 10 to 56).

Figure 4. First drug and injection drug use among PWID, Chiang Mai.

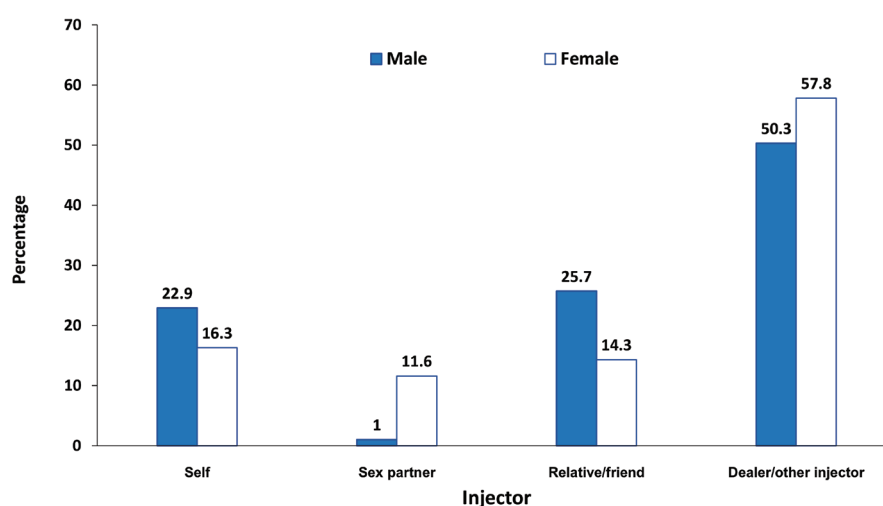


Most PWID reported first injecting Heroin (63%) and first being injected by a dealer or other injector (51%) (Table 4). A significantly higher percentage of females (12%, CI: 3.3, 19.6) who inject drugs were first injected by a sex partner, compared to males (1%; CI: 0.1, 2.1) (Figure 5).

Table 4. First injection drug use among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Drug first injected		
Heroin	193	63 (55.4, 70.6)
Amphetamine type stimulants	59	21 (14.3, 27.7)
Heroin w/other drug	26	8.6 (5.9, 11.3)
Methadone/opium/morphine/methadone w/other drug	10	3.4 (1.4, 5.4)
Opium/Morphine	10	3.4 (0.3, 6.5)
Cocaine	1	0.3 (0, 0.8)
benzodiazepine (alprazolam)	1	0.3 (0, 0.7)
By whom injected first time		
Self	68	22 (17.6, 26.3)
Sex partner	8	2.7 (1, 4.5)
Relative/friend	69	23.8 (19.1, 28.5)
Dealer/other injector	154	51.5 (46.2, 56.8)

Figure 5. By whom injected first time by sex, PWID, Chiang Mai



Drug use in past six months

Aside from the high use of Heroin (69%), Amphetamine (48%), and methadone (29%), between 14 and 16% of PWID reported using Benzodiazepine (alprazolam), Marijuana (Hash, Ganja/cimeng) and Alcohol in the past six months (Table 5). Most PWID reported injecting Heroin (67%), Amphetamine (26%) and methadone (23%) in the past six months. Eighteen percent of PWID injected more than one drug at the same time in the past six months, most commonly Methadone (71%), Benzodiazepines (60%) and/or Heroin (38%).

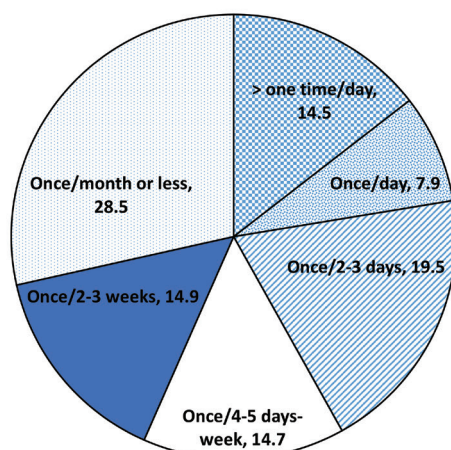
Table 5. Drug use in the past six months.

	Chiang Mai n=300	
Drugs used in past six months*		
Heroin (<i>Putaw</i>)	208	69.1 (63.5, 74.6)
Diazepam (valium)	4	1.2 (0.2, 2.1)
Amphetamine (<i>yabaa</i>)	146	48.3 (42.4, 54.2)
Methadone	90	28.7 (22.3, 35.1)
Codeine	3	1.2 (0.1, 2.3)
Ketamine	4	1.6 (0, 3.2)
Methamphetamine	30	9.5 (6.2, 12.7)
Amitriptyline	3	0.9 (0, 1.9)
LSD	2	0.8 (0, 1.7)
Benzodiazepine (alprazolam)	46	13.9 (10.2, 17.6)
Marijuana (<i>Hash, Ganja, cimeng</i>)	46	13.9 (10.2, 17.6)
Alcohol	46	15.9 (11.8, 20)
Fentanyl	2	0.7 (0, 1.6)
Gorilla (synthetic marijuana/cannabinoids)	3	0.7 (0.1, 1.3)
Opium/Morphine	25	7.4 (4.6, 10.3)
Leaf (special drug in Thailand)	10	3.2 (1.5, 4.9)
Drugs injected in past six months^		
Heroin (<i>Putaw</i>)	203	67 (61.1, 73)
Diazepam (valium)	2	0.7 (0, 1.3)
Amphetamine (<i>shabu</i>)	75	26.2 (18.6, 33.6)
Methadone	70	22.7 (15.5, 29.9)
Methamphetamine	11	3.4 (1.3, 5.4)
Benzodiazepine (alprazolam)	37	11.6 (8.1, 15)
Gorilla (synthetic/cannabinoids)	2	0.5 (0, 1.1)
opium/Morphine	12	3.8 (1.5, 6.1)
Injected drug simultaneously in past six months		
	57	18.2 (13.9, 22.6)
Drugs injected simultaneously in past six months^^		
Heroin (<i>Putaw</i>)	20	38.5 (25.6, 52.4)
Amphetamine (<i>shabu</i>)	13	23.5 (0, 55.7)
Methadone	40	71.2 (56.6, 86)
Methamphetamine	1	0.9 (0.5, 1.1)
Benzodiazepine (alprazolam)	36	60.0 (28.2, 90.3)
Gorilla (synthetic marijuana/cannabinoids)	1	0.9 (0.5, 1)
Opium/Morphine	2	3.2 (0, 7.9)

*No one reported using Suboxone; ^No one reported injecting Amitriptyline; ^^No one reported injecting Amitriptyline or Diazepam (valium).

Only 14% of PWID reported injecting more than one time a day and only 8% reported injecting once per day (Figure 6).

Figure 6. Frequency of injecting drugs in past six months



Injection drug use behaviors-Ever and past month

Of those who reported ever injecting with the same needle or syringe as others (34%), the median number of months the PWID reported doing so the last time was 20.2 (Median: 3, range: 1-240) (Table 6). There were no differences in ever injecting with the same needle or syringe with others by sex or by age group. Of those who injected in the past one month (n=171, 54%, CI: 48.8, 60.1), 83% reported sharing during their last injection in the past one month. The mean number of needles used in the past month was 15 while the mean number purchased in the past month was 12. The mean number of syringes used in the past month was 13, while the mean number purchased was 11.

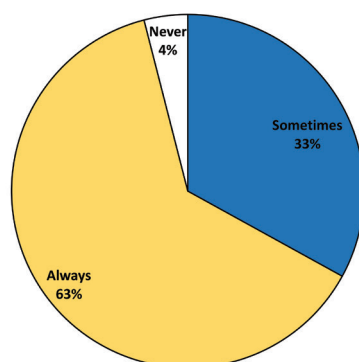
Table 6. Ever and past month injection behaviors among PWID, Chiang Mai

Chiang Mai n=300		
	n	95% CI
Ever injected with same needle/syringe as others		
	101	34.3 (29.6, 39.1)
Injected in last month		
	171	54.4 (48.8, 60.1)
Shared a needle/syringe during last injection in last month		
	146	83.2 (77.2, 88.7)
Mean, median, range		
Number of needles used in past month	15, 5.5 (1, 420)	
Number of needles purchased in past month	12, 6.0 (1, 120)	
Number of syringes used in past month	13, 4.5 (1, 405)	
Number of syringes purchased in past month	11, 5.0 (1, 420)	

Injection drug use behaviors-Past six months

Most PWID used sterile, not previously used needles and syringes in the past six months (Figure 7), however, the last time PWID had a new, unused needle and syringe which was not shared with anyone else, they were used a mean of 2.1 times (median: 1, range: 1-60) before discarding them.

Figure 7. Frequency of using sterile, not previously used needle/syringe in past six months



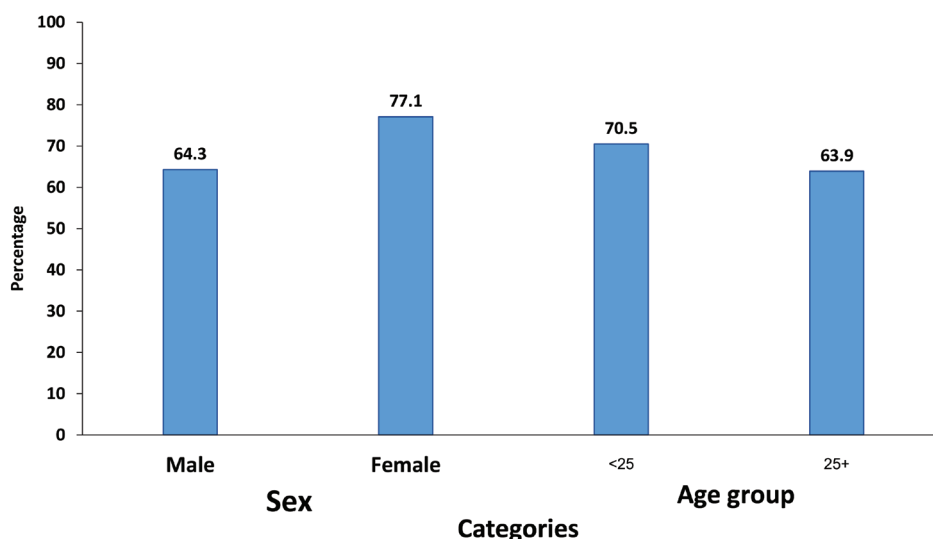
Almost one quarter of PWID injected with a needle or syringe previously used by someone else in the past six months, of which 57% reported doing so once a month or less often and with a mean of 3.2 other persons (median: 3.0; range: 1.0, 8.0) (Table 7). There were no significant differences for injecting with a needle or syringe previously used by someone else in the past six months (Figure 8). Twenty seven percent of PWID reported that someone injected with a needle or syringe after participant used it in the past six months. One quarter used injecting equipment after someone else used it the last time they injected, of which 85% reported using a spoon and/or cooker after someone else used it. Most PWID reported never (67%) using injecting equipment after someone else used it and never (74%) dividing drugs with a syringe that someone else had already used.

Table 7. Injection drug user behaviors in past six months among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Injected with needle/syringe previously used by someone else		
	71	24.1 (19.5, 28.8)
Frequency of injecting with needle/syringe previously used by someone else		
Once/month or less	39	57.4 (6.4, 108.9)
2-4 times/month	5	8.7 (0, 30.4)
2-7 times/week, once a day	13	15.3 (0, 54.0)
2-3 times/day	5	6.4 (1.2, 11.3)
5 + times/day	9	12.3 (5.2, 19.4)
Someone injected with needle/syringe after participant used it		
	74	26.8 (22.0, 31.6)
Used injecting equipment* after someone else used it last time injecting		
	69	23.4 (18.6, 28.2)
Equipment used after anyone else		
Spoon/cooker	58	84.6 (65.6, 104.0)
Filter/cottons	24	33.9 (22.6, 45.0)
Water	37	55.5 (44.9, 66.1)
Drug solution/mix	39	54.7 (43.6, 65.4)
Frequency of using injecting equipment* after someone else used it		
Always	30	10.2 (6.9, 13.6)
Sometimes	68	22.7 (18.4, 27.1)
Never	200	67.0 (61.7, 72.4)
Frequency of dividing drugs with syringe that someone else had already used		
Always	14	4.8 (2.7, 6.8)
Sometimes	65	21.3 (16.8, 25.8)
Never	217	74.0 (69.1, 78.8)

* spoons, cotton, cups, and water.

Figure 8. Injected with needle/syringe previously used by someone else in past six months by sex and age groups among PWID, Chiang Mai



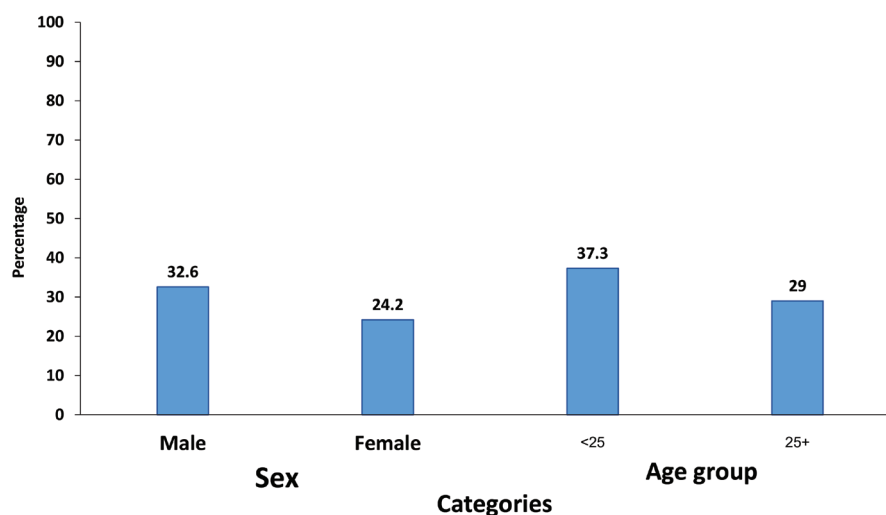
Overdose

Thirty one percent of PWID reported ever overdosing (Table 8), of which 88% (CI: 80.3, 94.9) were males and 12% (CI: 5.1, 19.7) were females. A non-significant higher percentage of males, compared to females, (33% vs. 24%) and a non-significant higher percentage of young PWID, compared to adult PWID, (37% vs. 29%) reported ever overdosing (Figure 9). The last time overdosing was a mean of 33 months (median: 6.5, range: 1-276).

Table 8. Overdosing among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Ever overdosed		
	95	31.2 (26.6, 35.9)
Last time overdosing (Mean, median, range)	94	33.4, 6.5 (1, 276)

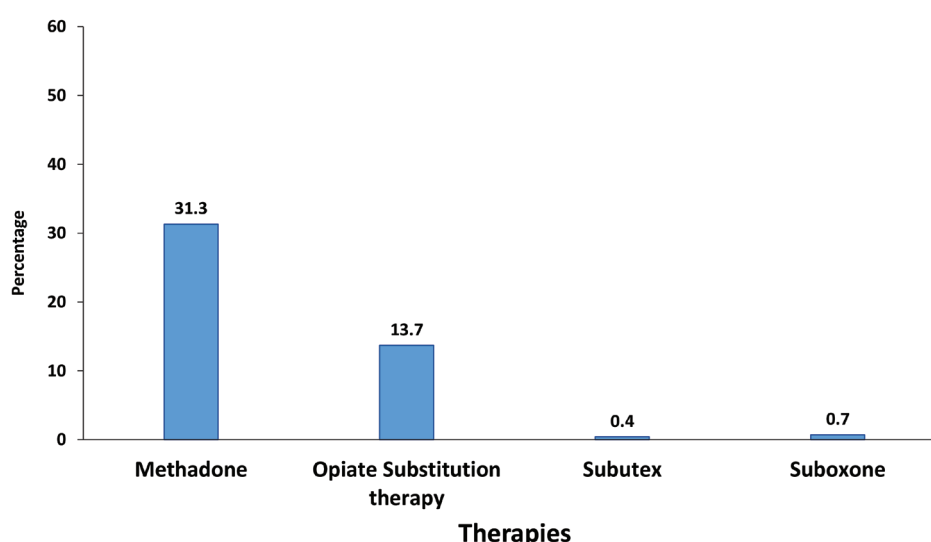
Figure 9. Ever overdosed among PWID by sex and age group, Chiang Mai



Treatments for PWID

Only 31% of PWID reported being prescribed methadone (Figure 10) and only about 17% contacted a methadone program in the past six months with the intention of enrolling (Table 9). Just 14% were ever prescribed opiate substitution therapy (OST), 0.4% ever prescribed Subutex and 0.7% ever prescribed Suboxone.

Figure 10. Ever prescribed/received the following treatments, PWID, Chiang Mai



Of those who ever received OST, the reason most cited for why they first used OST was because of their own need or because of suggestions by friends and the mean number of months since they last received OST was 21.7. Of the 7% who ever received OST six months continuously, 76% are currently on OST. In all, only 5% of PWID are currently on OST. Thirty six percent have ever received OST for injection drug use as in-patient and 22% contacted in-patient drug treatment program with intention of enrolling in the past six months. Only 6% of PWID have been referred by a drop-in center, outreach workers or peer educators to any drug treatment services in past 12 months; of those, they were referred a mean of 2.7 time (median: 3.0, range: 1.0-6).

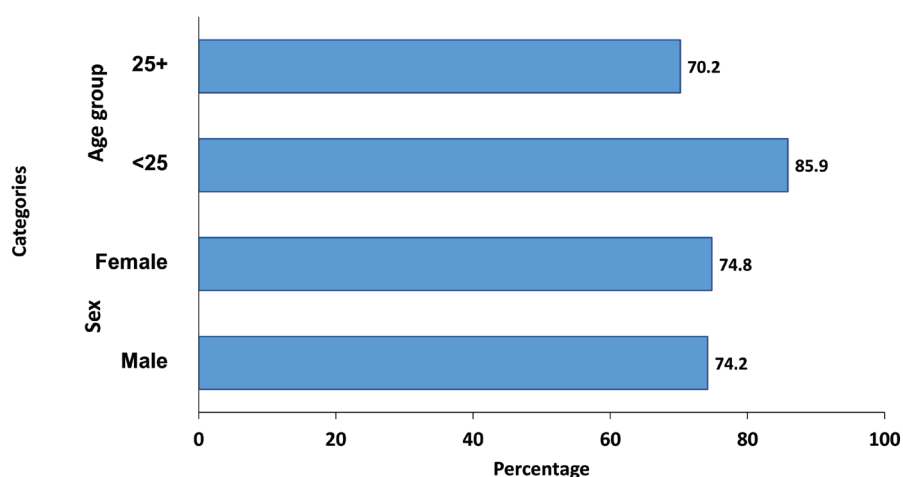
Table 9. Treatment for PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Contact with methadone program in past 6 months with intention of enrolling		
Yes, and got in	52	17.4 (13, 21.7)
Yes, but did not get in	8	2.3 (0.9, 3.6)
Never contacted in patient program	215	80.4 (75.7, 84.9)
Reason for using OST first time		
Referred by health care provider	1	1.8 (0, 3.9)
Referred by peer educator	5	11.2 (4.0, 18.3)
By your own will/suggested by friends	31	69.0 (57.9, 80.2)
Compulsory treatment after being arrested	4	10.7 (1.7, 20.4)
Required /suggested by parents/guardians	4	7.36 (0, 14.4)
Last time received OST for drug use (Mean, median, range)		
	43	21.7, 2.0 (1, 234)

Chiang Mai n=300		
	n	95% CI
Contact with methadone program in past 6 months with intention of enrolling		
Yes, but did not get in	4	1.3 (0.3, 2.2)
Never contacted in patient program	263	90.8 (87.8, 93.9)
Ever received 6 months continuously OST		
	26	7.5 (4.9, 10.1)
Currently receiving OST		
	21	5.6 (3.4, 7.8)
Ever received OST for injection drug use as in-patient		
	9	36.4 (20.9, 52.8)
Contacted in-patient drug treatment program with intention of enrolling in past six months		
	22	6.4 (3.9, 9.0)
Referred by drop-in center/outreach workers/peer educators to any drug treatment services in past 12 months		
	17	5.9 (3.5, 8.2)
Tried to give up drugs in past six months		
	220	74.3 (70.0, 78.7)

Most PWID (74%) have tried to give up drugs in the past six months, a significant majority of which were <25 years (86%, CI: 78.7, 92.9) vs. 25 years and older (70%, CI: 64.6, 75.7); there were no differences between males and females (Figure 11).

Figure 11. Tried to give up drugs in past six months among PWID by sex and age group, Chiang Mai



Sexual Risk

Sexual intercourse

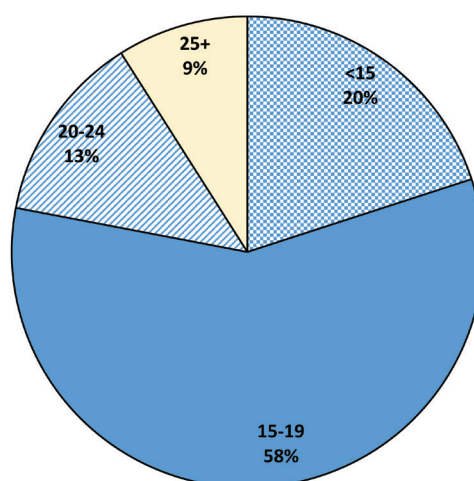
Most PWID reported ever having sex, 79% reported having sexual intercourse in the previous 12 months and 75% in the previous one month (Table 10). A significant higher percentage of young PWID (96%, CI: 84.2, 97), compared to adult PWID (75%, CI: 68.6, 80.6) and similar percentages of males and females (79%) reported having sexual intercourse in the past 12 months.

Table 10. Sexual intercourse ever, past 12 months, past month among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Ever had sexual intercourse		
	293	97.7 (96.3, 99.2)
Sexual intercourse in past 12 months		
	234	78.7 (74.0, 83.5)
Sexual intercourse in past month		
	172	75.5 (68.8, 82.2)

Twenty percent reported first having sexual intercourse when they were younger than 15 years (Figure 12) (mean: 8.4, median: 7, range: 1-25).

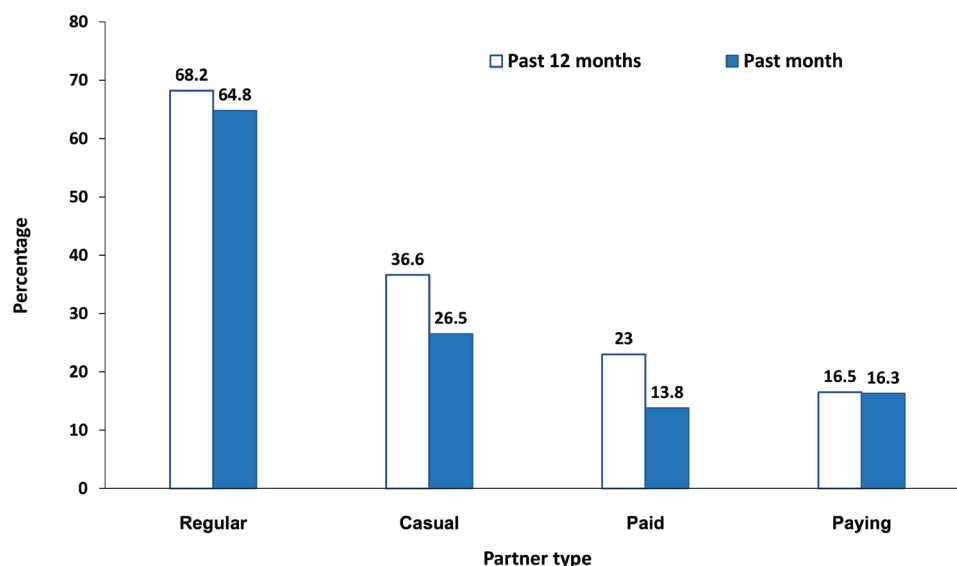
Figure 12. Age at first sexual intercourse, PWID, Chiang Mai



Sexual partner types

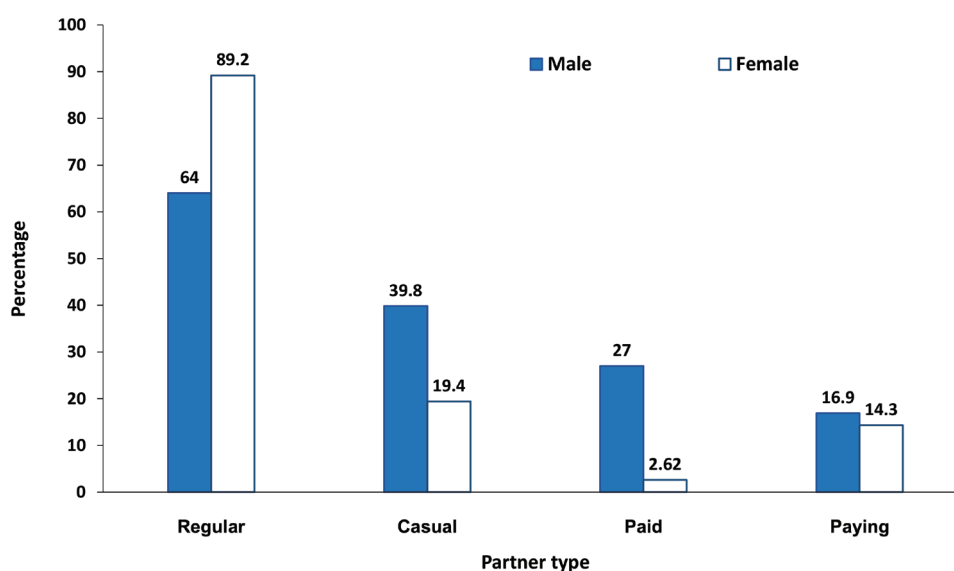
Most PWID reported having a regular sexual partner (mean: 1.7, range: 1-10), 37% had a casual partner (mean: 4.7, range: 1-13), 23% had a sex partner whom they had paid (mean: 6.6, range: 1-14) and 16% had a sex partner who paid them (mean: 8.9, range: 1-20) in the past 12 months (Figure 13). There were similar percentages of regular (mean: 1, range: 1-2) and paying partners (mean: 5.3, range: 1-12) types in the last one month, but lower percentages of casual (mean: 3.2, range: 1-9) and paid partners (mean: 2.8; range: 1-7) in the past one month.

Figure 13. Types of sexual partners in the past 12 months and past one month, PWID, Chiang Mai



A significant higher percentage of females (89%, CI: 80.4, 97.8), compared to males (64%, CI: 57.6, 70.2), reported having a regular partner in the past 12 months, whereas a significant higher percentage of males (40%, CI: 32.6, 47.1; 27%, CI: 20, 34), compared to females (19%, CI: 6.3, 32.2; 3%, CI: 0.8, 6.1), reported having casual partners and paid partners in the past 12 months (Figure 14).

Figure 14. Partner type in the past 12 months by partner type by sex, PWID, Chiang Mai



Just over half of PWID reported that their last sex partner in the past 12 months was a regular partner (Table 11).

Table 11. Last partner type in last 12 months, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Last type of sex partner in last 12 months		
Regular	127	51.4 (44.8, 57.60)
Casual	57	26.2 (20.7, 31.9)
Paying	25	10.8 (6.8, 14.9)
Paid	25	11.5 (7.4, 15.7)

Condom use

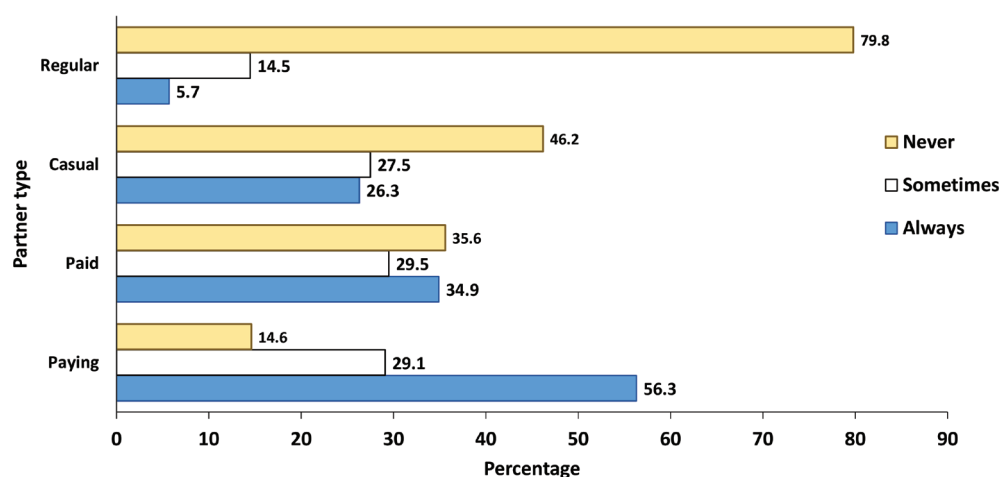
Condom use at last sex in the past 12 months varied by partner type, whereby, 16% of PWID used a condom with their regular partners, 41% used a condom with their casual partners, 75% with a partner they paid and 49% with someone who was paying them (Table 12). One third of PWID had used a condom at last sex with any partner in the past one month (among PWID who reported injecting in past one month). Most PWID never used drugs to get high before having sex in past month and only 6% reported being forced to have sex in the past 12 months.

Table 12. Condom use, drug use during sex and forced sex among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Used condom at last sex with regular partners in past 12 months		
	28	15.6 (9.8, 20.8)
Used condom at last sex with casual partners in past 12 months		
	37	40.8 (25.7, 54.8)
Used condom at last sex with paid partners in past 12 months		
	41	75.4 (64.5, 86.0)
Used condom at last sex with paying partners in past 12 months		
	19	49 (31.6, 65.0)
Used a condom at last sex in past month (among those who injected in past one month and had sexual intercourse in past month)		
	35	33.9 (21, 46.7)
Participant/partner took drugs to get high before having sex in past month		
Participant did	49	27.4 (21.3, 33.4)
Partner did	7	4.4 (1.4, 7.4)
Both did	15	7.9 (3.7, 11.8)
Never did	100	60.4 (52.6, 68.5)
Forced to have sexual intercourse in past 12 months		
	14	5.7 (3.1, 8.2)

Few PWID reported using condoms with a regular partner, 46% reported never using a condom with a casual partner, 36% never used a condom with a paid partner and 15% never used a condom with a paying partner in the past one month (Figure 15).

Figure 15. Frequency of condom use in past one month by partner type, PWID, Chiang Mai



Males who have sex with males

Just over one quarter of male PWID reported ever having anal sex with a male, among which 77% reported doing so in the past 12 months (Table 13). Among those who reported having sex with a male in the past 12 months. Most PWID reported usually have the receptive position during anal sex with a man and only 47% reported using a condom at last anal sex with a man.

Table 13. Males who have sex with males, PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Ever had anal sexual intercourse		
	61	26.0 (20.1, 31.9)
Had sex with a male in past 12 months		
	46	76.6 (68.1, 85.1)
Position during last anal sex with a male		
Insertive	9	18.8 (7.0, 30.2)
Receptive	35	76.9 (62.0, 92.2)
Both	2	4.1 (0, 11.5)
Used condom during last anal sex		
	24	47.2 (27.5, 65.3)

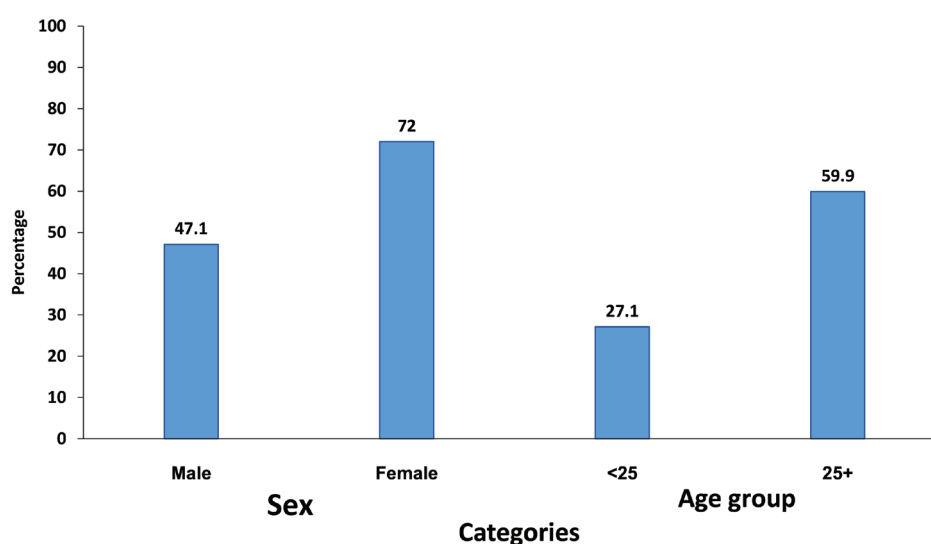
Prison and detention

Just over one quarter of PWID had been arrested for drug use in the past 12 months and 51% had ever been detained in prison or detention center (Table 14), among which, a significant higher percentage of females (72%, CI: 59, 85), compared to males (47%, CI: 40.5, 53.7), and a significant higher percentage of adult PWID (60%, CI: 53.6, 66.3), compared to young PWID (27%, CI: 16, 38.2), had been detained (Figure 16). Of those detained in the previous 12 months (23%), few injected drugs during imprisonment or detainment, none used a needle or syringe used previously by another person and 21% received services or treatment to help with drug use. Of those who received services or treatment while in prison or detained, most reported receiving methadone.

Table 14. Prison and detention among PWID, Chiang Mai

Chiang Mai n=300		
	n	95% CI
Arrested for drug use in past 12 months	84	27.3 (22.8, 31.9)
Ever detained in prison/detention center	156	51.2 (45.5, 56.8)
Detained in prison/detention center in past 12 months	36	23.4 (16.3, 30.6)
In past 12 months:		
Injected drugs for non-medical purposes while in prison/detained	1	1.8 (1.6, 1.6)
Receive services/treatment to help with drug use while in prison/detained	8	20.6 (10.1, 30.2)
Types of services/treatment received while in prison/detained		
OST	0	--
Methadone	2	19.2 (0, 39.8)
In-patient drug treatment	1	9.1 (0, 23.0)

Figure 16. Ever detained in prison/detention center by partner type and age groups, PWID, Chiang Mai



Sexually transmitted infections

Twenty eight percent of PWID reported having experienced intense pain and/or burning sensation during urination and 16% had sores or ulcers in the genital area in the past 12 months (Table 15). Only 12% were tested or screened a mean number of 1.4 times (median: 1, range: 1-4) for an STI in the past 12 months. Of those tested or screened in the past 12 months, 26% were last referred by a health care worker or NGO, almost half had their test or screening at a public hospital and 12% were diagnosed with an STI. Of those diagnosed with an STI, 77% (n=4) received treatment either from a Public hospital or private clinic or hospital.

Table 15. Sexually transmitted infection among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Experienced any of the following symptoms in past 12 months		
Intense pain/burning sensation during urination	87	28.4 (23.21, 33.5)
Warts in anal area	27	8.9 (6.2, 11.6)
Sores or ulcers in the genital area	48	16.3 (11.9, 20.7)
Abnormal discharge from penis (men)	27	8.9 (5.88, 11.8)
Abnormal anal discharge	6	1.7 (0.4, 3.0)
Bumps/swelling in anal area	16	4.9 (2.8, 7.1)
Vaginal discharge (women)	2	0.5 (0.05, 0.9)
Pain in lower abdomen	75	26.3 (21.5, 31.1)
Tested/screened for STI (not including HIV/AIDS) in past 12 months		
	39	12.2 (8.7, 15.6)
Referred by health care worker/NGO for last STI test/screening in past 12 months		
	11	25.9 (14.9, 35.4)
Where last STI test/screening in last 12 months was conducted*		
Primary Health Center	1	3.5 (2.6, 4.8)
Public Hospital	19	46.8 (23.4, 69.5)
Private Clinic/hospital	12	28.8 (5.5, 51.4)
NGO	3	9.0 (6.5, 12.1)
Mobile STI	4	11.7 (8.6, 15.7)
Diagnosed with STI in past 12 months		
	5	11.9 (0, 38.7)
Received treatment the last time diagnosed with STI		
	4	77 (48.2, 104.3)
Where treatment was received last time diagnosed with STI**		
Public Hospital	2	55.9 (0, 132.4)
Private Clinic/hospital	2	44.1 (0, 118)

*No one responded drug treatment clinic or STI clinic. **No one responded primary health center, NGO, mobile STI, drug treatment clinic, STI clinic.

HIV testing and treatment

Just under half of PWID have ever had an HIV test, the majority of which had tests at a public hospital and 29% stating that their reason for having their last HIV test was as an army recruit or because they felt at risk by having unprotected sex and 11% because they felt at risk for sharing drug injection paraphernalia (Table 16). No one reported being referred by health care worker or NGO for last HIV test. Under half of PWID had their last HIV test in the past 12 months, 55% had their last test at a public hospital, and 92% received their last HIV test results. Twenty percent of PWID had and HIV test in the past 12 months and received test results or knows test result. A nonsignificant higher percentage of males (22%, CI: 16.1, 27.3), compared to females (14%, CI: 4.8, 22.5), had and HIV test in the past 12 months and received test results or knows test result. Four percent of PWID reported that their last HIV test result was positive, among which 73% initiated Antiretroviral therapy (ART). However, no PWID living with HIV reported being currently taking ART. Among those who had initiated ART, one reported that their treatment was covered by the National Health Scheme, two by the Social Security Fund and one by their own funds.

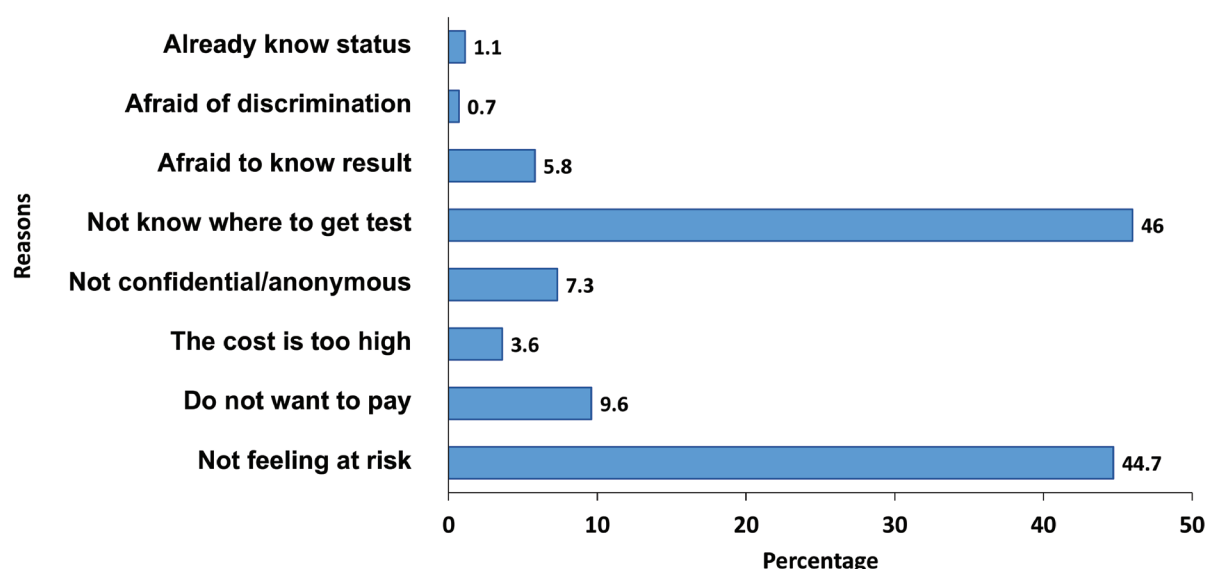
Table 16. HIV testing and treatment among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Ever been tested for HIV		
	145	47.6 (42.2, 53.1)
Places where HIV tests were taken*		
Primary Health Center	5	3.9 (0.8, 7.1)
Public Hospital	90	57.9 (49.9, 65.7)
Private Clinic/hospital	31	20.9 (13.3, 28.8)
NGO drop-in center	17	9.9 (5.5, 14.0)
Mobile HIV testing	16	10.8 (6.0, 15.8)
Main reason for having HIV test the last time**		
Feel at risk/Had unprotected sex	46	28.6 (21.3, 35.6)
Feel at risk/shared needle/injection equipment	17	10.7 (5.2, 16.1)
New sexual partner	2	1.1 (0, 2.5)
Preparing for pregnancy	2	1.6 (0, 4.6)
As antenatal care	12	7.5 (2.1, 12.8)
Job application	7	3.9 (1.1, 6.6)
Army recruitment	44	28.6 (18.6, 38.5)
Feeling sick	7	7.3 (0, 23.8)
Participating in research	17	10.6 (5.6, 15.4)
My partner has HIV		
Last HIV test		
< 6 months	45	30.1 (21.3, 39.1)
6-12 months	21	13.0 (7.5, 18.4)
> 12 months	88	56.9 (47.6, 66.2)
Place of last HIV test^		
Primary Health Center	4	3.1 (0, 6.5)
Public Hospital	84	54.7 (47.1, 62.3)
Private Clinic/hospital	26	17.8 (10.7, 24.9)
NGO drop-in center	14	7.8 (3.6, 11.8)
Mobile HIV testing	14	9.7 (5.0, 14.5)
Received last test result		
	143	91.9 (87.0, 96.5)
Result of last test		
Positive	6	4.0 (1.3, 6.8)
Negative	133	95.6 (92.8, 98.5)
Indeterminate/inconclusive	1	0.4 (0, 0.8)
Had and HIV test in the past 12 months and received test results or knows test result		
	60	20.4 (15.7, 25.1)
Initiated ARV treatment		
	4	72.6 (44.4, 103.2)
How ARV treatment is covered^^		
National Health Scheme	1	31.0 (0, 83.1)
Social Security Fund	2	38.0 (0, 74.8)
Out of pocket	1	31.0 (0, 84.0)

*No one responded drug treatment clinic or STI clinic. **No one responded for marriage, insurance, blood donation, applying for education, getting ordained, surgery or because partner has HIV. ^No one responded drug treatment clinic, STI clinic. ^^No one responded Government Health Coverage, Health Insurance for Migrant Workers. private health insurance.

Of the reasons for not ever having an HIV test, 46% of PWID reported that it was because they do not know where to get a test and 45% because they were not feeling at risk (Figure 17).

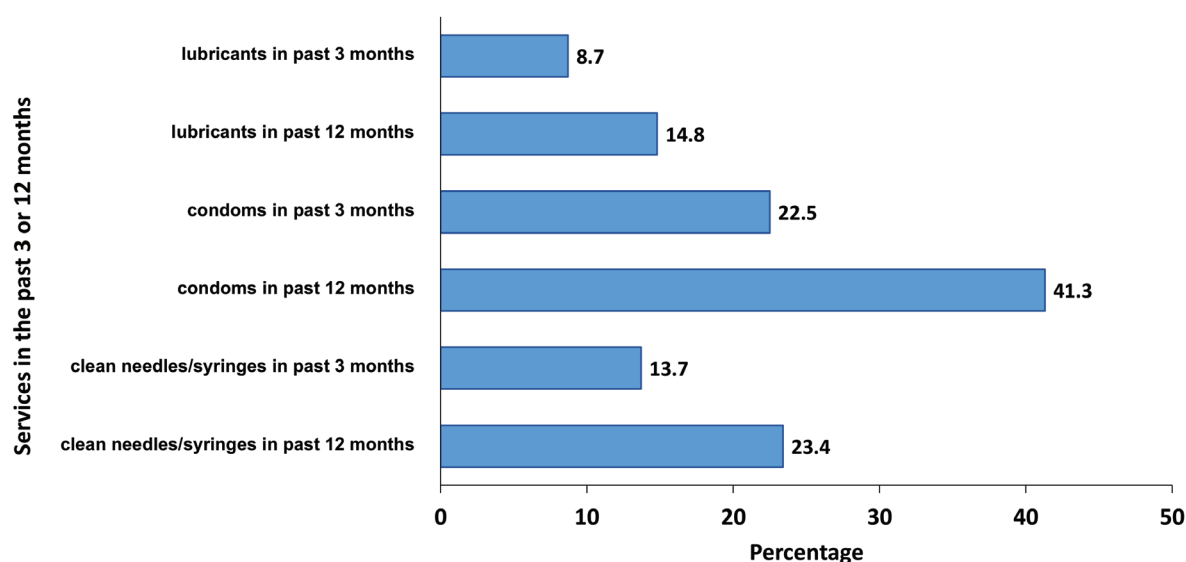
Figure 17. Reasons for not having an HIV test among PWID, Chiang Mai



HIV prevention

Between 40% and half of PWID reported receiving condom use and safe sex, sexually transmitted infections or cleaning needles and safe injection education in the previous three months (Table 17). However, over 80% received education about HIV, cleaning needles/safe injection and OST/MMT/other treatment in the previous 12 months (Figure 18). Of the places from where to receive HIV prevention materials/information in past 12 months, most PWID reported receiving them from governmental service providers (19%). Higher percentages of PWID reported receiving lubricants, condoms and/or clean needles and syringes in the past 12 months compared to the past three months. Fewer PWID received lubricants in the past three and 12 months compared to receiving condoms or clean needles and syringes.

Figure 18. Services received in the past 3 and 12 months, PWID, Chiang Mai



Clean needles and syringes in the past 12 months (50%) and condoms (37%) in the past three months were mostly received from Outreach worker/peer educator; However, 37% of PWID also reported receiving condoms and 41% received lubricants in the past three months from an NGO drop-in center. Only 19% of PWID can be considered to have received a combined set of HIV prevention interventions in the past three months.

Table 17. HIV prevention among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Received education* in past 3 months for:		
Condom use, safe sex	144	48.1 (43.0, 53.2)
Sexually transmitted diseases	137	45.7 (39.7, 51.8)
TB	82	28.1 (22.6, 33.6)
Hepatitis	73	25.3 (20.8, 29.7)
HIV	130	43.5 (38.0, 49.0)
Cleaning needles/safe injection	106	34.3 (29.3, 39.3)
Overdose prevention	77	25.0 (20.9, 29.1)
OST/MMT/other treatment	95	30.1 (25.5, 34.7)
Received education* in past 12 months for:		
Condom use, safe sex	112	76.7 (69.4, 83.7)
Sexually transmitted diseases	103	74.6 (65.9, 83)
TB	60	72.9 (62.5, 83.4)
Hepatitis	54	78.2 (70.0, 87.7)
HIV	103	80.2 (73.3, 87)
Cleaning needles/safe injection	85	80.2 (73.3, 87.0)
Overdose prevention	61	79.4 (71.7, 87.0)
OST/MMT/other treatment	82	87.5 (79.0, 96.6)
Places/people from where/whom received HIV prevention materials/information in past 12 months		
Governmental service providers	59	19.5 (15.2, 23.9)
Private hospital service providers	12	4.3 (2.0, 6.5)
Drop-in centers	18	5.5 (3.0, 7.9)
Friend/sex partner (not peer educator)	44	14.9 (10.5, 19.4)
Mass media (TV/radio/internet)	47	15.2 (11.4, 19.0)
Targeted media (brochure, leaflets)	28	8.9 (6.0, 11.9)
Campaign	10	3.4 (1.5, 5.2)
Places/people from where/whom received clean needles/syringes in past 12 months**		
NGO drop-in Center	21	26.0 (12.1, 38.8)
Outreach worker/peer educator	34	49.9 (39.7, 61.3)
Friend/sex partner/other PWID (not outreach worker)	14	17.3 (9.3, 24.9)
Government drug treatment facility/hospital	11	14.2 (5.0, 31)
Private hospital/clinic	1	1.82 (1.9, 1.9)
Places/people from where/whom received clean needles/syringes in past 3 months^		
NGO drop-in Center	17	36.7 (0, 83.5)
Outreach worker/peer educator	17	36.9 (22.1, 51.3)
Friend/sex partner/other PWID (not outreach worker)	10	21.0 (10.6, 30.7)
Government drug treatment facility/hospital	5	11.1 (3.3, 19.1)
Places/people from where/whom received condoms/lubricants in past 3 months^^		
NGO drop-in Center	12	40.7 (0, 89.3)
Outreach worker/peer educator	5	19.5 (5.8, 33.6)
Friend/sex partner/other PWID (not outreach worker)	1	2.7 (1.7, 3.5)
Government drug treatment facility/hospital	3	12.5 (7.7, 17.9)
Private hospital/clinic	2	5.7 (3.8, 7.1)
Received a combined set of HIV prevention interventions in past three months		
	55	18.7 (14.6, 22.9)

*Through outreach service, drop-in centre, sexual health clinic **No response for convenient/drug store, where drugs are bought. ^ No response for convenient/drug store, where drugs are bought, private hospital/clinic. ^^No response for convenient/drug store, where drugs are bought.

Hepatitis testing and treatment

Of the 16% of PWID who ever had an HCV test, 32% had a positive test result, of which 43% had a liver fibro scan for HCV and, of those, 45% received treatment (Table 18).

Table 18. Hepatitis testing and treatment among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Ever tested for HCV		
	50	16.5 (12.7, 20.3)
Ever positive for HCV (among those who ever tested)		
	18	32.5 (18.4, 44.6)
Ever received liver fibro-scan for HCV		
	9	42.8 (0, 88.5)
Ever received treatment for HCV		
	7	44.8 (27.8, 62.6)

PREP and PEP

Of the 17% of PWID who ever heard of PREP, none took PREP in the past three months and of the 12% of PWID who have ever heard of PEP, none took PEP in the past three months (Table 19).

Table 19. PREP and PEP among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Has heard of PREP		
	48	16.8 (12.5, 21.0)
Took PREP in past 3 months		
	0	0
Has heard of PEP		
	36	12.2 (8.6, 15.8)
Took PEP in past 3 months		
	0	0

Stigma and discrimination

Seven percent or lower, reported being discriminated against or treated unequally when accessing services because of injecting drugs (Table 20). Of the few PWID who reported avoiding HIV testing/prevention/treatment services because of fear someone will know of injection drug use in past 12 months, half reported that it was fear of/concern about stigma by health care staff, 16% because of fear of/concern about stigma by community, and 14% because of fear of/concern about or experienced police harassment or arrest. In past 12 months 4% of PWID was ever denied employment/expelled from school because of injecting drugs, 13% was ever denied employment/

expelled from work-place because of injecting drugs and 43% had any family member express aversion (e.g., not wishing to speak with/ speaking sarcastically about/blaming/scolding/gossiping about) because participant injects drugs. Of the 45% of PWID who became so sick in the past 12 months they had to go to the hospital, 9% received poorer care/services from clinic or hospital doctor/nurse/ staff compared to other patients because of injection drug use and 3% had clinic or hospital attending physician/nurse/staff refuse treatment because of injection drug use. Twenty two percent avoided/delayed medical services when needed or avoided/delayed HIV testing in the past 12 months. The most cited reason for avoiding or delaying medical services when needed was due to being afraid people might know he/she injects drugs and the most cited reason for avoiding or delaying HIV testing was due to being afraid of being (or was) caught by police. Over half of PWID reported having difficulties telling other people they inject drugs and feel disgusted with themselves for injecting drugs. Just over three quarter feel guilty for injecting drugs and 61% feel ashamed for and/or feel of no value for injecting drugs.

Table 20. Stigma and discrimination among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
Discriminated/treated unequally when accessing services because of injecting drugs in past 12 months*		
Drug treatment	11	4.1 (1.88, 6.3)
STI screening/treatment	2	0.7 (0, 1.4)
HIV counselling/testing	4	1.7 (0.2, 3.2)
ARV Treatment	1	0.2 (0, 0.6)
Other health services	14	5.2 (2.7, 7.7)
Other types of services	22	7.3 (4.6, 9.9)
Avoided HIV testing/prevention/treatment services because of fear someone will know of injection drug use in past 12 months		
	23	7.1 (4.4, 9.7)
In past 12 months, avoided HIV testing/prevention/treatment services for following reasons**		
Fear of/concern about stigma by health care staff	12	50.0 (26.9, 71.5)
Fear of/concern about stigma by community	4	15.6 (1.2, 28.9)
Fear of/concern about or experienced police harassment or arrest	4	14.5 (13.9, 13.9)
In past 12 months was ever denied employment/expelled from school because of injecting drugs		
	11	4.0 (93.9, 98.2)
In past 12 months was ever denied employment/expelled from work-place because of injecting drugs		
	39	12.8 (9.2, 16.3)
Any family member express aversion (e.g., not wishing to speak with/speaking sarcastically about/blaming/scolding/gossiping about) because participant injects drugs		
	131	43.5 (37.9, 49.2)
In past 12 months had to go to hospital/clinic because of being sick		
	134	45.5 (40.1, 51.0)
In past 12 months received poorer care/services from clinic or hospital doctor/nurse/staff compared to other patients because participant inject drugs		
	11	9.3 (3.3, 15.5)
In past 12 months, clinic or hospital attending physician/nurse/staff refused participant treatment because of injecting drugs		
	4	3.2 (0, 6.7)
In past 12 months avoided/delayed medical services when needed		
	32	22.2 (15.2, 28.9)

	Chiang Mai n=300	
	n	95% CI
In past 12 months avoided/delayed HIV testing		
	32	22.3 (15.1, 29.0)
Reasons for avoiding/delaying medical services when needed		
Afraid health care providers might stigmatize/treat poorly/be unwilling to provide services/discriminate	3	8.7 (0, 21.5)
Afraid people might know participant injects drugs	8	21.4 (0.9, 40.9)
Afraid of (or had) violent experiences	2	6.6 (6.8, 6.8)
Afraid of being (or was) caught by police	4	14.5 (15.1, 15.1)
In past 12 months avoided/delayed medical services when needed		
	26	8.0 (5.2, 10.9)
Reasons for avoiding/delaying HIV testing services when needed^		
Afraid that health care providers might stigmatize/treat poorly/be unwilling to provide services/discriminate	3	10.3 (0, 23.1)
Afraid people might know participant injects drugs	3	10.6 (2.5, 18.7)
Afraid of being (or was) caught by police	5	17.0 (0, 44.3)
Difficult to tell other people that participant injects drugs		
	167	55.2 (49.8, 60.7)
Feel disgusted with self for injecting drugs		
	170	57.5 (52.0, 63.2)
Feel guilty for injecting drugs		
	229	76.5 (72.1, 80.9)
Feel ashamed for injecting drugs		
	176	60.7 (50.1, 65.5)
Feel of no value for injecting drugs		
	173	60.5 (55.0, 65.9)

*No response for drug treatment, STI screening/treatment. **No response for fear of/concern about or experienced violence. ^No response for afraid of (or had) violent experiences.

HIV, Syphilis, HBV and HCV Prevalence

The prevalence of HIV among PWID was 8%, of active syphilis was 9%, of HCV was 22% and of HBV was 9% (Table 21). Of those who were positive for HIV, 31% (N=7, CI: 13.4, 48.5) were positive for syphilis and 41% (N=12, CI: 21.9, 60.2) were also positive for HCV. Among those with positive HIV results, 17% (n=10, CI: 6.9, 26.9) of male PWID reported ever having anal sex with a man and 25% (n=5, CI: 8.8, 41.8) of male and female PWID reported ever sharing needles and syringes. Of those with positive HCV results, 43% (n=26, CI: 29.9, 56.6) reported ever sharing needles and syringes.

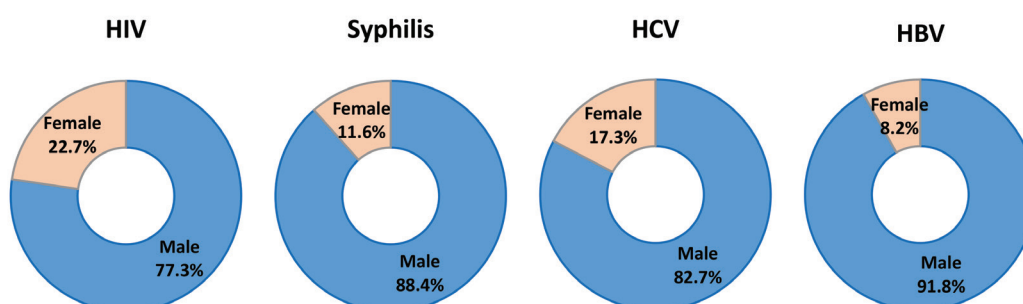
Table 21. HIV, Syphilis, HBV and HCV among PWID, Chiang Mai

	Chiang Mai n=300	
	n	95% CI
HIV	26	8.1 (5.4, 10.9)
Syphilis	24	9.1 (6.0, 12.4)
HCV	68	21.8 (16.4, 27.2)
HBV	27	9.3 (6.0, 12.5)

HIV, Syphilis, HBV and HCV Prevalence by sex

Among those who were HIV positive, 23% (n=20, CI: 7.7, 37.5) were females, Syphilis positive, 12% (n=4, CI: 1.0, 22.5) were female, HCV positive, 17% (n=11, CI: 7.8, 26.5) were female and HBV positive, 8% (n=2, CI: 0.1, 18.7) were females (Figure 19). Eleven percent (CI: 3.8, 18.8) of females who inject drugs are living with HIV, compared to 7% of males (CI: 4.3, 10.7); 7% (CI: 0.6, 12.9) of females are living with Syphilis, compared to 10% (CI: 5.9, 13.4) of males; 5% (CI: 0.7, 10) of females are living with HBV, compared to 10% (CI: 6.4, 14) of males; 23% (CI: 10.8, 34.8) of females are living with HCV, compared to 21% (CI: 15.7, 27.3) of males.

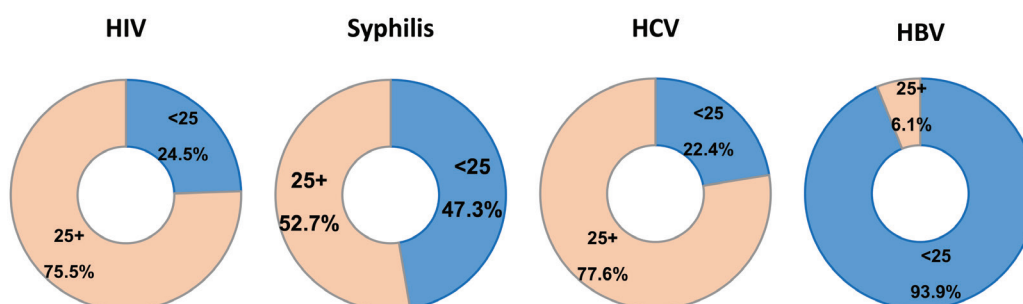
Figure 19. HIV, Syphilis, HCV and HBV by sex, PWID, Chiang Mai



HIV, Syphilis, HBV and HCV Prevalence by age group

Among those who were HIV positive, 24% (n=6, CI: 8.6, 40.5) were under the age of 25 years, Syphilis positive, 47% (n=12, CI: 27.1, 67.5) were under the age of 25 years, HCV positive, 22% (n=16, CI: 10.7, 34.4) were under the age of 25 years and HBV positive, 8% (n=2, CI: 0.1, 13.4) were under the age of 25 years (Figure 20). Seven percent (CI: 1.5, 13.3) of young PWID (under the age of 25 years) are living with HIV, compared to 8% (CI: 5.2, 11.6) of adult PWID; 16% (CI: 9.3, 23.3) of young PWID are living with Syphilis, compared to 7% (CI: 2.7, 10.5) of adult PWID; 2% (CI: 0.1, 4.3) of young PWID are living with HBV, compared to 12% (CI: 7.7, 16.1) of adult PWID; 18% (CI: 9.9, 26.5) of young PWID are living with HCV, 23% (CI: 16.7, 29.3)

Figure 20. HIV, Syphilis, HCV and HBV by age groups (<25, 25+), PWID, Chiang Mai



■ POPULATION SIZE ESTIMATIONS

Service multiplier

Having received methadone or an HIV test were used for service multipliers. The methadone center reported that 146 PWID had received services and the HIV testing center reported that 52 PWID received an HIV test. Data analyzed from the survey found that 22% of PWID reported receiving methadone and 2% reported having an HIV test. The calculations for the service multipliers for methadone is 664 PWID, which represents 0.32% of the adult population in Chiang Mai (pop: 205, 700) and for HIV testing is 2600 which represents 1.26% of the adult population (Table 22).

Table 22. Population size estimates using service multipliers, PWID in Chiang Mai

	Methadone	HIV test
Number of unique visits	146	52
Percent ⁹ from survey who visited the service	22%	2.0%
Calculation	146 .22=	52 .02=
Population Size	664	2600

Successive sampling population size estimation

The SS-PSE population size estimation method used imputed network sizes and simulations using a burn-in period of 10,000 iterations and an interval of 1000 iterations. Population size estimates based on SS-PSE provided a mean population size estimation of 700 or .34% of the adult population.

All population size estimations

Ideally, the next step in trying to make sense of the different estimations is to conduct a meeting of FSW, experts and stakeholders involved in working with FSW, and those involved in conducting the surveys in order to assess possible violations of the methodology assumptions and errors data sources which could lead to over and underestimates. Based on previous estimates, the PWID population size in Chiang Mai is estimated to be close to 1500. If we accept all size estimations from this survey as parameters, we could accept the mean of the three calculations. This mean would be 1321 PWID, which is 0.64% of the adult population.

■ DISCUSSION AND RECOMMENDATIONS

Concentrated HIV epidemic among PWID in Chiang Mai.

PWID have high HIV prevalence, among which 23% are female and 24% are under the age of 25 years. Higher percentage of females, compared to males, are living with HIV (11% vs. 7%) and Similar percentages of young and adult PWID are living with HIV (7% vs. 8%). These findings are alarming and

9 Percentages are weighted using RDS Analyst

indicate an urgent need to scale up HIV prevention and intervention among PWID, with added focus on females and young PWID. Given that roughly one quarter of PWID reported sharing needles, syringes and equipment and have multiple sexual partner types and inconsistent condom use (66% did not use a condom at last sex in past month), further transmission of HIV is likely. Expansion of existing programs is needed to ensure that PWID have access to harm reduction and treatment.

High prevalence of Hepatitis C infection.

Twenty percent of PWID in Chiang Mai are living with HCV, of which 17% are female and 22% are under the age of 25 years. Higher percentages of females are living with HIV, compared to males (23% vs. 21%). Alarming, 18% of young PWID are living with HCV. PWID's continued sharing of needles and syringes (24% injected with needle or syringe after someone else had used it) syringes and injecting equipment (23% used injecting equipment after someone else used it) requires on going monitoring and an expansion of programs to prevent and treat HCV based on the WHO Guidelines for the screening, care and treatment of persons with HCV infection¹⁰. Ongoing sharing of needles, syringes and equipment indicate further spread of HCV.

Low screening for STI; Syphilis infection

Despite many PWID reporting possible signs and symptoms of an STI in the previous 12 months (28% reported intense pain/burning sensation during urination and 16% Sores or ulcers in the genital area), few have sought testing or screening in the past year (12%). Seven percentage of females who inject drugs and 10% of males who inject drug were found to have syphilis. Having STI that produce ulcers in the genital area increase the risk of HIV transmission during unprotected sexual intercourse. PWID friendly programs should provide on site screening and treatment of STI, as well as education about when to see testing and screening and how to avoid STI.

PWID in Chiang Mai are frequent and long term injectors.

Just under half of PWID injected in the previous week and three quarters have been injecting drugs for six years or more. Long term use and frequency of injecting drugs increases the risk of HIV and/or HCV transmission, as well as increased morbidity and mortality from complications of drug use. WHO recommends a comprehensive package of harm reduction which includes the expansion of needle and syringe programmes, drug dependence treatment with specific focus on opioid substitution therapy (OST), HIV testing and counselling (HTC), HIV treatment and care Information, education and risk reduction counseling, condom distribution and STI management and management of TB and viral hepatitis¹¹.

10 WHO Guidelines for the screening, care and treatment of persons with hepatitis C infection (updated version). 2016. Geneva, Switzerland. http://apps.who.int/iris/bitstream/10665/205035/1/9789241549615_eng.pdf.

11 WHO. See: <http://www.who.int/hiv/topics/idu/about/en/>.

Few PWID have received OST

Most PWID in Chiang Mai are injecting opioids (67% injected heroin in the previous six months). In addition, most PWID, especially young injectors, have tried to give up drugs in the previous six months. However, few PWID have ever had OST and only 6% are currently receiving OST. OST, a harm reduction initiative that offers people who are dependent on opioids (such as heroin) an alternative, prescribed medicine – most typically methadone or buprenorphine, which is swallowed rather than injected, is effective in helping PWID to cease or reduce their injection drug use and is recommended as part of a comprehensive package for the prevention, treatment and care of HIV among PWID¹². However, the treatment of injection drug use is a complex and multifaceted health problem which requires the development of comprehensive treatment programs which include engaging psychiatric, psychological and mental health care, social services (for housing and job skills/employment and, other specialist health care (such as services for HIV, HCV and other infections)¹³.

Females at high risk of HIV

Females comprise 16% of those injecting drugs in Chiang Mai. Female injectors tend to be more stigmatized, vulnerable and isolated than male injectors and may rely on male partners to buy drugs and injecting equipment for them. Indeed, females were more likely to have received their first injection from a sex partner. Higher percentages of females compared to males were found to be infected with HIV and HCV and were ever detained in a prison or detention centre. A lower percentage of females who inject drugs had an HIV test in the past 12 months and received test results or knows their test result. Worldwide, female injectors generally have a higher HIV prevalence than male injectors¹⁴. Harm reduction and treatment services for women who inject drugs should also address issues of violence, sexual abuse, depression, family planning, STI screening, sex work and care for family and children¹⁵. In addition, services should provide spaces and time accessible only to females, separate from males who inject drugs.

Consumption of different types of drugs.

PWID consume many different types of harmful and addictive drugs, most notably heroin and amphetamine. The most commonly injected drugs were heroin, amphetamine and methadone. Of 18% who reported injecting more than one drug simultaneously, most injected methadone, benzodiazepine and heroin. Drug treatment programs for heroin users should also screen and provide treatment for other drug use.

12 UNAIDS. Do No Harm: Health, Human Rights and People who use Drugs. Geneva, Switzerland; 2018 [Available from: https://www.unaids.org/sites/default/files/media_asset/donoharm_en.pdf

13 1.UNODC. International Standards for the Treatment of Drug Use Disorders. Vienna, Austria; 2017. Available from: https://www.unodc.org/documents/UNODC_WHO_International_Standards_Treatment_Drug_Use_Disorders_December17.pdf

14 Des Jarlais DC, Feelemyera JP, Modia SN, Arasteha K, Haganb H. Are females who inject drugs at higher risk for HIV infection than males who inject drugs: An international systematic review of high seroprevalence areas. *Drug and Alcohol Dependence*. 124 (2012) 95– 107.

15 UNODC. Global epidemiology of women and injecting drug use. Vienna, Austria; 2018. Available from: http://regist2.virology-education.com/2018/8Women/21_Ciupagea.pdf

PWID share syringes and needles and other injecting equipment.

About one quarter of PWID share needles and syringes and injecting equipment. Both HIV and HCV can survive for long periods of time on injecting materials allowing for ample opportunities for transmission among those who use materials previously used by others^{16,17}. Easy access to clean needles and syringes and other injecting equipment through many venues, including pharmacies, clinics, hospitals and harm reduction programs, is essential for reducing HIV and HCV transmission among PWID¹⁸.

High risk sexual practices

Most PWID are having sexual intercourse with multiple partner types, including paid and paying partners. PWID reported inconsistent condom use with 66% reporting not using a condom at last sexual intercourse. Among the 26% of males who reported having anal sex with a male, just under half did not use a condom at last anal sex. Sexual intercourse is an important route for HIV and other STI transmission. Sexual risk behaviors should be closely monitored among PWID.

HIV testing among PWID is low.

Only half of PWID have ever had an HIV test, of which under half did so in the past 12 months. Only 20% of PWID had an HIV test in the past 12 months and received their test results, with lower percentages of females having done so. Increasing the percentage of PWID who seek HTC could be addressed by increasing awareness about the importance of being tested and the availability of HIV testing locations, promoting existing services, with additional training for counselors on how to receive and provide quality HTC services for PWID, having more 'PWID friendly' HTC settings, and relaxing the policy that only medical doctors can provide pre and post-test HIV counselling.

HCV testing among PWID is low.

Despite the high association of injection drug use with HCV, few PWID in Chiang Mai have ever had an HCV test. HCV testing as well as strategies for infection management and treatment should be explored. Given that so many PWID were HCV positive in this survey, any PWID seeking HTC should also be tested and receive counseling and education for HCV.

PREP and PEP

HIV PrEP and PEP are evidence-based interventions that reduce HIV incidence among PWID. However, uptake in PWID has lagged due to limited PrEP and PEP knowledge, discrepancies between perceived and actual HIV risk, stigma, and structural barriers to adherence including homelessness and incarceration¹⁹. Under 20% of PWID in Chiang Mai have heard of PrEP or PEP and none have taken either in the previous three months. Provision of PrEP and PEP to PWID should be explored.

16 Accessed on June 15, 2012 at: http://www.aidsinfonet.org/fact_sheets/view/154.

17 Thibault V et al. Hepatitis C transmission in injecting drug users: could swabs be the main culprit? *J Infect Dis*, online edition, doi: 10.1093/infdis/jir650

18 European Monitoring Center for Drugs and Addiction. Harm reduction interventions for opioid injectors. Accessed at: <http://www.emcdda.europa.eu/best-practice/harm-reduction/opioid-injectors>.

19 Taylor JL, Walley AY, Bazzi AR. Stuck in the window with you: HIV exposure prophylaxis in the highest risk people who inject drugs. *Subst Abus*. 2019;441–3.

Access to HIV prevention

Under one quarter of PWID have received clean needles and syringes, 41% received condoms and 15% received lubricants in the previous 12 months. Only 50% of those who received clean needles and syringes, received them from an outreach worker or peer educator. Almost 50% of PWID reported receiving education on condom use, safe sex and HIV in the previous year, however, under 35% received education related to injection drug use (i.e., cleaning needles/safe injection, overdose prevention, OST/MMT/other treatment). Provision of clean needles and syringes, condoms and lubricants and education on HIV prevention are an essential components of harm reduction. Expansion of outreach and NGO drop-in services are needed to ensure PWID have access to a full range of harm reduction services.

PWID population sizes of PWID

There were some limitations to the population size estimation calculations. It is unclear whether the program data reported unique PWID who accessed methadone or HIV testing during the specific time period. Double counting could lead to underestimations. If we are to take the mean size estimation as relatively accurate, considering previous knowledge of the size of the population, there may be roughly 2600 PWID in Chiang Mai. Of those, 16% or 416 are considered to be female. Population size estimates are useful for deciding how and where resources should be allocated for better program planning and management.

■ SUMMARY OF KEY RECOMMENDATIONS

Strategic Information and population size estimation

- Continue to collect strategic information to monitor HIV transmission and related behaviors, including among young and female PWID.

Access to services

- Scale-up OST, harm reduction and effective treatment programs and increase the number of NSP and OST programs in Chiang Mai.
- Improve existing treatment programs: The currently available evidence strongly supports OST, combined with psychosocial assistance for keeping PWID in treatment.
- Continue to scale up harm reduction, including provision of clean needles and syringes and HIV prevention education.
- Increase HIV testing, especially for females who inject drugs, by scaling up HTC services that treat PWID with dignity and respect.
- Make use of the knowledge that PWID constitute a large social network (as confirmed by the effective recruitment of PWID in this study) to deliver prevention through peer driven intervention modalities.

- Investigate and implement the best practices for PWID targeted programs to provide HIV and harm reduction education, effective drug treatment and maintenance modalities, condom distribution and easy access to needles to reduce the spread of HIV.
- Continue to enhance formal guidelines and interventions for hepatitis prevention and management of both hepatitis and hepatitis-HIV co-infection among PWID.
- Develop strategies to scale up programs to provide HCV and harm reduction education to PWID.
- Integrate prevention and screening of HIV and HCV among PWID at public health centers.
- Educate health staff to improve prevention services targeting high risk populations, especially PWID.
- Educate pharmacists to the needs of PWID and allow PWID to access clean syringes at pharmacies.
- Educate condom providers (shops, stores, etc.) about the needs of PWID, to encourage PWID to use and purchase condoms.
- Evaluate the scale up of PrEP and PEP for PWID.
- Enhance youth programs to include healthy lifestyle choices and support for young people who may be vulnerable to drug use and injecting.
- Increase outreach efforts/policy changes, including reducing stigma and discrimination related to PWID.
- Increase education about drug use and HIV and HCV risk to youth and allow harm reduction and outreach to young people, which is currently stymied because of parental consent requirements.
- Use the population size estimations of PWID to better plan and allocate resources for prevention and intervention programs.

APPENDIX

	Chiang Mai n=300	
	n	95% CI
Had contact with any of the following		
Ozone Chiang Mai Drop in center	8	2.8 (0.9, 4.5)
Ozone Chiang Mai Outreach workers	5	1.7 (0.3, 3.0)
TDN Chiang Mai Drop in center	24	7.3 (0.3, 3.0)
TDN Chiang Mai Outreach workers	24	7.4 (4.9, 9.9)
Herbal Life Chiang Mai Drop in center	11	3.6 (1.8, 5.4)
Herbal Life Chiang Mai Outreach workers	7	2.0 (0.7, 3.5)
Times having contact with in past 3 months		
Ozone Chiang Mai Drop in center	8	1.6, 1.0 (1.0, 3.0)
Ozone Chiang Mai Outreach workers	5	1.2, 1.0 (1.0, 2.0)
TDN Chiang Mai Drop in center	23	1.7, 1.0 (1.0, 5.0)
TDN Chiang Mai Outreach workers	22	1.5, 1.0 (1.0, 5.0)
Herbal Life Chiang Mai Drop in center	11	2.5, 2.0 (1.0, 6.0)
Herbal Life Chiang Mai Outreach workers	6	1.7, 1.5 (1.0, 3.0)
Times having contact with in the past 12 months		
Ozone Chiang Mai Drop in center	8	2.3, 1.5 (1.0, 5.0)
Ozone Chiang Mai Outreach workers	5	1.2, 1.0 (1.0, 2.0)
TDN Chiang Mai Drop in center	23	3.3, 2.0 (1.0, 9.0)
TDN Chiang Mai Outreach workers	21	2.3, 2.0 (1.0, 6.0)
Herbal Life Chiang Mai Drop in center	11	4.6, 4.0 (1.0, 9.0)
Herbal Life Chiang Mai Outreach workers	6	2.3, 2.0 (1.0, 4.0)

