

**Assessment of the health and experiences of people who inject drugs in Maricopa County,
Arizona**

Maricopa County Department of Public Health

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In loving memory of P. R. P.
(Assessment Field Site Staff, 1980 – 2019)
“Life is so important and good..”

Introduction

People who inject drugs (PWID) are at risk for numerous injection-related injuries and diseases including human immunodeficiency virus (HIV), hepatitis C virus (HCV), abscesses, vascular damage, endocarditis, sepsis, bone and joint infections, thrombosis, and emboli.¹⁻³ Estimating the size of this vulnerable and hard-to-reach population is challenging due to the illicit nature of the behavior and the fact that administrative datasets such as hospital discharge and death certificate data do not include specific codes for injection drug use. Similarly, understanding the health needs of this population is difficult because many are disconnected from health and social service systems.

This assessment provides an overview of the demographics, health conditions, and other characteristics of PWID in Maricopa County (MC) and attempts to estimate the total size of the population. This is the first assessment of its kind in MC, a diverse jurisdiction in central Arizona that includes more than 4 million people. To identify an assessment method that is scientifically sound that could also be effectively implemented in our local context, we conducted formative research through a literature review and feasibility study in collaboration with stakeholders. This report outlines the findings from our formative research and the methods and results of our 2019 assessment.

Formative research

Literature Review

To identify and evaluate potential methods for estimating the number of PWID in Maricopa County, we conducted a systematic review of peer-reviewed and “grey” literature. We conducted a systematic search that included five peer-reviewed literature databases, several sources of grey literature, and relevant conference abstracts. We identified a total of 29 unique studies that estimated the prevalence or incidence of PWID in a county or equivalent geography and reported on both estimate(s) and methods. We abstracted data into a standard database detailing the study location, date, data sources, and analytic approach. Since our objective was to both quantify the population size and assess the health of PWID, we focused on approaches that lent themselves to both population estimation and primary data collection.

The most commonly reported methods in our review were capture-recapture (15 studies) and multiplier methods (11 studies). Other identified methods included a population-based survey, literature reviews, wisdom-of-the-crowd estimates, and direct estimation from respondent-driven sampling survey designs. Sixteen studies employed some form of primary data collection. Recruitment for these surveys was most frequently done through respondent-driven sampling or community partners such as syringe exchanges.

Respondent driven sampling (RDS) was most frequently used in assessments that quantified population size and collected primary data. RDS is a peer-recruitment method used frequently to survey the health of hard-to-reach populations where a few initial “seeds” are given a small number of coupons that they can use to recruit acquaintances in the population of interest. Coupons are marked with a unique identification number that can be used to track who recruited whom. Each participant is interviewed and reports their network degree, and participants receive incentives for participation and recruitment. This process generates a sample of the population of

interest in the absence of a sampling frame and is particularly useful when the population of interest is small and/or disconnected relative to the general population. Estimation of population prevalence for various indicators of interest can be done using a mathematical model that weights the sample to compensate for the fact that the sample was collected in a non-random way. While analysis of data collected through RDS requires statistical methods to account for the complex sampling design, several widely accessible tools exist to assist with analysis.¹

Methods to directly estimate total population size from the characteristics of the RDS network have been introduced in recent years.^{8,9} These methods take advantage of the recruitment chain and network size information, leveraging the assumption that those with larger networks tend to be sampled earlier in the recruitment process. An additional advantage of RDS over other methods for estimating population size (such as capture-recapture) is the ability to incorporate primary data collection, in the form of a survey or interview, into the process. Most RDS studies we reviewed did this, focusing on themes including:

- General demographics
- HIV and hepatitis testing history
- History of drug use including current use, past use, and initial age of use
- Sexual health and behaviors
- History of drug treatment
- Perceptions on risk and treatment
- Service access (particularly if the service is a dataset being used by a multiplier)
- Incarceration history
- Network size

Feasibility Study

After identifying RDS as the optimal method for participant sampling and recruitment, we developed a preliminary assessment proposal including survey methods and a questionnaire. Using these materials as a starting point, we conducted in-depth interviews with seven categories of stakeholders: people who inject drugs (current or former); family members of people who inject drugs; organizations that provide services to people who inject drugs; advocacy groups; law enforcement; local public health practitioners; and academicians and subject matter experts. Stakeholders were initially contacted by email to describe the proposed project and were invited to discuss the project. Interviews were approximately one hour in length and most were conducted in person at the Maricopa County Department of Public Health (MCDPH) Office of Epidemiology (n=12), but other options were available for convenience (i.e., by phone, n=0; at locations selected by the interviewee, n=2). Interviewees were provided (1) a draft summary of the proposed methods and logistics for estimating the number of people who inject drugs and (2) a draft of the proposed survey. We used a standard set of core questions plus supplemental questions tailored to each stakeholder's subject matter expertise.

¹ Volz, E.; Wejnert, C.; Cameron, C.; Spiller, M.; Barash, V.; Degani, I.; and Heckathorn, D.D. 2012. Respondent-Driven Sampling Analysis Tool (RDSAT) Version 7.1. Ithaca, NY: Cornell University

Overall, stakeholders were positive about the project, and all had previously recognized the need for data regarding the experience of PWID in MC. Several themes emerged across the interviews. All centered around ensuring the process was set up to maximize engagement and avoid stigma:

- Questions should not be stigmatizing, and phrases such as sexual partner or questions referring to buying drugs and stealing may be offensive or off-putting. These subjects may be dealt with, but gently, as these and many other questions may be perceived as stigmatizing.
- The mental health, housing and medical portions of the survey may need to have expanded options to capture variety in responses. Some of these questions may be open-ended. Questions about identity should also be more open-ended.
- Clear and simplified language should be used. For drug terms, this includes street terms regarding drug usage. This also includes clarifying in the reverse; that participants may know medical terminology rather than slang. It is better to include more terms rather than fewer and have more options rather than less on the drugs listed and the drug terminology.

Assessment Methods

Participant recruitment and eligibility

Eligible participants were recruited using respondent-driven sampling (RDS). RDS is a form of snowball sampling where a small number of “seeds” (5–8 persons) are located, enrolled, and asked to recruit up to five of their contacts who inject drugs. The individuals recruited by the initial seeds then recruit eligible individuals within their networks, and this recruitment chain continues until the preferred sample size is reached. Participants recruit their peers by giving them a coupon that provides information on how to participate and complete the survey. Eligible individuals are aged 18+ years, have injected drugs for non-medical purposes at least once in the last 30 days, and live primarily in Maricopa County. The Arizona Department of Health Services Human Subjects Review Board reviewed the protocol and determined this assessment to be limited risk to participants. All participants provided informed consent verbally prior to beginning the survey.

Data collection

Field sites

Once recruited, individuals brought their coupons to a field site to complete a questionnaire about their health behaviors and experiences. Field sites were operational 7 days per week at sites around Maricopa County and co-located at venues where PWID regularly go such as substance use treatment facilities. Sites offered both day time and evening hours depending on the day of the week and were staffed by at least three individuals during all hours of operation. All sites included semi-private areas for participant consent and assessment completion. The first field site was opened for accepting coupon recipients on Tuesday, 2/12/19. The first seed arrived on Sunday, 2/17/19.

Recruitment and Incentive Information

Participants had to present a valid coupon to take the survey, which included an ID number that could be linked to the ID number of the person who recruited them. No identifiable information was collected from participants, however we identified potential duplicate responses using a unique code consisting of the first two letters of the participant's mother's first name, the day the participant was born, the first two letters of the participant's first name, the month the participant was born, and the first two letters of the city the participant was born in. This code along with the coupon number, gift card information, and coupons given out was stored in the RDS Coupon Manager Software². Participants received a \$20 gift card incentive for completing the survey and \$5 gift card for each successful recruit. All coupon and incentive information was tracked in a paper logbook as backup.

Questionnaire

Participants completed the questionnaire using Qualtrics software installed on a tablet. The questionnaire was self-guided but field staff were nearby to answer questions. Question topics included substance use patterns, medical history, substance use and other treatment, demographic and economic factors, experience of trauma, mental health, and injection practices. The complete questionnaire was reviewed by participants in the feasibility study including service providers, health professionals, and people who inject drugs. Field staff ensured the coupon number was recorded in Qualtrics to link survey and recruitment information.

Data Management and Analysis

Survey responses and coupon management data were exported from Qualtrics and RDS Coupon Manager, respectively. The two data sources were joined by the respondent's coupon ID number using SAS Enterprise (Version 7.15) and reconciled against the paper log book. Surveys that were duplicates (identified based on the participant's unique ID), that took only a few minutes, or that used an invalid coupon ID number were removed from analysis.

Some participants did not report a network size. Because network size is necessary to calculate population frequency estimates, we imputed mean network size for these individuals based on the sample distribution, with a minimum imputed network size for any individual set as the number of their recruits. For other variables, missing data were coded as a missing indicator.

Recruitment Diagnostics

We used the RDS Analyst program to map the recruitment network and calculate diagnostic information: network size by wave, number of recruits by wave, recruits per seed, and recruits per subject. The source population for the network information was all individuals who took the survey using a valid coupon, to maintain the integrity of the recruitment chains.

We calculated recruitment homophily for the sample using RDS Analyst. Recruitment homophily measures the tendency for individuals to recruit others who are similar to them with respect to a particular characteristic. Values close to one suggest low levels of homophily. We calculated this measure for key demographic variables including age, sex, and ethnicity as well as needle sharing practices.

² Available at: <http://www.respondentdrivensampling.org/>

Descriptive Analysis

We calculated crude frequencies and weighted and unweighted population prevalence (percentages) for key variables. Population prevalence estimates were limited to responses from eligible participants. Participants were eligible if they reported they were at least 18 years old, had injected drugs for a non-medical purpose in the last 30 days, and primarily lived in Maricopa County, Arizona. In order to participate, eligible participants also had to confirm that they had not taken the survey before and consent to participate. To calculate weighted percentages and 95% confidence intervals we used Gile's Successive Sampling estimator in RDS Analyst. We used 29,716 as the estimated population size throughout our analysis.³

Assessment Results

Recruitment and Eligibility

A total of 765 responses were submitted through Qualtrics, and 725 entries registered in RDS Coupon Manager. These two data sources represented 720 individuals who had a valid coupon, 672 of whom were eligible and included in analysis.

The recruitment network is presented in Figure 1. Of the six seeds initially identified, three failed to yield any recruits. Four additional seeds were identified over the course of recruitment. Nearly all recruits (n=693) could be traced back to one seed (Figure 1 and Table 1). There were a total of 22 waves of recruitment, waves 11-14 included the largest numbers of participants (Figure 2).

Survey Findings

Sample and population summary findings for key survey questions presented in Tables 2-16. Selected findings are highlighted in the narrative below.

Demographic, Social, and Economic factors

Demographics of eligible respondents and corresponding population prevalence estimates are presented in Table 2. PWID in MC are more likely to be male than female. Most of both men (84.6%) and women (69.9%) identify as straight. Unemployment, housing instability, and justice involvement are common in this population: Nearly half (48.5%) report unemployment and 37.7% report incarceration within the last month. An estimated 68% of PWID report homelessness at some point in their life, nearly half (47.9%) in the past year (Table 3). The majority of respondents came from the Central region of the county, a pattern which is relatively consistent with the population distribution overall.

Health Conditions and Treatment

Table 4 presents the prevalence of and treatment for selected health conditions. Abscesses were the most common health condition, reported by an estimated 27.8% of the population. Other conditions including staph infection, pneumonia, and cellulitis occurred in at least 10% of the population. Nearly 20% of PWID are estimated to be infected with hepatitis C virus, and less

³ Tempalski B, Pouget ER, Cleland CM, Brady JE, Cooper HL, Hall HI, Lansky A, West BS, Friedman SR. Trends in the population prevalence of people who inject drugs in US metropolitan areas 1992-2007. PLoS One. 2013 Jun 5;8(6):e64789.

than half of those infected reported treatment. Trauma and mental health concerns were also prevalent, with more than half the population reporting four or more adverse childhood experiences and 41% reporting a diagnosis of depression (Table 7). Additionally, 42% thought seriously about taking own life, and among those about 69% had attempted.

Drug Use, Overdose, and Naloxone

Heroin and methamphetamines were the drugs most frequently injected, with over half the population reporting use in the last month (Table 8). While 32.1% of PWID have witnessed an opioid overdose in the last year, only half reported knowing how to use naloxone (Table 10). Community organizations and peers were the most frequently reported sources of education about how to use naloxone.

Treatment and Syringe Access

About a quarter of the population had substance abuse treatment within the past year (Table 11). Nearly a third reported that they wanted treatment but were unable, with the most frequent reason reported being individuals not being ready to stop using. Less than two-thirds of participants (63.4%) accessed new, sterile needles in the past month (Table 12), while 35.3% reported never injecting with a previously used needle (Table 13). Forty-four percent reported never giving, lending, or renting one of their needles to someone else.

Discussion

Limitations

Our assessment faced challenges with recruitment that could limit the generalizability of inferences. The majority of participants were recruited from a single seed. However, participants were successfully recruited across 22 waves, suggesting that we were able to reach relatively deep into a network of PWID. Additionally, we observed low levels of homophily for sex, ethnicity, and needle sharing, with values close to 1 (data not shown). This suggests that the tendency of the sample was not necessarily to recruit others like them with respect to these characteristics. Most participants came from the central part of the county, in and around downtown Phoenix. While this is not inconsistent with the population distribution of Maricopa County it does suggest that our data might not be representative of the county geographically.

There was a large amount of missing data for many questions. We used a missing indicator in an effort to produce the most conservative estimates. For indicators such as the prevalence of disease or an inability to access treatment, we expect the true prevalence to be at least as high as the estimates we report, if not higher.

In addition to assessing and describing the health of PWID, the intention of this assessment was also to produce an updated estimate of population size using methods that leverage the respondent-driven sampling network information. However, we faced substantial challenges to the integrity of the RDS method including having to remove a number of ineligible individuals from the dataset and the fact that most participants came from the recruitment chain of a single seed. Therefore, we determined that a population size estimation using methods that leverage the

RDS network, such as the Successive sampling-population size estimation (SS-PSE) estimator, was not appropriate for this assessment. We instead used the previously published population size estimate of 29,716 in our analysis.

Conclusion

This assessment provides important and actionable insight into the health and experiences of PWID in Maricopa County. For example, while many infections reported by PWID were relatively well treated, reports of treatment for hepatitis C were relatively low. We observed high levels of housing instability, incarceration, and unemployment. These and other findings can provide guidance to public health agencies, healthcare, and social service providers on how to most effectively engage PWID.

Figure 1. Recruitment network for respondent-driven sampling, people who inject drugs, Maricopa County, 2019

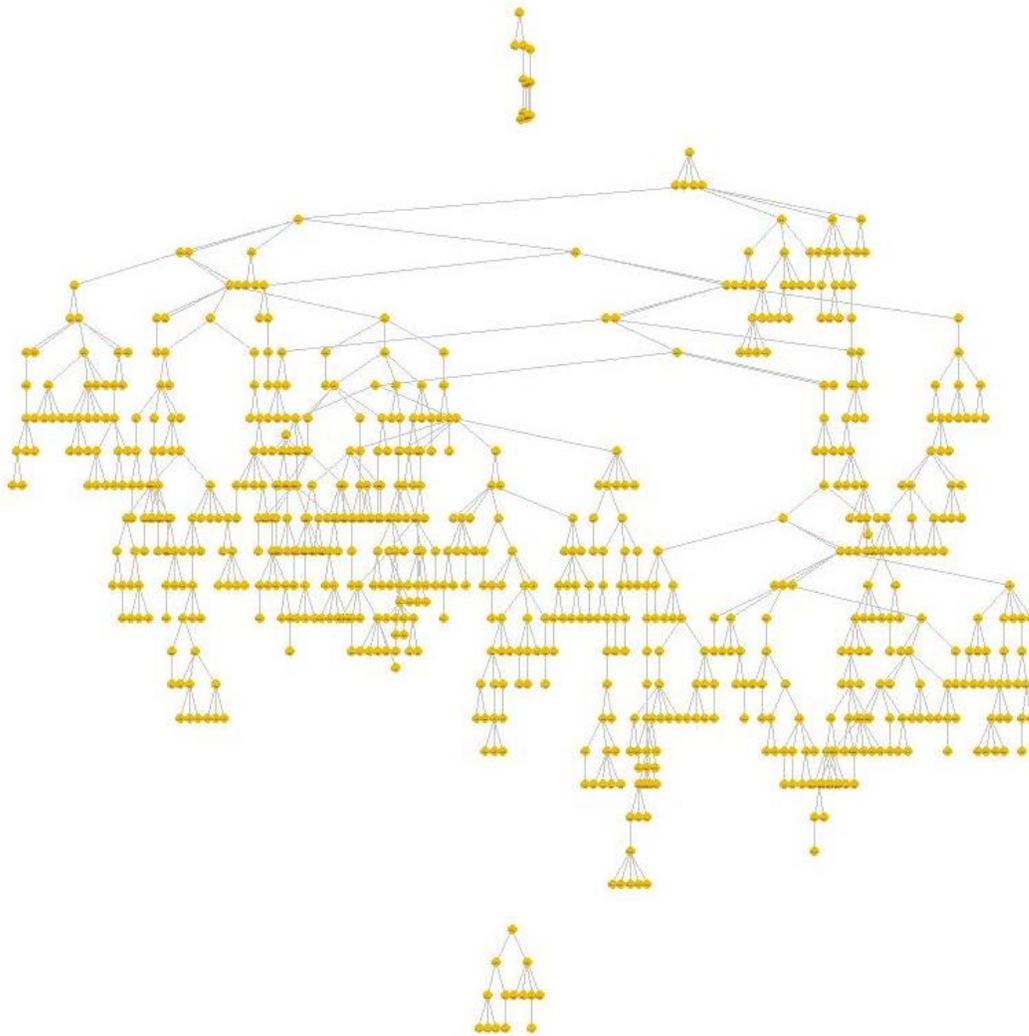


Table 1. Number of recruits per seed, respondent-driven sample of people who inject drugs, Maricopa County, 2019

Seed Number	Number of recruits
19001	3
19002	1
19006	693
19247	14
20403	2
20453	2
20467	5

Note: Three additional seeds (19003, 19004, 19005) did not yield any participants

Figure 2a. Number of participants per wave, respondent-driven sample of people who inject drugs, Maricopa County, 2019 (Left: Full Sample, N=725; Right: Eligible participants, N=672)

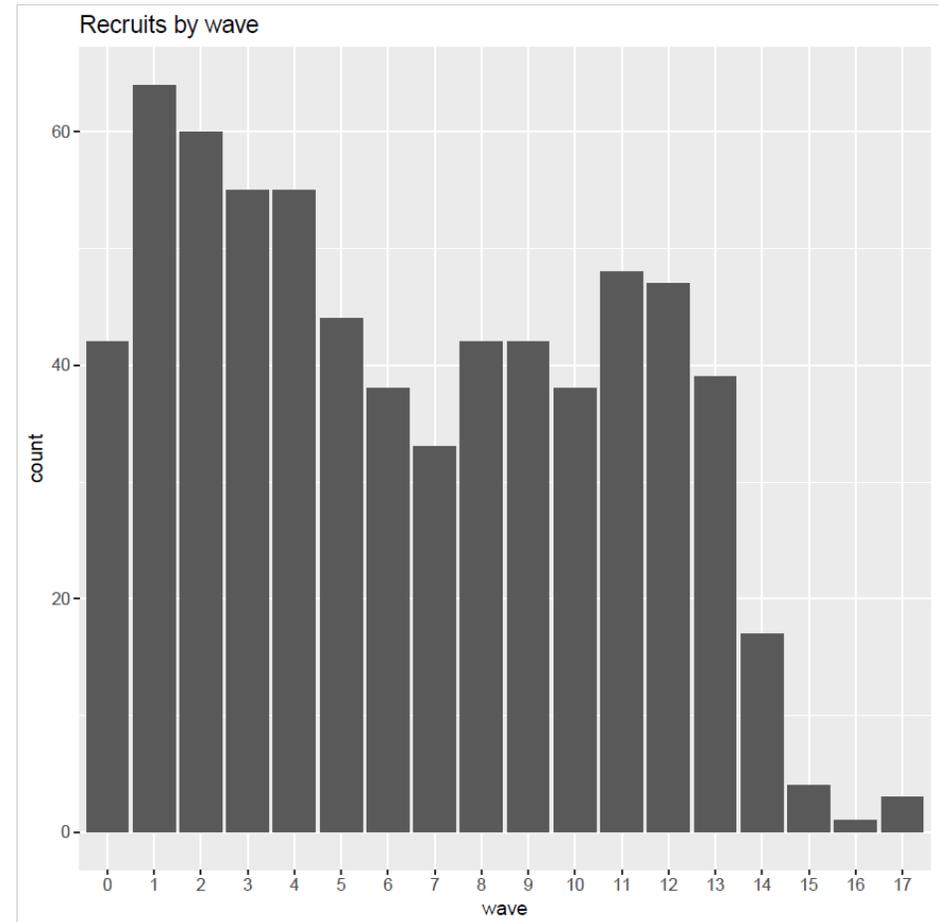
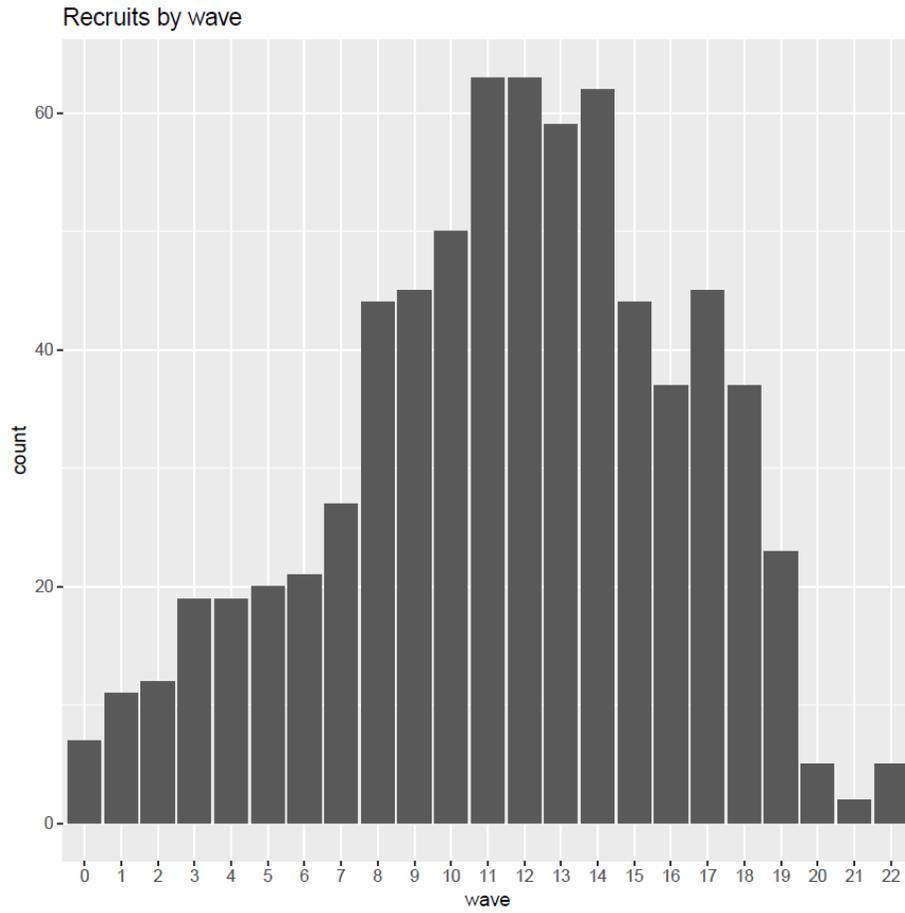


Table 2. Sample and population demographics, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95% CI)</i>
Age groups		
18 – 25	55 (8.2)	9.3 (4.8, 13.9)
26 – 35	208 (31.0)	32.0 (26.1, 37.8)
36 – 45	167 (24.9)	24.7 (19.4, 13.1)
46 – 55	162 (24.1)	22.4 (17.4, 27.3)
56 – 65	74 (11.0)	11.0 (7.1, 14.8)
> 65	6 (0.9)	0.6 (0.1, 1.1)
Gender		
Female	222 (33.0)	36.8 (30.6, 42.9)
Male	372 (55.4)	62.8 (56.6, 68.9)
Intersex / ambiguous	<5 N/A	NA
Transgender		
Male to Female	10 (1.5)	2.8 (0.2, 5.8)
Female to Male	10 (1.5)	1.3 (0.3, 2.2)
Gender nonconforming	<5 N/A	NA
Sexual identity, women		
Straight women	147 (66.2)	69.9 (61.2, 78.5)
Bisexual women	51 (23.0)	18.3 (12.0, 24.5)
Lesbian women	15 (6.8)	8.0 (2.2, 13.9)
Other identity (e.g., pansexual), women	<5 N/A	NA
Sexual identity, men		
Straight men	332 (89.3)	84.6 (77.1, 92.0)
Bisexual	18 (4.8)	5.5 (1.2, 10.0)
Gay men	9 (2.4)	3.1 (0.4, 6.5)
Other identity (e.g., pansexual), men	5 (1.3)	2.0 (0.3, 4.3)
Race, Hispanic, Latino/a, Spanish origin		
American Indian or Alaska Native	12 (9.0)	11.2 (1.9, 20.3)
Asian	<5 N/A	NA
Black or African American	9 (6.7)	8.3 (2.5, 18.9)
Native Hawaiian or Other Pacific Islander	7 (5.2)	NA
White or Caucasian	46 (34.3)	36.7 (23.7, 49.9)
Other race	47 (35.1)	28.5 (15.7, 41.3)
Race, Non-Hispanic, Latino/a, Spanish origin		
American Indian or Alaska Native	42 (9.5)	10.3 (5.7, 14.9)
Asian	<5 N/A	NA
Black or African American	120 (27.2)	31.8 (24.4, 39.1)
Native Hawaiian or Other Pacific Islander	<5 N/A	1.0 (0.2, 2.3)
White or Caucasian	275 (62.4)	56.3 (49.2, 63.6)
Other race	16 (3.6)	3.1 (1.3, 5.0)
Region of Residence		
Central	396 (58.9)	54.0 (46.9, 61.0)
West	19 (2.8)	2.4 (1.1, 3.7)
North	39 (5.8)	5.5 (3.1, 8.0)
South	89 (13.2)	14.0 (8.4, 19.6)

Table 3. Sample and population education, occupation, housing, justice-involvement, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95% CI)</i>
Highest grade or level of school		
Never attended/Kindergarten Only	<5 NA	3.2 (1.1, 5.3)
1st-8th	22 (3.3)	17.2 (12, 22.2)
9th-11th	110 (16.3)	32.6 (27.1, 38.2)
12 th grade or GED	213 (31.7)	19.5 (15.3, 23.8)
Some college, no degree	153 (22.8)	5.8 (3.5, 8.1)
Associate's degree	41 (6.1)	3.7 (1.7, 5.8)
Technical degree	25 (3.7)	2.2 (1.1, 3.2)
Bachelor's degree	20 (3.0)	3.0 (0.1, 5.8)
Any post-graduate studies	13 (1.9)	3.2 (1.1, 5.3)
Employment status		
Employed, full-time	56 (8.3)	9.5 (5.6, 13.3)
Employed, part-time	47 (7.0)	6.9 (3.6, 10.2)
A homemaker	18 (2.7)	3.3 (1.2, 5.4)
A full-time student	15 (2.2)	2.0 (0.6, 3.4)
Retired	19 (2.8)	2.9 (1.4, 4.3)
Unable to work for health reasons	72 (10.7)	10.5 (7.2, 13.9)
Unemployed	338 (50.3)	48.5 (42.4, 54.4)
Other	21 (3.1)	2.4 (1.0, 3.8)
Veteran of the US Armed Forces	47 (7.0)	6.2 (4.1, 8.3)
Homelessness		
Ever	483 (71.9)	68.0 (62.6, 73.5)
Past 12 months	360 (53.6)	47.9 (41.8, 53.9)
Current	314 (46.7)	42.4 (36.1, 48.8)
Jail, at least one night, past month	267 (39.7)	37.7 (32.2, 43.2)

Table 4. Sample and population physical health, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted		Estimates for all people who inject drugs in Maricopa County	
Total	672			
Self-reported health conditions	Condition	Treatment received	Condition	Treatment received
	<i>n (%)</i>	<i>n (%)</i>	<i>% (95%CI)</i>	<i>% (95%CI)</i>
Abscesses	218 (32.4)	188 (86.2)	27.8 (22.7, 33.1)	85.4 (78.6, 91.0)
Hepatitis C virus (HCV)	163 (24.3)	67 (41.1)	19.5 (14.3, 24.8)	41.9 (28.1, 55.9)
Cellulitis	129 (19.2)	101 (78.3)	14.7 (10.6, 18.9)	80.2 (69.9, 89.9)
Pneumonia	118 (17.6)	98 (83.1)	13.7 (9.3, 18.1)	80.3 (65.3, 95.2)
Staph infection or MRSA	115 (17.1)	99 (86.1)	15.2 (10.6, 20.0)	90.7 (84.3, 97.0)
Chlamydia	72 (10.7)	65 (90.3)	8.3 (5.6, 10.9)	88.5 (75.7, 101.1)
Blood infection or sepsis	63 (9.4)	39 (61.9)	6.2 (4.2, 8.2)	56.8 (41.2, 73.1)
Gonorrhea	57 (8.5)	46 (80.7)	8.0 (5.2, 10.7)	77.9 (64.6, 91.4)
Blood clots	50 (7.4)	27 (54.0)	6.0 (3.4, 8.6)	52.2 (32.4, 72.2)
Genital warts or HPV	33 (4.9)	21 (63.6)	4.0 (1.9, 6.0)	70.6 (50.9, 91.2)
Tuberculosis (TB)	32 (4.8)	21 (65.6)	3.8 (2.1, 5.4)	67.4 (44.7, 90.7)
Endocarditis	31 (4.6)	17 (54.8)	2.3 (1.2, 3.4)	54.1 (32.4, 75.1)
Syphilis	28 (4.2)	22 (78.6)	3.0 (1.4, 4.6)	71.4 (48.5, 95.6)
Cirrhosis of the liver	25 (3.7)	10 (40.0)	2.4 (1.2, 3.7)	40.6 (18.4, 63.4)
Hepatitis B virus (HBV)	21 (3.1)	8 (38.1)	2.2 (0.8, 3.6)	30.0 (6.5, 53.9)
Tetanus, botulism, or necrotizing fasciitis	19 (2.8)	12 (63.2)	1.8 (0.08, 2.8)	52.0 (26.9, 75.9)
Genital herpes	18 (2.7)	9 (50.0)	2.0 (0.9, 3.0)	45.7 (17.8, 75.0)
HIV or AIDS	10 (1.5)	8 (80.0)	2.5 (0.4, 4.6)	95.3 (82.9, 107.2)
Liver cancer	8 (1.2)	<5 N/A	27.8 (22.7, 33.1)	NA

Table 5. Sample and population Hepatitis C and HIV infection, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
HIV		
Ever tested	421 (62.7)	61.2 (55.2, 67.1)
Self-reported HIV or AIDS	10 (1.5)	2.5 (0.3, 4.7)
First diagnosis within past year	<5 N/A	NA
Received treatment	8 (80.0)	95.3 (84.5, 106.3)
Never tested for HIV, reasons	251	
Don't have the time	25 (13.7)	15.1 (7.3, 23.0)
Low risk for HIV infection	19 (10.4)	6.2 (2.4, 9.9)
Afraid	14 (7.7)	3.2 (1.1, 5.3)
Did not want the test results reported to insurance provider	10 (5.5)	2.7 (0.4, 4.9)
Too expensive	7 (3.8)	3.2 (0.5, 5.9)
Other	26 (14.2)	8.9 (4.3, 13.4)
Hepatitis C virus (HCV)		
Ever tested	436 (64.9)	61.6 (55.8, 67.5)
Self-reported HCV	163 (24.3)	19.5 (14.8, 24.3)
First diagnosis within past year	37 (22.7)	18.0 (10.1, 25.9)
Received treatment	67 (41.1)	42.1 (28.6, 55.1)

Table 6. Sample and population mental health status and trauma, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Self-reported mental health conditions		
Depression, bipolar disorder, or anxiety disorder	310 (46.1)	41.0 (34.4, 47.7)
Treatment received	241 (77.7)	80.6 (73.7, 87.2)
Thought seriously about taking own life		
Attempted to commit suicide	195 (68.9)	26.7 (21.7, 31.7)
Adverse Childhood Experiences Score		
0	122 (18.15)	20.2 (15.6, 24.8)
1	52 (7.74)	7.8 (4.9, 10.7)
2	55 (8.18)	9.24 (6.0, 12.5)
3	59 (7.78)	9.8 (5.9, 13.7)
4 or more	384 (57.14)	53.0 (46.7, 59.4)

Table 7. Sample and population access to healthcare, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Seek health advice from a primary source	354 (52.7)	51.9 (43.6, 60.1)
Emergency room at a hospital	182 (51.4)	45.5 (36.7, 54.2)
Urgent care facility	141 (39.8)	38.2 (29.7, 46.6)
Clinic or health center	116 (32.8)	26.5 (19.0, 33.9)
Doctor's office or HMO	104 (29.4)	12.1 (7.6, 16.8)
Community organization that is not a healthcare facility	49 (13.8)	6.5 (3.4, 9.7)
Some other place	29 (8.2)	
Last routine checkup		55.4 (49.7, 60.9)
Within the past year	334 (49.7)	16.6 (12.4, 20.8)
More than 1 year, less than 2	122 (18.2)	9.7 (6.3, 13.15)
More than 2 years, less than 5	69 (10.3)	5.4 (3.2, 7.6)
5 or more years	47 (7.0)	45.6 (39.6, 51.7)
No health care coverage in the past year	303 (45.1)	51.9 (43.6, 60.1)
Delays in getting needed medical care, past year, reasons		
<i>Have not delayed care</i>	191 (28.6)	45.6 (39.6, 51.7)
Didn't have transportation	160 (23.9)	21.3 (16.3, 26.4)
Treated poorly by medical staff in past because of my drug use	147 (22.0)	16.8 (12.3, 21.4)
Couldn't get an appointment soon enough	114 (17.0)	16.5 (12, 20.8)
Embarrassed to seek medical care	110 (16.4)	12.7 (8.9, 16.6)
Once there, had to wait too long to see the doctor	96 (14.4)	14.1 (10.2, 18.0)
Couldn't get through on the telephone	75 (11.2)	11.9 (7.6, 16.2)
Clinic/doctor's office wasn't open when I could get there	30 (4.5)	3.4 (1.9, 5.4)

Table 8. Sample and population history of drug use, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Age at first injection		
< 15 years	37 (5.5)	4.7 (1.4, 8.0)
15 – 18 years	103 (15.3)	13.5 (9.7, 17.3)
19 – 21 years	110 (16.4)	18.1 (12.9, 23.4)
22 – 25 years	114 (17.0)	18.8 (14.0, 23.5)
26 – 30 years	96 (14.3)	13.7 (9.9, 17.5)
31 – 35 years	80 (11.9)	12.2 (8.5, 15.9)
> 35 years	88 (13.1)	12.3 (8.9, 15.6)
First drug injected		
Heroin	268 (39.9)	39.0 (32.8, 45.2)
Amphetamine or methamphetamine	182 (27.1)	29.2 (23.5, 35.0)
Cocaine	113 (16.8)	14.8 (11.1, 18.5)
Any opioid other than heroin	23 (3.4)	4.6 (1.4, 7.8)
A mixture (or polysubstance)	11 (1.6)	1.1 (0.26, 1.95)
Benzodiazepine	<5 NA	NA
Prescription stimulants	<5 NA	NA
Other	16 (2.4)	3.0 (1.4, 4.7)
Time between first drug use and first injection		
< 1 year	157 (23.4)	21.2 (16.9, 25.4)
1 – 2 years	122 (18.2)	19.2 (14.5, 23.8)
3 – 5 years	136 (20.2)	23.1 (17.8, 28.4)
6 – 10 years	84 (12.5)	12.7 (8.2, 17.4)
> 10 years	102 (15.2)	13 (8.8, 17.3)
Drug of choice		
Heroin	169 (25.2)	19.2 (14.6, 23.6)
Amphetamine or methamphetamine	62 (9.2)	7.7 (5.0, 10.5)
Cocaine	14 (2.1)	1.3 (0.4, 2.2)
Any opioid other than heroin	10 (1.5)	1.5 (0.4, 0.6)
A mixture (or polysubstance)	7 (1.0)	0.6 (0.0, 1.2)
Prescription stimulants	<5 NA	NA
Drugs injected in the last 30 days		
Heroin	395 (58.8)	51.4 (44.9, 58.0)
Amphetamine or methamphetamine	366 (54.5)	50.5 (44.0, 57.0)
Cocaine	115 (17.1)	16.1 (12.2, 19.9)
Any opioid other than heroin	99 (14.7)	12.8 (8.9, 16.6)
A mixture (or polysubstance)	33 (4.9)	4.7 (1.7, 7.7)
Benzodiazepine	24 (3.6)	3.6 (1.7, 5.6)
Prescription stimulants	17 (2.5)	1.7 (0.7, 2.7)
Other	8 (1.2)	1.5 (0.3, 2.7)
Most recent drug injection		
Today	283 (42.1)	34.1 (27.8, 40.2)
Yesterday	93 (13.8)	15.9 (11.0, 20.8)
2 – 7 days ago	122 (18.2)	20.5 (15.8, 25.2)
8 – 30 days ago	81 (12.1)	14.2 (9.9, 18.6)
More than 30 days ago	21 (3.1)	4.6 (2.4, 6.8)

Table 10. Sample and population experience of overdose, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Opioid overdose, past year	94 (14.0)	12.6 (8.4, 16.9)
Received naloxone, past year	98 (14.6)	10.6 (7.3, 13.9)
Stimulant overdose, past year	56 (8.3)	7.4 (4.0, 10.7)

Table 11. Sample and population awareness, knowledge, and skills, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Knowledge about how to use naloxone / Narcan	377 (56.1)	50.3 (44.2, 56.5)
<i>Educated by:</i>		
On the streets	113 (30.0)	26.4 (19.3, 33.6)
A community-based organization	84 (22.3)	27.2 (19.3, 35.0)
Peers (people who use opioids)	58 (15.4)	13.3 (8.8, 17.9)
Family or friends	47 (12.5)	10.3 (5.9, 14.5)
A doctor, clinic, or community health agency	19 (5.0)	5.3 (2.4, 8.2)
While in jail or prison	15 (4.0)	3.7 (1.2, 6.2)
Internet (I looked for it myself)	12 (3.2)	4.4 (0.5, 9.3)
Other	23 (6.1)	8.2 (2.7, 13.6)
Knowledge about how to access a naloxone / Narcan kit	352 (52.4)	48.9 (42.8, 55.0)
Currently have a naloxone / Narcan kit	283 (42.1)	38.5 (32.3, 44.6)
Witnessed someone who had an opioid overdose, past year	291 (43.5)	32.1 (24.0, 37.2)
Treated someone by administering naloxone, past year	112 (16.7)	9.0 (5.6, 12.4)

Table 12. Sample and population access to substance use treatment, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
<i>n (%)</i>	<i>% (95%CI)</i>	<i>n (%)</i>
Received treatment for drug use, ever	299 (44.5)	40.6 (34.4, 47.0)
Treatment, past year	171 (25.5)	23.2 (17.5, 29.1)
Tried to get treatment but unable to access for some reason, past year	211 (31.4)	31.9 (25.9, 37.9)
Not ready to stop using	196 (92.9)	39.6 (27.6, 51.5)
Did not know where to go to get treatment	71 (33.6)	15.7 (8.3, 22.7)
Didn't find a program that offered the type of treatment or counseling wanted	67 (31.8)	20.8 (10.0, 31.7)
No openings in the programs	61 (28.9)	22.3 (11.2, 33.6)
Health care coverage, but it didn't cover treatment or didn't cover the full cost	57 (27.0)	20.2 (8.7, 31.5)
No transportation to a program, the programs were too far away, or the hours were not convenient	54 (25.6)	22.5 (11.5, 33.7)
No health care coverage and couldn't afford the cost	49 (23.2)	14.6 (5.5, 23.9)
Concerned that getting treatment or counseling might cause neighbors or community to have a negative opinion	44 (20.9)	10.1 (4.8, 15.6)
Concerned that getting treatment or counseling might have a negative effect on job	38 (18.0)	9.8 (1.6, 17.9)
Other	50 (23.7)	11.6 (2.8, 20.5)

Table 13. Sample and population access to clean needles, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Used a new sterile needle, last 30 days		
Always	206 (30.7)	36.6 (30.7, 42.5)
Most of the time	180 (26.8)	13.4 (9.3, 17.4)
About half the time	104 (15.5)	22.6 (17.7, 27.5)
Rarely	56 (8.3)	7.4 (4.5, 10.4)
Never	33 (4.9)	5.0 (2.6, 7.4)
Easily obtain new, sterile needles and syringes when needed, last 30 days	425 (63.2)	63.4 (57.8, 69.0)
Place for new, sterile needles and syringes, last 30 days		
Needle / syringe access program	307 (45.7)	39.9 (33.7, 46.2)
Bought from a pharmacy or drug store	202 (30.1)	29.8 (24.2, 35.4)
Friend, relative, or sex partner	190 (28.3)	27.1 (21.4, 32.8)
Other drug injector	113 (16.8)	13.0 (9.9, 16.1)
Drug dealer, needle dealer, or off the street	111 (16.5)	11.2 (8.5, 13.9)
Doctor's office, clinic, or hospital	33 (4.9)	4.7 (2.5, 6.7)
Stolen from pharmacy, shop, or hospital	29 (4.3)	3.0 (1.5, 4.4)
Other	36 (5.4)	11.2 (8.5, 13.9)
Used services of a needle / syringe access program, ever	355 (52.8)	43.7 (37.6, 49.8)
What did you usually do with the needle or syringe after injection, last 30 days		
Kept it to re-use it	202 (30.1)	25.8 (20.5, 31.1)
Threw it away in a solid plastic or container, sealed it, and threw the container in the trash	183 (27.2)	29.1 (23.2, 35.0)
Threw it away in a trash bin or on the street	163 (24.3)	26.1 (21.0, 31.3)
Put it in a medical waste disposal container (e.g. a "red box")	103 (15.3)	12.7 (9.2, 16.2)
Took it to a needle or syringe exchange program	71 (10.6)	9.4 (6.2, 12.6)
Gave or sold it to someone else to use it	44 (6.6)	4.8 (2.8, 6.8)
Other	36 (5.4)	5.9 (2.6, 9.2)

Table 14. Sample and population needle use, sharing, and disposal, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County	
Total	672		
	<i>n (%)</i>	<i>% (95%CI)</i>	
Injected with a previously used needles or syringes that were used by someone else			
Yes, within the last 30 days	327 (48.7)	42.2	(36.2, 48.2)
Yes, but not in the last 30 days	63 (9.4)	12.1	(7.5, 16.7)
Never	203 (30.2)	35.3	(29.3, 41.4)
Number of times needle used to inject before disposing			
1 time only	194 (28.9)	35.8	(29.6, 42.0)
About 2 to 5 times	285 (42.4)	38.3	(32.0, 44.0)
6 – 25 times	54 (8.0)	6.4	(3.8, 8.9)
26 – 50 times	15 (2.2)	1.5	(0.5, 2.5)
More than 50 times	15 (2.2)	1.6	(0.6, 2.6)
Used a spoon, cooker, filter, cotton, acid, lemon juice, or rinse water already used by someone else			
Yes, within the last 30 days	388 (57.7)	51.1	(44.8, 57.4)
Yes, but not in the last 30 days	49 (7.3)	9.5	(5.6, 13.3)
Never	155 (23.1)	26.4	(20.8, 32.1)
Gave, lent, rented, or sold a needle or syringe you had used to someone else (including partner)			
Yes, within the last 30 days	285 (42.4)	34.9	(29.6, 40.2)
Yes, but not in the last 30 days	48 (7.1)	8.9	(4.9, 12.9)
Never	258 (38.4)	44.5	(38.8, 50.2)
Cleaned needles or syringes that were used by someone else before re-using them			
Yes, within the last 30 days	8 (1.2)	1.0	(0.3, 1.7)
Yes, but not in the last 30 days	392 (58.3)	53.1	(46.9, 59.4)
Never	181 (26.9)	29.7	(24.1, 35.2)
Usual cleaning methods for needles and syringes (among those who have cleaned them)			
Bleach	258 (64.5)	30.0	(24.6, 35.2)
Water (not boiling)	141 (35.3)	16.9	(12.6, 21.2)
Rubbing alcohol	125 (31.3)	18.9	(13.6, 24.1)
Boiling water	101 (25.3)	11.5	(7.7, 15.3)
Hydrogen peroxide	77 (19.3)	8.3	(5.6, 11.1)
Soap or detergent	27 (6.8)	3.2	(1.7, 4.8)
Iodine	15 (3.8)	2.4	(0.2, 4.9)
Other	13 (3.3)	2.6	(0.2, 5.5)

Table 15. Sample and population children and pregnancy, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Children under the age of 18 years old	255 (38.0)	38.0 (32.0, 44.1)
Currently pregnant or have been pregnant in the last 12 months (among women)	19 (6.3)	8.6 (1.8, 15.2)
Prenatal care among those who are pregnant	9 (47.4)	61.3 (25.0, 95.3)

Table 16. Sample and population living situation, respondent-driven sample of people who inject drugs, Maricopa County, 2019

	Survey respondents, eligible, unweighted	Estimates for all people who inject drugs in Maricopa County
Total	672	
	<i>n (%)</i>	<i>% (95%CI)</i>
Living situation, past 12 months		
Lived alone	150 (22.3)	23.0 (17.4, 28.8)
Partner	153 (22.8)	22.4 (17.4, 27.4)
Children	25 (3.7)	2.3 (1.2, 3.4)
Parents	51 (7.6)	7.9 (4.9, 10.8)
Relatives	41 (6.1)	5.6 (3.0, 8.2)
Other adults	187 (27.8)	24.5 (19.3, 29.7)
Other	33 (4.9)	4.2 (2.4, 6.1)