

City of Vancouver

Submission on Thresholds

Request for an exemption from the Controlled Drugs and Substances Act (CDSA) pursuant to section 56(1) that would decriminalize personal possession of illicit substances within the City of Vancouver

Version Date: April 8 2021



Introduction

The City of Vancouver is requesting an exemption from the Controlled Drugs and Substances Act for the simple possession of drugs for personal use. Health Canada has asked for clarity on the threshold amounts of drugs proposed to be exempted, notably for Schedule 1 drugs. A City of Vancouver Working Group supported by a research scientist from Simon Fraser University has developed a rigorous methodology to determine potential threshold amounts for the substances most commonly associated with overdose deaths in Vancouver. This document sets out the methodology, analysis, and proposed thresholds for 4 drugs. Over the coming weeks the working group will carry out additional work to identify recommended thresholds for additional drugs, such as psychedelic substances, in order to mitigate the unintended risk that only exempting Schedule 1 substances could lead some drug users to migrate use to those substances.

Defining the Threshold for Personal Possession

Scope of Exemption Request

The City of Vancouver request for an exemption to the Controlled Drugs and Substances Act is specific to the personal possession of substances regulated under the Act. Because of the lengthy list of substances regulated by the CDSA, as an initial step, the City of Vancouver has focussed on the main drugs contributing to high rates of overdose mortality in Vancouver: opioids (heroin, fentanyl, and other powder street opioids), cocaine, crack cocaine, and amphetamines. The BC Corner’s report—referenced below—notes that these substances represent the ones most frequently involved in illicit drug toxicity deaths in the province from 2018-2020.

Top Drugs Involved Among Illicit Drug Toxicity Deaths, 2018-20

| Drug Detected | BC (n=2,003) |
|------------------------------|--------------|
| Illicit fentanyl & analogues | 87.0% |
| Cocaine | 48.7% |
| Methamphetamine/amphetamine | 38.4% |
| Other opioids | 31.5% |

Source: BC Coroners Service Illicit Drug Toxicity Deaths in BC January 1, 2011-February 28, 2021



It must be noted that because of different legislation concerning young offenders, this exemption is requested for adults at this time. Minors are not within the scope of this request. The City is committed to working with the VPD, and local health and social service providers to support youth at risk of overdose, including offering diversion pathways.

Definitions

For purposes of this submission, simple possession is defined as possession of one or more controlled substances for personal consumption. Simple possession does not include possession for the purpose of trafficking. It is recognized that simple possession may involve possession of a multi-day supply of drugs, and that some sharing of an individual's supply may occur within for example a family unit or close social network.

Short Term Objectives

The decriminalization of simple drug possession has many potential medium and long term benefits as outlined in the logic model presented earlier in the City of Vancouver Preliminary Submission including reduction in stigma associated with substance use, redirection of police resources, and improved integration of PWUDs in the economic and social life of the community. Many of these objectives will not be achieved simply by exempting personal possession from the provisions of the CDSA. It will require a much broader set of policy and program initiatives.

The more immediate objectives of the City of Vancouver exemption related to the thresholds proposed are as follows:

1. Reduce the reluctance of PWUDs to seek support from the health care system due to fear that they may encounter criminal sanctions if they reach out for support. (Performance measures are an increase in new clients in substance use services in Vancouver Coastal Health and self-reported willingness of People Who Use Drugs (PWUDs) to engage with health and social services)
2. Reduce seizures of drugs intended for personal use to prevent harms such as property crime, survival sex work, and unsafe purchases created by efforts to replace seized drugs and prevent withdrawal. (Performance measure is number of drug seizures and amounts seized)
3. Improve health care connections for PWUD by connecting individuals at risk of overdose to an Overdose Outreach Team (Performance measure is increase in referrals to and caseload of VCH Overdose Outreach Team)
4. Increase understanding within communities that substance use is not criminal in nature. (Performance measure is attitudes to drug use across Vancouver)

Collection of data on these measures will form part of the evaluation of the exemption initiative.

Considerations for Defining Personal Possession

The successful implementation of this approach requires a clear understanding of possession for personal use. The definition must be sufficiently simple that enforcement personnel such as police officers can make a clear, and informed determination that the substances in possession are intended for personal use. Similarly, PWUDs must be able to easily judge under what conditions they will not be subject to drug seizure or criminal charge.

The three primary drug charges under the CDSA – possession, trafficking and possession for the purpose of trafficking – are not differentiated solely based on weight. Instead, each offence requires a constellation of factors and evidence, with the weight of drugs being just one aspect. As such, a proposed **threshold amount** would not constitute a legal change or legal reform, as the threshold amount would not be used to delineate possession from possession for the purpose of trafficking. Instead, the threshold amount would specify a particular volume of drugs that individuals would be permitted to possess for personal consumption. As a result, individuals below the threshold amount who possess the drugs for personal use (i.e. there is no evidence of trafficking) would not be subject to a seizure of their drugs nor would they be subject to prosecution for simple possession.

It must be stressed that possession above the threshold does not automatically constitute possession for the purpose of trafficking. Police, prosecution services and advocate organizations have stressed that under Canadian law an amount of a drug is not, by itself, a sufficient basis for determining an intent to traffic. To reflect this, the exemption threshold is a **threshold floor**. This means that amounts above the threshold amount do not necessarily constitute possession for the purposes of trafficking. Under the new framework there will be individuals whose substance use exceeds the threshold amount and for whom a health care response to their substance use is of utmost importance. The police and criminal justice system in BC are sensitive to the need to divert PWUD to the health care system and have several programs and diversion approaches available for individuals once in the criminal justice system. In Vancouver these include conditional discharges, referral to Drug Treatment Court or Downtown Community Court.

Community members have raised concerns that police could start to substitute trafficking charges for what might otherwise be considered simple possession as has been reported in experiences with decriminalization elsewhere. It is certainly contrary to the intent of the exemption request as it would increase criminalization of simple possession and the harms associated with it. This situation is not possible under the proposed model as more serious drug charges – namely, trafficking and possession for the purpose of trafficking – will require supporting evidence that remains unchanged by the exemption and for which the drug weight is only one aspect of the required evidence. Nevertheless, given community concerns, it is critical that police and the criminal justice system make available a set of threshold guidelines in the form of a **Frequently Asked Questions** to clarify the fact that trafficking and possession for the purpose of trafficking offences, and required evidence, remain unchanged by the exemption.

Some community members have expressed the view that if the threshold amount reflects realistic local patterns of possession for personal use, individuals below the threshold amount should be entirely exempt from provisions of the CDSA for possession for the purposes of selling. An exemption related to trafficking or possession for the purposes of trafficking is not within the scope of this exemption request.

Threshold Amount

An essential aspect of any decriminalization model is the determination of an appropriate personal use threshold. A recent report from BC's Provincial Health Officer reviewed models and concluded that:

There is no ideal threshold for a given substance —what is a typical quantity for personal use varies by the substance and the person—but thresholds that are too low have not been found to be impactful. Experience in Mexico, for example, where threshold amounts were set very low, resulted in increased numbers of PWUD being charged for trafficking rather than simple possession. Experience from Portugal has shown that a set objective amount for each substance should be determined to remove the subjectivity associated with interpretation of more ambiguous terms.

There is no ideal threshold for personal use and setting the amount too low will undermine the goal of decriminalization and potentially lead to risks and harms. Of particular concern is excluding and further stigmatizing people who consume larger quantities of substances and are generally most at risk of overdose. In developing the Vancouver framework, threshold amounts from other jurisdictions have not been adopted because they are based on their respective local/regional contexts. A more evidence-based approach is required that is:

- Based on science and research evidence
- Reflects the actual personal use amounts in Vancouver and
- Not unnecessarily restrictive.

The threshold amounts must include a range of drugs to accommodate the poly drug use patterns in Vancouver. The amounts also consider that PWUD in Vancouver have been consistently exposed to fentanyl, which has increased tolerance for many users. Our methodology draws on longitudinal research data collected through studies undertaken specifically with the population of PWUDs in Vancouver to estimate levels of personal use for substances to be decriminalized. The studies used are:

- TASA Study - Check Day Study (PI: Dr. Richardson). Followed PWUD in Vancouver between October 2015 to January 2019 n=194
- VIDUS (PI Dr. Hayashi). Participants in the VIDUS cohort are adults who use injection drugs VIDUS between December 2017 and November 2018. n=1,190

- ARYS (PI: Dr. DeBeck) Participants in the ARYS cohort are street-involved youth who use drugs in Vancouver between December 2017 and November 2018

The full methodology is described in the *Working Document – Thresholds* (included as an Appendix). The method involves several steps:

- Step 1: Estimate price per substance use event (TASA data)
- Step 2: Estimate frequencies for # of substance use events per day by substance (TASA; VIDUS; ARYS)
- Step 3: Translate use frequencies into street \$ value for daily use using the price per substance use event
- Step 4: Estimate cost per unit of substance (from VIDUS and ARYS)
- Step 5: Translate into volume of drugs consumed per day
- Step 6: Generate projections for multiday supply scenario

To be effective, threshold amounts must recognize that individuals will possess daily consumption amounts, but also some amount for later use. The threshold amounts proposed for the City of Vancouver exemption request incorporates an estimated daily amounts multiplied by a set number of days. For the daily amount three possible volumes were considered:

- Maximum: this represents the maximum amount of daily use that individuals in the studies report. An average of the maximums was taken to ensure that estimates were conservative.
- Upper Quartile: this represents the average of amounts in the upper quarter of the range of amounts reported.
- Median: this represents the median of all daily reported amounts.

All daily estimate volumes are considered conservative estimates due to the timeframe of the studies (up to 2018), data limitations, and the choice to ‘average’ maximum consumption reports between studies among other factors such as changes in drug tolerance in the population.

Further work will be conducted using more current data as it becomes available, and experiential validation by expert clinicians and PWUD will be on-going as part of the evaluation of the exemption so recommendations to update the thresholds can be made to Health Canada as necessary.

For the number of days, three possible scenarios were considered. Incorporating multiple days into the threshold volume is critical for people who live in parts of the city that do not have widespread drug sales. This would help those individuals who do not want to frequent daily areas of the City that are hubs for drug sales to replenish their needed supply of drugs.

- Low 3 days – Reflects the evidence that daily consumption (possession) will increase on certain days such as income assistance cheque distribution days due to factors such as poverty, bingeing,

and/or increased availability of drugs. This also reflects that there are multiple advantages to purchasing drugs in bulk, including limiting trips to purchase drugs and improved purchase price.

- Medium 5 days – Recognizes and possibly better encourages PWUDs to manage a supply of drugs so they can more safely regulate use. As with 3 days, this reflects that there are multiple advantages to purchasing drugs in bulk, including limiting trips to drug purchasing hubs and improved purchase price.
- High 10 days – As above but also recognizes that daily use estimates based on the empirical studies are conservative estimates and this would help account for that limitation. It is also noteworthy that during the COVID pandemic, the BC Centre on Substance Use has advised clinicians to prescribe a 14 days’ supply of medication or safe supply in case they contract or are exposed to COVID-19 and must self-isolate.

The following table shows a range of personal use volumes based on different daily volume categories and number of days.

| Substance | | Estimated Volume of Drugs Consumed per Day | 3 Day Supply | 5 Day Supply | 10 Day Supply |
|----------------------|----------------|--|--------------|--------------|---------------|
| Opioids* | Median | 0.33 g | 0.98 g | 1.63 g | 3.25 g |
| | Upper Quartile | 0.65 g | 1.95 g | 3.25 g | 6.50 g |
| | Max | 4.39 g | 13.16 g | 21.94 g | 43.88 g |
| Cocaine | Median | 0.50 g | 1.50 g | 2.50 g | 5.00 g |
| | Upper Quartile | 1.06 g | 3.19 g | 5.31 g | 10.63 g |
| | Max | 4.75 g | 14.25 g | 23.75 g | 47.50 g |
| Crack Cocaine | Median | 2 rocks** | 6 rocks** | 10 rocks** | 20 rocks** |
| | Upper Quartile | 4 rocks | 12 rocks | 20 rocks | 40 rocks |
| | Max | 75 rocks | 225 rocks | 375 rocks | 750 rocks |
| Amphetamine | Median | 0.21 g | 0.63 g | 1.05 g | 2.10 g |
| | Upper Quartile | 0.45 g | 1.35 g | 2.25 g | 4.50 g |
| | Max | 6.45 g | 19.35 g | 32.25 g | 64.50 g |

*Opioids = heroin, fentanyl, and other powder street opioids; **1 rock = one point, 0.1 g

Risk Analysis

There is no exact formula for arriving at thresholds. It must ultimately reflect local patterns of substance use with some constraints recognizing the complexity of arriving at a threshold. The following analysis provides an exploration of the advantages and risks associated with the various levels.

| Alignment with Objectives | Definition | Risks | Risk Mitigation |
|--------------------------------|--|--|--|
| Comprehensive Inclusion | Those with severe substance use disorders covered for <u>multi day supply</u> | Perception that the highest thresholds could facilitate possession for the purposes of trafficking especially in parts of the City where daily use volumes are lower | Communication on thresholds to clarify possession versus trafficking Monitor impacts |
| Good Inclusion | Those with high levels of substance use covered for <u>multi day supply</u> | Leaves out some individuals who may be most vulnerable to harms associated with severe substance use disorders | Monitor impact on inclusion Ensure diversion options available in Criminal Justice System |
| Limited Inclusion | Focus on average use rather than those with a severe substance use disorder with <u>multi day supply</u> | <ul style="list-style-type: none"> • Insufficiently impactful to meet objectives as many PWUDs would not be covered by exemption • Potential to increase seizures if this level is more restrictive than current police practice • Potential increase in number of PWUD charged with trafficking • Unlikely to promote diversion to healthcare services for people most in need of treatment and support • Smaller inclusion means police discretion could lead to targeting specific groups who are in simple possession • Could lead to more frequent interactions to purchase drugs | |

This risk analysis helped to inform the decision on the final amounts to recommend as thresholds.

Conclusion and Recommended Thresholds

The City of Vancouver’s threshold analysis provides a sound basis to set thresholds based on data from three local longitudinal surveys. Together, these surveys collected data from close to 1400 PWUDs prior to January 2019. Because information from these studies does not reflect changes in the local illicit drug supply over the past two years, estimates derived from these data were discussed with physicians working in the field of addictions medicine, some PWUD, and the Vancouver Police Department who reviewed their charging data. The experience of other jurisdictions that have moved to decriminalize drugs such as Portugal and the State of Oregon were also considered.

It is recommended that the thresholds should be set using the top quartile of reported use – not an average or a maximum. This will:

- provide broad coverage to ensure most PWUD are covered by the exemption
- recognizes concerns that maximum amounts may not be a good representation of use outside of the Downtown Eastside of Vancouver
- recognizes that there are perceptions that a high threshold could enable drug trafficking and thus jeopardize the request for an exemption
- mitigates that the survey estimates may be low given evidence of higher rates of contamination in the local illicit drug supply in the context of the COVID19 pandemic
- recognizes that there is still discretion by police above the threshold to pursue a health response and not charge for possession.

The threshold should accommodate possession of several days supply. This reflects actual use patterns whereby individuals can often possess a multi-day supply for personal use. A 3 day supply is appropriate because:

- 3 days at the highest quartile provides a relatively sufficient volume of drugs for personal use
- the 3 day supply volumes are aligned with the VPD’s experience on personal possession data where persons were historically charged.

The following chart presents the recommended personal use volumes. These have been rounded in some instances to eliminate small fractions.

| Substance | Proposed Threshold Volume |
|---------------|---------------------------|
| Opioids* | 2 grams |
| Cocaine | 3 grams |
| Crack Cocaine | 10 rocks** (1 gram) |
| Amphetamine | 1.5 grams |

*Opioids = heroin, fentanyl, and other powder street opioids; **1 rock = one point, 0.1 g



Thresholds for Additional Drugs

These thresholds are targeted specifically for those drugs commonly associated with overdose mortality in Vancouver. It is not possible to develop thresholds for all drugs with the same rigour as for those completed to date. Additional work will be carried out to identify potential thresholds for some other drugs, as we seek to avoid the unintended migration of drug users to those substances listed, which may elevate risk for some PWUD.

Monitor and Adjust

During initial consultations, it was emphasized that the threshold amounts in this exemption request may not meet all the intended objectives of the Vancouver model of decriminalization. It was also noted that the exemption will be innovative and not all consequences can be anticipated. While the risk analysis required for the exception is important to guide the initial selection of the threshold amounts, on-going monitoring and evaluation of the impact of the thresholds will be essential. Therefore, as a part of the City's exemption from the CDSA, we request a commitment by Health Canada to consider ongoing modifications to the thresholds proposed in this exemption request.

Appendix

Working Document – Threshold Values

Methodology

Daily Consumption Estimates for: Opiates, Cocaine, Crack Cocaine, and Amphetamines

Data Sources: To inform the determination of threshold levels for decriminalizing drug use possession, estimates for the quantity of street drugs that PWUD in Vancouver consume on a daily basis were derived from data from three established studies of PWUD in Vancouver. These studies include the *Impact of Alternative Social Assistance on Drug Related Harm (TASA)*, the *Vancouver Injection Drug Users Study (VIDUS)* and the *At-Risk Youth Study (ARYS)* studies. TASA is a randomized controlled trial to examine social assistance distribution and drug-related harm. It enrolled and followed n=194 PWUD in Vancouver between October 2015 to January 2019. Participants in the VIDUS cohort are adults who use injection drugs and participants in the ARYS cohort are street-involved youth who use drugs in Vancouver. Data from n=1,190 VIDUS and ARYS participants was collected between December 2017 and November 2018 and was used to help generate estimates of drug consumption among PWUD in Vancouver.

Step One: estimate price per substance use event As a first step, data from the TASA study was used to derive the estimated *price per substance use event* for multiple categories of street drugs. The measure of *price per substance use event* was selected to address methodological challenges involved in using self-report to estimate the volume of drugs that individuals consume on a daily basis. Specifically, the

unregulated nature of the street drug supply results in substantive variations in drug potency and packaging, as well as colloquial descriptions and references for drug amounts. Self-reported amounts of drug consumption, therefore, do not easily translate into consistent units of measure that can be collected systematically. Estimating drug consumption levels based on reports of the amount of money that individuals directly spend on drugs is also imprecise as drug acquisition commonly involves informal sharing, exchanges, and collective purchases. Given that PWUD frequently think in ‘dollars’ worth’ of a substance with respect to a particular experience they expect a substance to generate, a more rigorous methods of estimating drug consumption volumes is to ask PWUDs to report the *street value* of the drugs they use per day. This avoids researchers having to interpret complicated systems of quantifying drug doses and equivalencies. Asking the *street value* of the amount of drugs consumed also ensures that drug consumption is captured among individuals who don’t technically spend money on drugs because they receive drugs for free or in exchange for a service or favor or gift.

All TASA study participants report the street value (in dollars) of the amount of substances they consume per day, and well as the number of times per day that they use each substance. Substance use categories in the TASA study include: heroin; fentanyl/other opiates; cocaine powder; crack cocaine; amphetamine; speedball (mix of cocaine and opiates); and goof ball (mix of amphetamine and opiates). Based on reports of the street value of drugs that TASA participants report consuming per day, the *price per substance use event* was derived by dividing the overall dollar amount by the number of substance use events reported. This calculation was based on the upper quartile of the street dollar value and the upper quartile for number of substance use events per day for each substance use category. See Table 1 for details.

Step Two: estimate frequencies for the number of substance use events per day by substance Given the somewhat limited sample size in the TASA study, as a next step, VIDUS and ARYS data were used to generate more robust estimates for the *number of substance use events per day* for each substance use category. Substance use categories in the VIDUS and ARYS studies were harmonized with the TASA study instrument; however, in VIDUS and ARYS frequencies for daily substance use events were restricted to injection drug use events and not collected for non-injection street-drug use. Specifically, the number of substance use events per day were not collected in VIDUS and ARYS for: cocaine snorting or smoking; crack cocaine smoking; and opioid snorting or smoking.

After collating the frequencies for substance use events per day by substance for TASA, VIDUS and ARYS, potential gender differences in the upper quartile and maximum number of daily substance use events were considered. No significant variations were observed based on gender. Then, based on comparisons of the TASA and VIDUS/ARYS data, a determination of the most appropriate upper quartile estimate was identified based on the sample size and the maximum value reported per substance. The estimate generated by the larger sample size was given preference as it was considered the more representative estimate, or if the variation between the upper quartile estimate and the max estimate was large, the greater of the upper quartile estimates was selected as the parameter. The same process was

undertaken to determine the median number of substance use events. See Table 2 for details. Estimates for the maximum number of substance use events per day were based on an average between the max reports from the VIDUS and ARYS studies and the TASA study. This was considered a conservative approach to the estimates as the daily substance use event data for VIDUS and ARYS was based on injection drug use events only (excluding non-injection substance use events), which therefore significantly underestimates the true frequency of substance use events per day. The max estimate for crack cocaine smoking was taken only from the TASA study sample since the frequency of daily crack use was not collected in the VIDUS and ARYS data.

A number of substance use categories were then collapsed together to reflect broader substance use categories. Specifically, the categories for 'heroin' and 'fentanyl' were merged into one category for 'opioids' given that participants were likely to report one or the other, but unlikely to report both categories at the same study visit. Conversely, given well established patterns of poly substance use, consumption of 'goofballs' and 'speedballs' was expected to take place in the context of other ongoing opioid and stimulant drug use. Therefore, when calculating the estimate for the upper quartile of substance use, half of the substance use events for 'goofballs' were assigned to the 'opioid' category and half to the 'amphetamine' category, while half of the substance use events for 'speedballs' were assigned to the 'opioid' category and half to the 'cocaine' category. To ensure that estimates were conservative, merging goofball and speedball events was not undertaken for the 'maximum' estimates given that it was anticipated that an individual reporting the maximum number of substance use events would be less likely to engage in the maximum level of another substance at the same time (although not impossible). See Table 2a for details.

Step Three: translate drug use frequencies into street dollar value for daily use Once estimates were finalized for the median, upper quartile and maximum number of substance use events per day, this was combined with the estimated *price per substance use event* derived from step 1 to determine the median, upper quartile and maximum *street dollar value for daily use* of each substance. Subsequently, using the drug use frequencies data from the VIDUS and ARYS cohorts, the street dollar value for daily use could be converted into estimated *volume of drug consumed per day* (median, upper quartile and max), based on data collected on the street price of drugs per specified units in the VIDUS and ARYS cohorts. See Table 3 for details.

Data Limitations and Implications

Although consumption estimates are drawn for a large community recruited sample of PWUD in Vancouver and reflect rigorous practices for estimating drug use consumption in this setting, there are a number of features of the data that make the presented calculations conservative and underestimates of the true volume of drugs consumption in Vancouver today, which is relevant if estimates are used to inform threshold calculations.

1. **Timeframe of data:** Data collection for VIDUS and ARYS was only until Nov 2018, and started in 2015 for TASA. Clinical observations suggest significant increases in substance use volumes due to increased tolerance.
2. **Data limitations for non-injection drug use:** VIDUS and ARYS data was mostly limited to injection events (missing non-injection events including snorting and smoking).
3. **Averaging among poly substance users:** Poly drug use is common among participants in the studies, estimates based on averaging (median and upper quartile) are expected to underestimate consumption levels among individuals who have one drug of choice.
4. **Check day impact:** Evidence from Vancouver (see: *Kreb et al. Increased drug use and the timing of social assistance receipt among people who use illicit drugs*. *Social Science & Medicine*. 2016. 17:94-102) suggests that drug consumption doubles among some PWUD when they receive social assistance payments. Therefore, the estimates generated by the VIDUS, ARYS, and TASA data are expected to underestimate (by as much as one half) drug consumption patterns among PWUD during social assistance payment periods.
5. **Economic dynamics:** Powder cocaine use is relatively expensive and likely less common among participants in the VIDUS, ARYS, and TASA studies vs. other populations of PWUD in Vancouver. Therefore, estimates are expected to underestimate powder cocaine consumption levels in other populations of PWUD in Vancouver.

For these reasons, it is important to interpret the *median, upper quartile and the maximum* consumption volumes as highly conservative estimates that are expected to significantly underestimate actual consumption levels in Vancouver. This should be taken into consideration when using the provided estimates to inform a determination of threshold amounts.

Scenarios

To inform decisions related to threshold determinations, Tables 4 present drug volume amounts reflecting the median, upper quartile and max estimated drug consumption levels for each key category of substance use. Scenarios include the volume of drugs that correspond to a 3 day, 5 day, and 10 day drug supply.

Table 1. TASA Study data to estimate Price Per Substance Use Event for each substance, study time period = Oct 2015 to Jan 2019; sample n=194

| Substance | # times substance used per day | | | Street \$ value | | | Estimated price per substance use event (TQ Street \$ value/ TQ # of uses) | Sample size for each substance |
|------------------------|--------------------------------|----------------|-----|-----------------|----------------|-------|--|--------------------------------|
| | Median | Upper Quartile | Max | Median | Upper Quartile | Max | | |
| Heroin | 2 | 4 | 120 | \$30 | \$50 | \$900 | \$13 | 132 |
| Fentanyl/other opiates | 1 | 3 | 4 | \$10 | \$40 | \$150 | \$13 | 18 |
| Cocaine powder | 2 | 3 | 56 | \$20 | \$30 | \$625 | \$10 | 54 |
| Crack cocaine | 4 | 8 | 150 | \$20 | \$40 | \$600 | \$5 | 94 |
| Amphetamine | 2 | 5 | 200 | \$20 | \$30 | \$600 | \$6 | 115 |
| “Speedball” | 2 | 7 | 60 | \$50 | \$90 | \$320 | \$13 | 17 |
| “Goofball” | 2 | 4 | 250 | \$50 | \$80 | \$700 | \$20 | 70 |

*Each participant provided daily drug use reports for a median of 164 data points (i.e., substance, days) (IQR = 84-250)

Table 2. Estimate frequencies for # of substance use events per day by substance

| Cohort | Substance | # uses per day | | | Sample size for each substance | Selected parameter for # uses per day | | | Notes |
|--------|------------------------|----------------|----------------|-----|--------------------------------|---------------------------------------|----------------|-------|--|
| | | Median | Upper Quartile | Max | | Median | Upper Quartile | Max | |
| TASA | Heroin | 2 | 4 | 120 | 132 | 2.5 | 4 | 67.5 | Convergence among studies |
| VIDUS | Heroin inject | 3 | 4 | 15 | 296 | | | | |
| TASA | Fentanyl/other opiates | 1 | 3 | 4 | 18 | 3 | 4 | 7 | Using VIDUS/ARYS due to larger sample size |
| VIDUS | Fentanyl powder/pills | 3 | 4 | 10 | 45 | | | | |
| TASA | Cocaine powder | 2 | 3 | 56 | 54 | 3 | 5 | 38 | Using higher since max # times used is very high |
| VIDUS | Cocaine inject | 3 | 5 | 20 | 27 | | | | |
| TASA | Crack cocaine | 4 | 8 | 150 | 94 | 4 | 8 | 150 | Using TASA (only available, sample size large) |
| VIDUS | Crack cocaine | - | - | - | - | | | | |
| TASA | Amphetamine | 2 | 5 | 200 | 115 | 2 | 5 | 107.5 | Using higher since max # times used is very high |
| VIDUS | Meth inject | 2 | 3 | 15 | 157 | | | | |
| TASA | Speedball | 2 | 7 | 60 | 17 | 2 | 7 | 45 | Using higher since max # times used is very high |
| VIDUS | Speed inject | 2 | 4.5 | 30 | 15 | | | | |
| TASA | Goofball | 2 | 4 | 250 | 70 | 3 | 5 | 135 | Using VIDUS/ARYS due to larger sample size |
| VIDUS | Goofball | 3 | 5 | 20 | 129 | | | | |

Table 2a. Combining estimated frequencies for # of substance use events per day

| Substance | # use per day | | | Notes |
|--|------------------|------------------|-------|---|
| | Median | Upper Quartile | Max | |
| Opioid (Heroin, Fentanyl, other opioids) | 2.5 + 1 + 1.5 | 4 + 3.5 + 2.5 | 67.5 | For UQ (not max) combine heroin and fentanyl (likely reported just one vs. both), ½ speedball, ½ goofball |
| Fentanyl/other opiates | 3 | 4 | 7 | Consider the same as heroin |
| Cocaine | 3 + 1 | 5 + 3.5 | 38 | For UQ Combining with ½ speed ball (not max) |
| Crack cocaine | 4 | 8 | 150 | |
| Amphetamine | 2 + 1.5 | 5 + 2.5 | 107.5 | For UQ Combining with ½ goofball |
| Speedball | 2 | 7 | 45 | For UQ Half goes to cocaine, half goes to opioid (not max) |
| Goofball | 3 | 5 | 135 | For UQ Half goes to amphetamine, half goes to opioid (not max) |

Table 3. Estimated substance use events per day translated into volume of drugs consumed per day

| Substance | # uses per day | | | Price per substance use event | Cost per unit of measure (from VIDUS) | Volume of Drugs Consumed per Day | | | Unit |
|---------------|----------------|----------------|-------|-------------------------------|---------------------------------------|----------------------------------|----------------|------|---------------|
| | Median | Upper Quartile | Max | | | Median | Upper Quartile | Max | |
| Opioid* | 5 | 10 | 67.5 | \$13 | \$20 per point (0.1 g) | 0.33 | 0.65 | 4.39 | gram |
| Cocaine | 4 | 8.5 | 38 | \$10 | \$80 g | 0.5 | 1.06 | 4.75 | gram |
| Crack cocaine | 4 | 8 | 150 | \$5 | \$10 per one point (rock) | 2 | 4 | 75 | 1 point rocks |
| Amphetamine | 3.5 | 7.5 | 107.5 | \$6 | \$10 Points (.1 grams) | 0.21 | 0.45 | 6.45 | gram |

Table 4. Estimated volume of drugs consumed and projections for multiday supply scenarios

| Substance | | Estimated Volume of Drugs Consumed per Day | 3 Day Supply | 5 Day Supply | 10 Day Supply |
|----------------------|----------------|--|--------------|--------------|---------------|
| Opioids* | Median | 0.33 g | 0.98 g | 1.63 g | 3.25 g |
| | Upper Quartile | 0.65 g | 1.95 g | 3.25 g | 6.50 g |
| | Max | 4.39 g | 13.16 g | 21.94 g | 43.88 g |
| Cocaine | Median | 0.50 g | 1.50 g | 2.50 g | 5.00 g |
| | Upper Quartile | 1.06 g | 3.19 g | 5.31 g | 10.63 g |
| | Max | 4.75 g | 14.25 g | 23.75 g | 47.50 g |
| Crack cocaine | Median | 2 rocks** | 6 rocks** | 10 rocks** | 20 rocks** |
| | Upper Quartile | 4 rocks | 12 rocks | 20 rocks | 40 rocks |
| | Max | 75 rocks | 225 rocks | 375 rocks | 750 rocks |
| Amphetamine | Median | 0.21 g | 0.63 g | 1.05 g | 2.10 g |
| | Upper Quartile | 0.45 g | 1.35 g | 2.25 g | 4.50 g |
| | Max | 6.45 g | 19.35 g | 32.25 g | 64.50 g |