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The UK Survey of Non-Medical Use of Prescription Drugs (NMURx) as a valuable source of general population illicit drug use data

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Front sheet

Title: The UK Survey of Non-Medical Use of Prescription Drugs (NMURx) as a valuable source of general population illicit drug use data

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Contributorship Statement

All authors contributed to planning the study. FLN and KPM derived data from the CSEW and NMURx databases respectively. FLN, DMW and PID wrote the manuscript. All authors reviewed and edited the manuscript before submission. FLN submitted the study. FLN is responsible as guarantor of the study.

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Abbreviations

BCS	British Crime Survey
CI	confidence intervals
CSEW	Crime Survey England and Wales
GBL	gamma-butyrolactone
GHB	gamma-hydroxybutrate
LSD	lysergic acid diethylamide
NMURx	Non-Medical Use of Prescription Drugs
NUTS	Nomenclature of Territorial Units for Statistics
RADARS	Researched, Abuse, Diversion and Addiction Related Surveillance
UK	United Kingdom of Great Britain and Northern Ireland

Abstract

Purpose of study: The aim of the study is to describe the prevalence of illicit drug use in England and Wales using data from the UK Survey of Non-Medical Use of Prescription Drugs (NMURx) Program, and to compare against the well-established Crime Survey England and Wales (CSEW). The rationale is that recreational and illicit drug use is common, but the prevalence is difficult to estimate with personal interviewing methods.

Study design: We compared two cross-sectional population surveys (NMURx, n=8,903 and CSEW, n=20,685) with data regarding self-reported recreational drug use and demographics. NMURx is an online survey using non-probability sampling methodology with pre-set demographical quotas based on Census data. CSEW surveys drug use via computer-assisted self-interviewing as part of a computer-assisted personal-interviewing crime survey.

Results: Cannabis was the most frequently used drug regardless of demographics. Prevalence of drug use for specific substances was generally higher for males, younger ages, and students. The relationship between income and drug misuse is less clear. Self-reported prevalence of drug use in the NMURx survey is consistently higher than CSEW (absolute difference 1-3% across substances and timescales), and persists after stratification for gender, age, student status and household income.

Conclusions: The NMURx survey has a broad reach of participants, and a sampling scheme that achieves external validity, compared to general population demographics. NMURx's online format allows flexibility in items surveyed, and in response to emerging trends. The self-reported drug use in the NMURx cohort is comparable, although slightly higher, than the CSEW estimates.

Introduction

Recreational and illicit drug use is common and can have a significant impact on health. The standardised mortality rate of drug misusers in the United Kingdom (UK) is nearly 5-times that of the general population.[1,2] In addition to individual health consequences, the UK National Crime Agency estimates an overall cost of drug use to be £10.7 billion annually, accounting for social, economic and reputational impact.[3]

The prevalence of illicit drug use is difficult to estimate, particularly as current methodologies have disincentives to report drug use or do not represent the general population, and have limited flexibility to adapt to new trends. Not all illicit drug use directly impacts health, or results in engagement with drug services, limiting the coverage of database and registry studies. One main source of drug use estimates in the UK is the Crime Survey England and Wales (CSEW; formerly British Crime Survey (BCS)). The primary purpose of the CSEW survey is to monitor the extent of crime in England and Wales, with an optional module regarding drug use. However, face-to-face surveys may be limited by the sensitive nature of illicit drug use. Previous studies have combined household surveys with drug testing from hair, saliva or urine, revealing that self-reporting underestimates the results of laboratory drug testing,[4,5] although these studies were of a narrower selected population with likely higher prevalence of drug use. There have also been recent consultations regarding potential changes to CSEW, including removing the drugs module,[6] highlighting the importance of a valid alternative methodology for assessing population estimates of illicit drug use.

Other drug use prevalence estimates are typically from selected subpopulations. The Global Drug Survey, reveals reporting of drug use up to 10-fold higher than CSEW.[7] However, this self-nominating sample is not representative of the general population; being majority male, typically well-educated, aged 20-40, with higher night-time economy use. Studies amongst those attending UK sexual health

services report drug use prevalence 2- to 10-fold higher than the CSEW.[8,9] Subpopulation studies are crucial in our understanding of recreational drug use in specific contexts, but not easily generalizable to the overall population.

This leaves a gap in the literature for a dedicated broad population assessment of illicit drug use. In this report, we assessed illicit drug use via a general population online survey, the UK Survey of Non-Medical Use of Prescription Drugs Program (NMURx). The wide accessibility in an internet-connected country such as the UK improves reach, while the anonymous nature of the survey may reduce disincentives to report sensitive behaviours like drug use. Utilising a census-based quota for demographic variables allows for better representation of the general population. The primary objective of this study was to describe the prevalence of illicit drug use in England and Wales using the UK NMURx survey. Where applicable, we compared the results to those from the well-established CSEW. Given the methodological differences between the two surveys, we also critically reviewed the strengths and weaknesses of the NMURx survey.

Methods

Data Sources

UK Survey of Non-Medical Use of Prescription Drugs Program

The Researched, Abuse, Diversion and Addiction Related Surveillance (RADARS®) System conducts drug surveillance through a mosaic of programs at different stages of the drug dependence pathway. The RADARS System NMURx Program studies drug use among the general adult population across multiple countries, and also collects respondent demographic data.

The NMURx Program collects data through a series of cross-sectional online surveys. The data presented relates to the 3rd quarter of 2016 survey (12th August to 1st September 2016). Individuals signed up to an online survey panel company are sent e-mail invitations to complete the confidential

self-administered survey. The median survey completion time was approximately 10 minutes. NMURx uses non-probability quota sampling to provide a distribution of survey respondents proportional to populations across regions with an equal gender distribution within each region. The sample includes adults aged 16-99. Respondents who complete the survey in less than 2/5 the median time (3 minutes and 51 seconds) were excluded. Median time is used as a metric for identifying careless responses[10] as it is expected that participants who finish the questionnaire too quickly were unable to provide the required attention to the survey in the short timeframe.

After data collection, post-stratification weights based on strata of UK region, gender, and age categories were applied to reflect the demographic distribution of the UK adult population and generate population estimates. Weights were calculated using the most recent (2015) population estimates by NUTS (Nomenclature of Territorial Units for Statistics) 2 regions provided to Eurostat, the statistical office of the European Union.

Respondents were asked about their use of specific drugs (cannabis, cocaine powder, crack cocaine, ecstasy, GHB (gamma-hydroxybutrate) / GBL (gamma-butyrolactone), non-pharmaceutical amphetamine, non-pharmaceutical fentanyl, heroin, ketamine, and mephedrone) during their lifetime, the past year, month, and week. The survey covered the entire UK, but only data from England and Wales were compared with CSEW. The NMURx Program was approved by the Colorado Multiple Institutional Review Board (Denver, Colorado, United States).

Crime Survey England and Wales (CSEW)

The CSEW was conducted by Kantar Public on behalf of the Office for National Statistics (ONS). The primary purpose of the survey is to monitor crime in England and Wales, and develop crime reduction policies. An optional module also surveys drug use (amphetamines, methamphetamines, cannabis, cocaine powder, crack cocaine, ecstasy, heroin, LSD/acid, magic mushrooms, non-

prescribed methadone/physeptone, semeron, tranquilisers, amyl nitrite, anabolic steroids, ketamine, mephedrone). The main crime survey invited participants based on a quota of households within each Police Force Area. If there was more than one resident within each household, the invitee was randomly selected.[11] The CSEW final data were also weighted to reflect the age and gender distribution of the population studied.[12] Participants aged 60+ were not surveyed with the drug use module. The results are publicly available online,[13] and a further data request was submitted to CSEW for prevalence estimates, standard deviation, and number of respondents, to derive 95% confidence intervals (95% CIs).

The research question formats for both surveys are shown within Supplementary Table 2.

Analysis

Analyses for NMURx were conducted in SAS Version 9.4 using the survey procedures to account for the weighting scheme, resulting in weighted proportions and 95% CIs. For CSEW data, CIs for prevalence estimates were calculated where the upper and lower limits = percentage ± 1.96 * standard error of mean * design effect (1.2).[8] Drug use estimates from the two data sources were considered similar if the 95% CIs overlapped. Formal statistical testing was not conducted because assumptions about independent and identically distributed samples are likely violated. Demographic estimates were compared to values from ONS data.[14-16]

Results

Sample

The sample sizes for both surveys were large (CSEW n=20,685, NMURx n=8,903). The demographic characteristics of the NMURx sample were generally more representative of the general UK population for age, gender, region and student status compared to CSEW (Supplementary Table 1).

Income statistics were not suitable for direct comparison - neither the NMURx nor CSEW surveys specify income type (i.e. gross, net, disposable), while the ONS data specified disposable income.

The response rates for the two surveys were different. For CSEW, 72% of invited individuals responded to the main survey, of whom 97% completed the optional drug use module, resulting in a 70% true response rate.[11] NMURx, being an online survey, had an unsurprisingly lower response rate. The available pool of survey respondents was large (approximately 120,800); 13% (N=15,707) opened the survey, of whom 64% (N=10,013) completed the survey. A small number (N=529) of responses were excluded due to completion of the survey in a time duration less than 2/5ths of the median time. Other exclusions were respondents who were not within the age range, did not agree to the confidentiality statement, or were from quotas that were already filled. The resulting response rate for NMURx was 8.7%.

Prevalence Estimates

The most commonly used drug in both surveys was cannabis (Table 1). The ranking of drugs in terms of frequency of use was also similar in both surveys; cocaine powder, ecstasy, and amphetamine were the next most commonly used. Heroin, GHB/GBL, and non-medical fentanyl had the lowest estimated prevalence of lifetime use. Details of self-reported use in shorter timeframes are detailed in Table 1. After demographic stratification, drug use in the past year tended to be more prevalent for younger ages, males (Table 2), and students (Table 3). For NMURx data, self-reported drug use was typically more prevalent with increased income, except for cannabis, being most prevalent amongst the <£10k/year income category. This differs from CSEW data where the relationship is less clear (Table 4). Cannabis remains the most prevalent drug in all subgroups.

Prevalence estimates of use for all timescales and drugs from the NMURx survey were larger than estimates from CSEW (Table 1). The relative difference was more marked for active use categories

(i.e. use in last year or month), and for substances with lower overall reporting levels (<3% in CSEW). For most categories, the absolute difference between the survey estimates was 1-3%, persisting even when stratifying by demographics (Tables 2-4).

Discussion

The large sample sizes for both surveys provide good statistical power for population estimates. Both surveys agreed on the overall patterns of illicit drug use. Cannabis was the most used drug, regardless of timeframe, gender, age, student status, or income, reflecting known trends in the UK and Europe more widely.[13,17] Self-reported drug use was higher in males and younger subgroups, which is a common finding to drug use estimates.[17-20] Results from NMURx support the assumption made by the CSEW designers that the prevalence of illicit drug use for individuals aged 60+ is *low* (<1%), but *not absent*. Students were more likely to report illicit drug use; however, these estimates can conflate the age difference between students and non-students. The relationship between self-reported drug use and income were different in the two surveys. While it is not possible to conclusively explain this difference, it may be related to differences in survey methodologies.

Prevalence estimates from the NMURx survey were consistently higher than CSEW across substances and timescales. These differences were more marked for substances with lower prevalence and active use within the last year or month. Two factors may account for these differences, potentially indicating strengths of the NMURx survey:

1. True differences in drug use may exist due to differing sampling strategies, where the NMURx cohort better reflects national census estimates than CSEW (Supplementary Table 1). NMURx targets individuals willing to fill out internet surveys for modest compensation, while CSEW targets households within police enforcement areas using postal letters. Additionally, CSEW does not include communal residences (such as university dormitories), which could contribute to discrepancies. Neither survey effectively targets prison

populations or the homeless. An analysis of CSEW determined these exclusions have "little impact on the overall estimates of the prevalence of victimisation",[21] but this considers the CSEW main focus on crime, and not the impact on drug use estimation.

2. Differences in survey methodologies may contribute to differences in willingness to report drug use, supported by the finding that differences persist after demographic stratification (Table 2-4). NMURx is an anonymous online survey that solely focuses on drug use. In contrast, CSEW drug use data are obtained at the end of a government-associated core interview survey on crime as a non-compulsory module. The core interview is conducted as a 'computer-assisted personal interview', with the interviewer asking questions from and inputting answers into a computer, surveying experiences of crime victimisation and perceptions of crime-related issues. Occasionally, the survey prompts "drugs" as a potential contributor to crime. The CSEW drugs module is subsequently completed anonymously with computer-assistance 'computer-assisted self-interview', but still in the presence of an interviewer. The importance of question structure, context and preceding questions have been shown in CSEW methodology reports to influence self-reporting of intimate personal violence and attitudes towards the police and criminal justice system.[22,23] It is possible that the structure of CSEW, being linked to questions on crime influences reporting of illicit drug use. Furthermore, CSEW allows "Don't want to answer" responses. This allows respondents to mask potential drug use with a non-committal answer that is not recorded as drug use. This option is not present with NMURx. A further difference is that NMURx formats the question in a table where all options are available, whereas CSEW asks sequential questions. Detailed differences between the surveys are outlined in Supplementary Table 2.

The main limitations to the NMURx survey are selection and non-response biases inherent in survey panels. Survey panels are self-selected, with potential for non-representative samples. However, NMURx utilizes pre-set quotas based on Census data and post-stratification weighting to represent

the general UK adult population. There is also potential for non-response bias, with a response rate of 8.7%. Although there are no clear disincentives to participating in this comparatively short, anonymous, online survey, it cannot be determined whether non-respondents differ in characteristics to respondents. However, respondents do not know the topic of the survey until they agree to the confidentiality statement, reducing such bias. Concerns of coverage bias are small, as internet coverage is extensive throughout England and Wales. Although the 16-19-year old group is under-represented in the NMURx survey, it is closer than CSEW to the general population (16-19 age group in Eurostat: 8.22%, in NMURx: 5.79%, and in CSEW: 4.19%). Exclusion bias, if present, is likely to be a small effect. A small number (n=529) of respondents had their surveys removed due to survey completion times faster than a pre-set industry standard cut-off. At one extreme, those who finish the survey quickly could all respond they have not used any drug in this analysis. With this small number, even if they were included as never-users for all drugs surveyed, it will decrease the point prevalence estimates by a small amount. The exclusion of this small number of fast responders would neither significantly bias the NMURx findings upwards nor would this change the overall conclusions of the study.

A major advantage of the short and succinct online format of the NMURx survey is the extensive analysis across multiple drugs. This is exemplified with the data obtained on GHB/GBL and non-prescribed fentanyl use, together with the extended age range covered. The survey could be expanded to explore other substance uses, or additional demographic data to allow for better stratification and further external validity in comparison to the general population. Additions can be quickly implemented in this flexible online format. Some additions have already been implemented, including ethnicity, marital status, highest education achieved, and alcohol consumption.

In summary, both CSEW and NMURx demonstrate that illicit drug use is common in England and Wales, self-reported drug use is higher in younger ages, males, and students, and cannabis use is the

most prevalent regardless of demographics. Prevalence estimates from the NMURx survey were consistently higher than, but comparable to, those of CSEW. These differences could be related to the population studied, where NMURx better reflects the general population, or the differences between an anonymous online survey (NMURx) against a government-associated interview survey on crime (CSEW). The NMURx program can provide timely, national estimates and is specifically designed to measure drug use. Whilst online survey panels have limitations, this study is evidence for external validity of the NMURx survey through illustration of similarities to the nationally accepted standard survey for illicit drug use, CSEW. This indicates that an anonymous online general population survey could be a method of assessing drug use across the general population, as opposed to subgroups, and NMURx can be a valuable data source to monitor trends and conduct research on drug use in the UK.

"What is already known on the subject"

- Illicit drug use is common, and cannabis use is most prevalent
- Demographical characteristics such as younger age, male and students also have a higher prevalence of ongoing (within last year) drug use
- General population surveys can underreport true rates of illicit drug use

Study's main messages

- A short cross-sectional online survey, with non-probability sampling methodology and pre-set demographical quotas based on Census data, focusing on illicit drug use is feasible and obtains a large dataset the demographics that reflect the overall UK adult population.
- This online survey finds prevalence of illicit drug use that is similar, but consistently higher, than previously established household surveys. This may potentially reflect the strengths of the online survey with its more representative cohort, or its anonymous, online and focused survey methodology and faster turnaround time from survey launch to available results.

- Like all online surveys, there are limitations particularly regarding response rates and potential non-response bias.

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Research Questions

- Are there similar discrepancies in drug misuse reporting with regards to face-to-face vs. online surveys in different countries?
- Why does the relationship between self-reported drug use and income differ between the two survey methodologies?
- Is the use of online surveys an appropriate and cost-effective alternative method for long-term assessment of trends in drug misuse?

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Tables (with legends)

	Lifetime Use		Last Year Use		Last Month Use	
	NMURx	**CSEW**	**NMURx**	**CSEW**	**NMURx**	**CSEW**
Cannabis	31.36% (30.19 - 32.54)	29.42% (28.68 - 30.16)	8.81% (8.06 - 9.55)	6.47% (6.07 - 6.87)	6.24% (5.61 - 6.88)	3.24% (2.96 - 3.53)
Cocaine Powder	13.64% (12.78 - 14.51)	9.65% (9.17 - 10.13)	4.96% (4.41 - 5.51)	2.21% (1.97 - 2.45)	2.82% (2.41 - 3.23)	0.84% (0.69 - 0.99)
Crack Cocaine	4.63% (4.11 - 5.14)	1.00% (0.84 - 1.16)	3.06% (2.64 - 3.48)	0.09% (0.04 - 0.14)	2.26% (1.90 - 2.63)	0.05% (0.01 - 0.08)
Ecstasy	13.45% (12.59 - 14.32)	9.39% (8.92 - 9.86)	4.45% (3.93 - 4.98)	1.50% (1.30 - 1.70)	2.46% (2.07 - 2.84)	0.39% (0.29 - 0.50)
Amphetamine	12.31% (11.50 - 13.12)	10.12% (9.63 - 10.61)	3.27% (2.83 - 3.71)	0.60% (0.48 - 0.73)	2.23% (1.87 - 2.60)	0.16% (0.10 - 0.23)
Ketamine	6.18% (5.57 - 6.79)	2.37% (2.13 - 2.62)	2.65% (2.25 - 3.04)	0.29% (0.20 - 0.37)	1.64% (1.33 - 1.96)	0.06% (0.02 - 0.11)
Mephedrone	4.58% (4.06 - 5.11)	2.01% (1.78 - 2.24)	2.64% (2.24 - 3.3)	0.27% (0.19 - 0.36)	1.79% (1.45 - 2.12)	0.11% (0.06 - 0.16)
Heroin	4.08%	0.58%	2.63%	0.08%	1.77%	0.05%

	(3.59 - 4.57)	(0.46 - 0.70)	(2.23 - 3.02)	(0.03 - 0.13)	(1.45 - 2.09)	(0.01 - 0.08)
GHB/GBL	3.95% (3.47 - 4.43)	N/A	2.39% (2.01 - 2.76)	N/A	1.68% (1.37 - 1.99)	N/A
Non-medicinal fentanyl	3.31% (2.87 - 3.74)	N/A	2.44% (2.06 - 2.82)	N/A	1.74% (1.42 - 2.06)	N/A

Table 1: Estimated prevalence of recreational drug use in CSEW and NMURx surveys for those aged 16-59 in England and Wales - listed by lifetime use, use in last year and use in last month.

95% CI in parentheses. N/A Data not collected by CSEW.

	Males						Females					
	16-24		25-59		60+		16-24		25-59		60+	
	NMURx	CSEW	NMURx	CSEW	NMURx	CSEW	NMURx	CSEW	NMURx	CSEW	NMURx	CSEW
Cannabis	17.16% (13.26 - 21.05)	19.94% (17.11 - 22.77)	9.26% (8.14 - 10.37)	6.57% (5.93 - 7.21)	0.78% (0.32 - 1.24)	N/A	14.05% (10.91 - 17.19)	11.52% (9.44 - 13.61)	5.02% (4.23 - 5.81)	2.11% (1.77 - 2.44)	0.26% (0.05 - 0.46)	N/A
Cocaine Powder	7.39% (4.85 - 9.92)	5.91% (4.25 - 7.56)	6.12% (5.21 - 7.03)	2.65% (2.24 - 3.06)	0.11% (0.00 - 0.27)	N/A	6.61% (4.42 - 8.81)	2.92% (1.82 - 4.01)	2.81% (2.21 - 3.40)	0.75% (0.55 - 0.95)	0.06% (0.00 - 0.17)	N/A
Crack Cocaine	5.15% (3.15 - 7.15)	N/A	3.68% (2.99 - 4.37)	N/A	0.00%	N/A	3.45% (1.87 - 5.03)	N/A	1.83% (1.35 - 2.31)	N/A	0.00%	N/A
Ecstasy	7.87% (5.25 - 10.49)	6.06% (4.39 - 7.74)	4.61% (3.82 - 5.39)	1.24% (0.95 - 1.52)	0.04% (0.00 - 0.13)	N/A	8.66% (6.14 - 11.18)	2.93% (1.83 - 4.03)	2.44% (1.89 - 2.99)	0.36% (0.22 - 0.50)	0.00%	N/A
Amphetamine	5.10% (3.07 - 7.13)	1.60% (0.72 - 2.48)	3.74% (3.03 - 4.44)	0.62% (0.42 - 0.82)	0.00%	N/A	4.15% (2.40 - 5.90)	0.63% (0.11 - 1.14)	2.15% (1.63 - 2.67)	0.34% (0.21 - 0.48)	0.00%	N/A

Ketamine	4.08% (2.26 - 5.91)	1.65% (0.76 - 2.55)	3.14% (2.51 - 3.78)	0.19% (0.08 - 0.31)	0.00%	N/A	3.44% (1.82 - 5.05)	0.30% (0.00 - 0.66)	1.62% (1.17 - 2.07)	0.05% (0.00 - 0.11)	0.06% (0.00 - 0.17)	N/A
Mephedrone	4.39% (2.48 - 6.31)	1.36% (0.55 - 2.17)	3.32% (2.66 - 3.98)	0.18% (0.07 - 0.29)	0.00%	N/A	2.56% (1.18 - 3.95)	0.50% (0.04 - 0.95)	1.54% (1.10 - 1.98)	0.05% (0.00 - 0.10)	0.00%	N/A
Heroin	4.21% (2.33 - 6.10)	N/A	3.25% (2.60 - 3.89)	N/A	0.00%	N/A	3.10% (1.59 - 4.60)	N/A	1.51% (1.07 - 1.94)	N/A	0.00%	N/A
GHB/GBL	4.26% (2.41 - 6.11)	N/A	2.88% (2.27 - 3.49)	N/A	0.00%	N/A	1.86% (0.71 - 3.02)	N/A	1.56% (1.11 - 2.00)	N/A	0.00%	N/A
Non-medicinal fentanyl	3.90% (2.11 - 5.70)	N/A	3.08% (2.45 - 3.70)	N/A	0.13% (0.00 - 0.33)	N/A	2.30% (1.01 - 3.60)	N/A	1.48% (1.05 - 1.91)	N/A	0.00%	N/A

Table 2: Estimated prevalence of recreational drug use in the past year in both CSEW and NMURx surveys for England and Wales - stratified by gender x age

95% CI in parentheses. N/A Data not collected by CSEW.

	Student		Non-student	
	NMURx	**CSEW**	**NMURx**	**CSEW [#]**
Cannabis	14.76% (12.07 - 17.45)	14.57% (11.44 - 17.71)	7.81% (7.06 - 8.55)	6.19% (5.80 - 6.59)
Cocaine Powder	8.35% (6.44 - 10.26)	3.45% (1.83 - 5.06)	4.39% (3.83 - 4.94)	2.17% (1.93 - 2.41)
Crack Cocaine	6.71% (5.02 - 8.40)	N/A	2.45% (2.05 - 2.85)	N/A
Ecstasy	11.06% (8.77 - 13.35)	5.02% (3.08 - 6.95)	3.34% (2.87 - 3.82)	1.38% (1.19 - 1.57)
Amphetamine	7.46% (5.67 - 9.25)	2.10% (0.83 - 3.37)	2.57% (2.15 - 2.98)	0.60% (0.47 - 0.72)
Ketamine	6.01% (4.40 - 7.63)	0.99% (0.12 - 1.87)	2.08% (1.71 - 2.46)	0.27% (0.18 - 0.35)
Mephedrone	6.46% (4.78 - 8.14)	1.21% (0.24 - 2.18)	1.99% (1.63 - 2.36)	0.24% (0.16 - 0.32)
Heroin	6.23% (4.59 - 7.88)	N/A	2.02% (1.65 - 2.38)	N/A
GHB/GBL	5.17% (3.70 - 6.65)	N/A	1.92% (1.56 - 2.27)	N/A
Non-medicinal fentanyl	5.71% (4.17 - 7.26)	N/A	1.89% (1.53 - 2.24)	N/A

Table 3: Estimated prevalence of recreational drug use in the past year in both CSEW and NMURx surveys for those aged 16-59 in England and Wales - stratified by student status

[#] CSEW "non-student" subgroup is not a defined CSEW grouping, and was calculated by subtracting the reported student subgroup from the overall sample population

95% CI in parentheses. N/A Data not collected by CSEW.

	<£10k		£10k-£20k		£20k-£30k		£30k-£50k		>£50k	
	NMURx	**CSEW**	**NMURx**	**CSEW**	**NMURx**	**CSEW**	**NMURx**	**CSEW**	**NMURx**	**CSEW**
Cannabis	13.13% (10.07 - 16.19)	9.67% (7.97 - 11.37)	9.42% (7.55 - 11.28)	7.47% (6.35 - 8.59)	9.04% (7.28 - 10.80)	6.02% (5.00 - 7.04)	7.67% (6.38 - 8.97)	4.96% (4.23 - 5.69)	9.13% (7.47 - 10.79)	6.06% (5.29 - 6.84)
Cocaine Powder	2.87% (1.50 - 4.25)	2.62% (1.70 - 3.54)	4.89% (3.51 - 6.28)	1.90% (1.32 - 2.48)	3.60% (2.49 - 4.70)	1.27% (0.79 - 1.75)	5.96% (4.82 - 7.10)	1.78% (1.33 - 2.22)	7.39% (5.96 - 8.83)	3.03% (2.47 - 3.59)
Crack Cocaine	0.83% (0.10 - 1.56)	N/A	2.20% (1.29 - 3.10)	N/A	1.98% (1.15 - 2.81)	N/A	3.64% (2.77 - 4.51)	N/A	6.29% (4.98 - 7.60)	N/A
Ecstasy	3.17% (1.52 - 4.82)	2.06% (1.24 - 2.87)	3.96% (2.73 - 5.18)	1.02% (0.59 - 1.44)	2.74% (1.75 - 3.74)	0.63% (0.29 - 0.97)	4.89% (3.87 - 5.91)	0.93% (0.61 - 1.25)	7.67% (6.17 - 9.16)	2.20% (1.72 - 2.68)
Amphetamine	1.37% (0.42 - 2.32)	1.06% (0.47 - 1.65)	3.12% (2.06 - 4.19)	1.10% (0.66 - 1.55)	1.93% (1.11 - 2.76)	0.33% (0.09 - 0.58)	3.77% (2.88 - 4.65)	0.55% (0.30 - 0.80)	5.99% (4.71 - 7.28)	0.50% (0.27 - 0.73)
Ketamine	0.64% (0.01 - 1.28)	0.22% (0.00 - 0.49)	1.97% (1.10 - 2.83)	0.28% (0.05 - 0.50)	1.37% (0.71 - 2.03)	0.28% (0.06 - 0.51)	3.35% (2.50 - 4.19)	0.13% (0.01 - 0.25)	5.18% (3.99 - 6.37)	0.39% (0.19 - 0.59)
Mephedrone	1.14% (0.29 - 1.99)	0.18% (0.00 - 0.41)	1.94% (1.09 - 2.80)	0.27% (0.05 - 0.50)	1.85% (1.04 - 2.66)	0.17% (0.00 - 0.34)	3.23% (2.41 - 4.05)	0.24% (0.08 - 0.41)	4.79% (3.65 - 5.94)	0.31% (0.13 - 0.49)
Heroin	1.13%	N/A	1.86%	N/A	1.84%	N/A	3.09%	N/A	4.95%	N/A

	(0.29 - 1.98)		(1.02 - 2.71)		(1.03 - 2.64)		(2.29 - 3.89)		(3.79 - 6.11)	
GHB/GBL	0.69% (0.01 - 1.37)	N/A	1.21% (0.55 - 1.88)	N/A	1.80% (1.01 - 2.59)	N/A	3.10% (2.29 - 3.91)	N/A	4.69% (3.56 - 5.81)	N/A
Non-medicinal fentanyl	0.83% (0.10 - 1.56)	N/A	1.75% (0.94 - 2.57)	N/A	1.62% (0.87 - 2.37)	N/A	3.16% (2.35 - 3.96)	N/A	4.50% (3.39 - 5.61)	N/A

Table 4: Estimated prevalence of recreational drug use in the past year in both CSEW and NMURx surveys for those aged 16-59 in England and Wales - stratified by household income

95% CI in parentheses. N/A Data not collected by CSEW.

Supplementary tables

		NMURx	CSEW	General population	[REF]
Unweighted N		8,903	20,685	33,245,355	[14]
Weighted N		37.4 million	32.8 million		
Sex: Female		51.13% (49.99 - 52.28)	54.87% (54.20 – 55.54)	50.02%	[14]
Age category (% calculated as proportion of those aged 16-59)	**16-19**	5.79% (5.07 - 6.52)	4.19% (3.92 – 4.46)	8.22%	[14]
	20-24	14.02% (12.97 - 15.06)	7.28% (6.93 – 7.63)	11.36%	
	25-29	10.40% (9.66 - 11.14)	10.52% (10.11 – 10.93)	11.80%	
	30-34	13.19% (12.36 - 14.01)	12.37% (11.92 – 12.82)	11.67%	
	35-44	22.46% (21.45 - 23.48)	25.27% (24.68 – 25.86)	22.29%	
	45-54	24.37% (23.33 - 25.41)	28.02% (27.41 – 28.62)	24.28%	
	55-59	9.77% (9.18 - 10.36)	12.34% (11.89 – 12.79)	10.37%	
Residential region	**England (excluding London)**	79.87% (78.95 - 80.79)	81.14% (80.71 – 81.57)	78.22%	[14]
	London	14.68% (13.88 - 15.47)	11.38% (10.84 – 11.90)	16.61%	
	Wales	5.46% (4.90 - 6.01)	7.49% (7.14 – 7.84)	5.18%	
Household income	**<£10000**	8.52% (7.85 - 9.19)	7.91% (7.55 – 8.23)	No directly comparable	[15]

	£10000-£19999	8.52% (7.85 - 9.19)	14.53% (14.05 – 15.01)	dataset. Bottom 1st decile <£13,586, bottom 3rd decile <£20,007, bottom 6th decile <£30,425, top decile >£53,448	
	£20000-£29999	19.46% (18.56 - 20.36)	14.51% (14.03 – 14.99)		
	£30000-£49999	26.56% (25.57 - 27.55)	23.27% (22.70 – 23.85)		
	>£50000	16.00% (15.21 - 16.80)	24.92% (24.33 – 25.51)		
	No information provided	8.43% (7.75 - 9.12)	14.86% (14.38 – 15.35)		
Students		10.37% (9.62 - 11.12)	3.36% (2.89 – 3.83)	Crude estimate 7-8% *	[16]

Supplementary Table 1: Demographical data for CSEW and NMURx respondents

* General population data for students obtained from UK labour market Feb 2017 [16], based on overall UK seasonally adjusted (October to December 2016) estimates; there were no readily available figures based on England and Wales alone.

95% CI in parentheses. Grouping by residential region was limited by data from NMURx. Data from CSEW includes further stratification of other regions within England.

	NMURx	CSEW
Format	Online	Computer-assisted self-interviewing module, in presence of interviewer from main survey
Invitation method	E-mail	Leaflet via post, with follow up personal visit to arrange interview
Sampling	Uses pre-set gender and region quotas based on Census data Postcode data is available, so further stratification is possible	Cluster design - by setting minimum of households surveyed (650) in each of the 42 Police Force Area [Ref 11] A whole household is selected, and if more than one resident aged over 16 in household, participant is chosen at random
Context	Isolated survey regarding drug use only	Drug use module completed at the end of the face-to-face interview that mainly covers questions on experiences of crime victimisation and perceptions of crime-related issues
Duration of survey	3Q16 Median: 9 minutes 37 seconds 3Q16 Average: 13 minutes 49 seconds	Mean duration of core interview 2014-15 was 47 minutes (duration dependent on number of Victimisation Modules completed: 20% took over 60 minutes) Mean duration of CASI modules (including drug misuse) 2014-15 was 14.4 minutes [Ref 24] Note: Respondents would have had to complete both sections to have relevant drugs misuse data

Question layout	Table format. 9 drugs (can include street name examples). Options (single tick): • No • Yes, in the last week • Yes, in the last 30 days • Yes, in the last 12 years • Yes, during my lifetime	Have you [EVER] taken ... [including street names] [in time period]? 1. Yes 2. No 3. Never heard of it 4. Don't want to answer Separate questions for lifetime use, last year and last month (in that order) [Ref 25]
Population (see Table 2)	Registered participants from an online survey panel Estimated compensation ~ £3 per respondent	Households within Police Force Areas, and does include group residences or other institutions [Ref 11] No financial compensation for respondent
Weighting	Post-stratification weighting based on UK Census age, gender, and region	Two step weighting process: Step 1 - Raw data weighted to compensate for unequal probabilities of selection involved in the sample design (by commercial contractor) Step 2 - Calibration weighting is used to adjust for differential non-response - by geography (by Office of National Statistics / Home Office)
Response rate	8.4%	~70%

Supplementary Table 2: Comparisons between CSEW and NMURx surveys