SURVEY MEASURES OF DRUG/SUBSTANCE USE

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1. What is drug/substance use and why measure it?

For the purposes of this review, we use the term 'drug' to mean the set of controlled substances covered by the 1961, 1971 and 1988 UN conventions on narcotics and translated into prohibitive UK law by the 1971 Misuse of Drugs Act and later legislation. These illicit drugs include cannabis (by far the most prevalent), cocaine (in powder and crack forms), heroin, 'magic mushrooms', MDMA ('ecstasy'), amphetamines, LSD and a growing list of other synthetic narcotics. Other related 'substances' which are controlled but not prohibited include various volatile chemicals (glue, lighter fuel, etc.) and, most common of all, alcohol and tobacco. There are several distinct reasons for including questions about drug and substance use in sample surveys.

First, there is concern about the possible adverse health effects of drug use, which may include impaired cognitive function, increased risk of psychotic illness, lung disease, liver damage, accidental overdose and blood-borne disease propagated through needle-sharing. Many of these substances bring a risk of long-term dependence and some (particularly cannabis) have been seen by some as causal 'gateways' in a progression to hard drug use.

Second, data on drug use may be important for a full understanding of the process of child/adolescent development, since early drug use is often associated with adverse family circumstances and characteristics, and is often accompanied by other adverse outcomes such as truancy, crime, low educational attainment and unemployment.

Third, drug use may impose serious external costs on the rest of society, including intangible costs like the anxiety and distress caused to other family members and tangible economic costs -   particularly acquisitive crime committed to generate income for the purchase of drugs. Drug use also brings an increased risk of accidental harm, for example through alcohol-related road accidents.

Drug/substance use is the subject of heated policy debate which, despite often seeming impervious to actual evidence, has been informed by a great deal of statistical research based on survey data. The policy debate brings into conflict the criminal justice and harm-minimisation approaches. The former emphasises legal sanctions as deterrents to participants and requires good evidence on the effect of such deterrents, while the latter seeks interventions which will reduce the personal and social harms caused by drug use and thus requires evidence on the magnitude of harms and the effects of regulation rather than criminalisation.

2. Concepts and measurement problems

Drug and substance use is, by its nature, difficult to measure in surveys and there are well-known problems flowing from the illegality of prohibited drugs or the social disapproval associated with smoking and problem drinking. Survey respondents may have a strong incentive to conceal their use of drugs from untrusted inquirers and refuse co-operation with surveys, so that under-reporting and non-response tend to lead to under-estimation of actual drug use in the population – especially for 'hard' drugs like heroin and cocaine. Many surveys include questions about a fictitious drug "semeron" which typically reveals only very small numbers of 'false positive' claims of use.

Illegal drug markets are necessarily unregulated and subject to occasional supply shortages which may cause suppliers to vary the degree of purity of retail drugs by adulteration with various substances. Consequently, consumers cannot be completely confident of what they are buying and consuming, and this is an obstacle to measurement of the consumption of the drug itself.

Surveys are concerned with a number of different aspects of drug/substance use:

Prevalence is based on a binary distinction between use and non-use of a substance within some reference period. Typical reference periods are the month or year prior to interview, or the whole of the respondent's life. Prevalence questions are believed to be less vulnerable to recall problems than other question types.

Age of onset and desistance   Most forms of drug use have distinctive age profiles. Experimentation with drugs tends to begin in adolescence or early adulthood and declines in mature adulthood. See Figure 1 for the case of cannabis (but note that this

pattern is less apparent for the legal drugs alcohol and tobacco). Thus drug surveys need to have good coverage of the younger population. There is evidence to suggest that early onset of drug use is particularly damaging in terms of the risk of immediate health problems, disturbance to child/adolescent development and longer-term drug dependence. Consequently, many surveys ask directly about the age of first use of specific substances, although there is evidence that these retrospective questions are vulnerable to recall error, particularly when asked in adulthood.
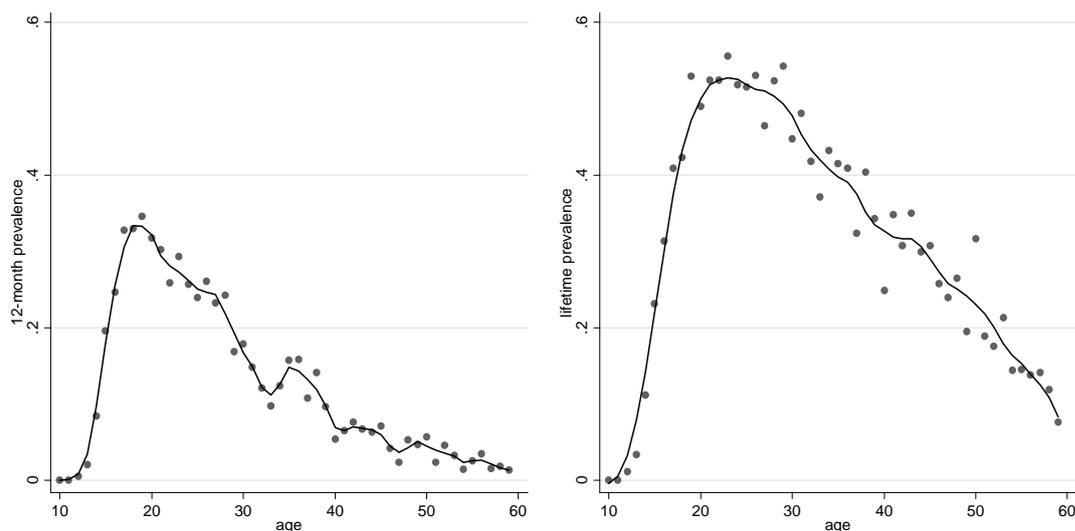
Figure 1 The age profile of cannabis prevalence (i) within the previous 12 months (ii) any time in the past (Offending Crime and Justice Survey: England and Wales 2003)

Frequency of use We are generally most concerned with regular heavy drug use or patterns of consumption that involve 'bingeing'. One of the most challenging tasks of the survey designer is to produce questions which will successfully reveal the nature of an individual's consumption practices. A particular concern is the fact that heavy drug or alcohol use impairs the cognitive processes that lead to perception and recall of the episode of use.

Quanities consumed Some surveys ask direct questions about the quantity consumed (as opposed to the number of episodes of use). This is most feasible for alcohol (often measured in standard 'units') and tobacco (number of cigarettes), but it has been found that question design (e.g. choice of reference period, inclusion of specific cues in question wording) has a big effect on responses. Quantities are particularly difficult for illegal drugs, since they are often sold in non-standard or ill-defined quantities (e.g. the £10 'bag' of heroin or the 'rock' of crack) and responses to quantity questions often contain large outliers that may indicate respondents' confusion between units. It is impractical to ask users about purity, and such data generally comes from analysis of seized samples by forensic science services.

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Dependence There is a distinction to be made between a practice of regular or large-scale use of a substance and the state of addiction or dependence. The concepts of addiction and dependence are contentious, since the complex of biological and social/psychological processes leading to these states is not well understood, nor is the way in which they shape observable behaviour. Of course, dependence may also be a feature of many consumption goods or activities not generally regarded as 'drugs' or 'substances'. In the absence of a clear theoretical definition and test for the existence of dependence, measurement is generally based on standard batteries of questions which can be used to give a dependency score. The Adult Psychiatric Morbidity Surveys exemplify this type of survey instrument.

Attitudes and perceptions An important channel of drug policy is through its impact on attitudes towards drugs. Survey questions are widely used to measure perceptions of the degree of risk associated with the use of specific drugs and have been found to be very responsive to some headline events (such as the cocaine-related death of US basketball player Len Bias in 1986). Social networks are an important aspect of drug use and survey questions are also often used to measure perceptions of the prevalence of drugs in the respondent's peer group – typically revealing a much higher level than that of actual use self-reported in the same survey.

Injecting Intravenous drug use is a particular concern because of its role in the spread of diseases like Hepatitis B and HIV/AIDS. Few general-population surveys contain questions about method of administration because such surveys are believed to under-represent regular users of hard drugs, but more specialised surveys focused on population groups with high rates of drug use typically contain such questions.

Drug-related crime   Drug-induced crime is hard to measure because of the "unobserved counterfactual" – since we can't observe how much crime a drug-user would commit in the absence of drugs, we cannot observe directly the amount of crime that is causally related to drug use. Most analysts have approached this measurement problem in one of in two ways – (i) by using surveys that ask about drug use and criminal activity and assume that all (acquisitive) crime committed by drug-users is drug-induced or (ii) by using surveys which ask drug-using respondents to report their own assessment of the extent to which their criminal activity is drug-related. It is likely that both approaches over-state the volume of drug-related crime.

Access to supply For all prohibited drugs and age-regulated products like alcohol and tobacco, the ability to buy is limited by availability as well as price. Many surveys attempt to measure access or availability by asking respondents how easy or difficult it would be for them to obtain the drug. Question wording is likely to be particularly important here, and most surveys adopt different rather vague wordings with a 4 or 5-point response scale ranging from "impossible" or "very difficult" to "very easy".

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Some attempts have been made to improve questions by specifying more clearly the period within which the substance would, hypothetically, have to be obtained.

Purity   There is no standardised product in illegal markets. At the retail level, substances like heroin and cocaine may be diluted to varying degrees with various contaminants and others, like cannabis, may vary enormously in terms of the content of the psycho-active ingredient, THC. The same difficulty may also arise to some degree in legal markets (especially alcohol), where product differentiation gives rise to a bewildering array of different products. Consequently, self-report surveys are not seen as a good way of generating data on purity.

Prices   Purchased quantities and expenditures of legal goods like alcohol and tobacco are recorded at the transaction level (but probably understated) in diary-based expenditure surveys like the UK Living Costs and Food Survey. Transactions in illegal markets are much more difficult to observe in survey data. Some surveys (like the 2003-6 England & Wales Arrestee Survey) have included questions about the quantity and expenditure involved in the most recent transaction, but unit values computed from the responses are best treated with extreme caution. There is no official retail price index for illicit drugs, but independent surveys giving direct estimates of average street prices include the annual survey of voluntary drug and alcohol services conducted by Drugscope and the regular internet survey carried out by the Independent Drug Monitoring Unit.

3. Existing survey content

Given the difficulty of measuring illicit drug/substance use, it is surprising that there are so many surveys which do include such questions. This is in addition to the many health surveys which contain questions about drinking and smoking. Table 1 gives a non-exhaustive list of major nation-level UK surveys that contain questions about drug and substance use. It is intended only to indicate the wide range of drug-related surveys available. A very few surveys, including the Health Survey for England and the Arrestee Survey have used bio-markers to test for substance residues, thus giving a physical check on self-reported substance use. Such comparisons generally indicate a degree of under-reporting in self-report surveys.

The range of question types and designs implemented in these surveys is very large and there is relatively little experimental work available to assess the relative success of different question designs, particularly for illegal substances.

Table 1: Cross-section surveys with questions on drug use

Survey	Years	Target population	Content
Cross-section household-population surveys			
British Crime Survey (BCS)	1982 onwards	Adults over 16 in private households + children aged 10-15	15 named drugs: prevalence (ever, year, month); frequency in last year. Frequency of drinking & drunkenness in last year
Scottish Crime and Justice Survey (SCJS)	1993 onwards	Adults over 16 in private households	16 named drugs: prevalence (ever, year, month); frequency in last year. Frequency of drinking & drunkenness in last year
Health Survey for England (HSE)	Annual, since 1991	Children 8-15 and adults in private households	Alcohol and tobacco: age of onset, prevalence in last year, detail on frequency & amounts in last week; knowledge of & attitudes to alcohol; separate questionnaires for children. Blood testing for cotinine marker.
Adult Psychiatric Morbidity Survey (APMS)	Occasional surveys since 1993: current survey 2007	Adults over 16 in private households	Very detailed questions about alcohol and 15 named drugs, including: prevalence, and frequency measures; subjective assessment of dependence; overdoses, injecting, treatment
England & Wales Arrestee Survey (EWAS)	Continuous survey 2003-6	Arrestees in police custody	Interviews cover 10 illegal drugs and alcohol, including: prevalence (ever, last year, last month); source of supply and details of most recent purchase and most recent use; drug injecting; treatment needed, offered and received. Past criminal activity and extent to which crimes are drug-related. Saliva testing for cannabis,

			cocaine and opiate residues
Survey of Smoking, Drinking and Drug Use among Young People (SSDDU)	Annual series; first conducted 1982	School students aged 11-15 mainly in England	For 14 illicit drugs, alcohol and tobacco: prevalence of use and being offered; age of onset; most recent use; lifetime no. of episodes of use; acceptability of drug/substance use; perception of prevalence; sources of information about drugs. For alcohol and tobacco, source of supply and perceived parental attitudes.
European School Survey Project on Alcohol and other Drugs (ESPAD) http://www.espad.org/	Every four years from 1995-2007	School students aged 15/16 in European countries	For 9 illegal drugs, tobacco and alcohol, detailed questions on: prevalence; age of onset; adverse consequences of use; perceptions of health risk; source of supply

Table 2: Longitudinal surveys with questions on drug use

Longitudinal surveys			
Offending, Crime and Justice Survey (OCJS)	2003-6	Initially age 10-65; waves 2-4: age 10-25	For 9 illegal drugs: prevalence (ever, last year, last 4 weeks); frequency of use (in lifetime and last year); age of onset and last episode of use; source of supply; method and place of consumption; indicators of dependence; expenditure in last 4 weeks; ease of access (number of potential sources accessible within a day); adverse consequences of drug use
Longitudinal Survey of Young People in England (LSYPE)	2004-8	Initially, school students aged 13/14	Cannabis prevalence (ever used); alcohol (ever and current frequency)
British Cohort Survey (BCS70)	At birth in 1970 and at age 5, 10, 16, 26, 30, 34, 38	Subjects sampled at birth in Great Britain	Drug prevalence questions (7 substances) asked first at age 16, using randomised question structure for confidentiality. Also questions on perceptions and attitudes. Prevalence questions for 12 drugs at age 30 and 34. Prevalence and frequency of use during previous 4 years asked at age 34.

4. Future prospects

Although there is certainly scope for great progress in the future development of drug surveys, recent developments in the UK have not been encouraging. The suspension of the longitudinal OCJS and the arrestee-targeted EWAS has left us too reliant on regular annual cross-sections of the private household population (e.g. the BCS) and the school population (e.g. the SSDDU), which understate the extent of problem drug use and do not give a sound basis for causal analysis of drug-related behaviour. Among urgent priorities for the future development of drug surveys, I would include the following.

- The collection of bio-markers as part of the survey process and the linkage of survey data to external health data and experimental investigations, opens the possibility of a deeper understanding of the biological basis of drug dependence.
- Targeted sampling of sub-populations with high rates of drug/substance use, analysed in conjunction with data from general-population surveys could be used more systematically to overcome the under-estimation of drug prevalence that is known to be a feature of standard sources like the BCS.
- At present, the choice and detailed design of questions used in extant surveys seems rather ad hoc and there have been few attempts in the UK to explore systematically the relationship between question design and response behaviour, particularly in relation to illicit drugs. Experimental testing of question designs could be used much more than at present to minimise measurement error, perhaps also in combination with bio-markers providing physical comparator measures.
- Declining survey response rates, particularly among the groups most likely to be drug users, will make it increasingly important to investigate new ways of recruiting and communicating with survey participants. Internet surveys have their problems but are likely to have an important role in generating data on drug use in the future. The LISS internet panel based at Tilburg University in the Netherlands is a leading example of this approach.