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What do we know about the extent of opioid use and dependence? Results of a global systematic review

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WHAT DO WE KNOW ABOUT THE EXTENT OF OPIOID USE AND DEPENDENCE? RESULTS OF A GLOBAL SYSTEMATIC REVIEW

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We dedicate this to our colleague and friend, Jen McLaren, who led the early work on this review and meant so much to our team.

EXECUTIVE SUMMARY

Aims: At present no peer-reviewed publication exists regarding the extent of use and dependence of heroin/opioids at the global level. To address this need for information, we aim to present the first systematic review of prevalence estimates, across all 229 UN Member States, for heroin/opioid use and dependence. We include all countries' most recent estimates, with methodological details, for the prevalence of use and dependence on heroin (or other opioids, if heroin estimates were unavailable). We also suggest priorities for improving data quality and coverage.

Methods: Relevant evidence was identified through systematic searches of grey and peer-reviewed literature (1990-2008), online databases, and the WWW; repeated consultation and feedback from experts worldwide; and a viral email to lists in the illicit drug and HIV fields. Data was extracted using manualised protocols, checked for internal consistency, classified using predefined variables and quality scored. This paper reports the most recent and highest graded prevalence estimate for the general population and school population and reports the proportion of coverage of the world's population for use and dependence estimates, general population and school surveys, age and sex specific estimates, and most recent year of estimates.

Results: Evidence of heroin/opioid use or dependence was found for 192 of 229 countries worldwide. For 101 countries, with 18.2% of the world population aged 15-64 years (WP15-64), no prevalence estimates were available. For 25 countries (33.5% WP15-64) dependence estimates were available. Fifty four countries (48.7% WP15-64) had estimates for use among the general population and 65 (40.4% WP15-19), for use among school-aged youth. Just 16 countries, constituting 5.6% WP15-64 had a national estimate of dependence using indirect (gold standard) methods as well as a national general population survey (direct) estimate of use. National past-year prevalence estimates ranged from 0-3% (any use in the past year) and 0.1-0.8% (dependence). Age ranges, estimation methods and the types of 'opioid' assessed differed widely.

Conclusions: The available prevalence data is incomplete, inconsistent and therefore unable to meet the needs of public health policy makers attempting to plan scaled responses. There is a need for greater data coverage, more rigorous methods, and regular data collection to improve this situation.

1. INTRODUCTION

Opioid dependence causes a significant burden to individuals and society. Users may struggle with dependence over many years, and can suffer from harms such as poor health, elevated mortality (1-3) particularly due to overdose (4, 5) and infection with blood borne viruses such as HIV (1). Risks are concentrated in opioid injectors, who make up the large majority of injecting drug users worldwide, although reliable data are lacking (185). Opioids carry a risk for illicit/non-medical use and dependence but also have high therapeutic value and are widely used for pain relief.

Opioids include both the natural opiates (narcotic analgesics found in certain opium poppies) and synthetic/semi-synthetic substances that mimic their effects (6, 7). Examples include opium, morphine, heroin (diacetylmorphine), and pharmaceutical preparations such as methadone. The immediate effects of opioid use include analgesia (relief from pain) and euphoria (feeling of wellbeing)(8).

The World Health Organization (WHO) diagnosis of dependence requires the presence of three or more indicators of drug dependence at the same time at some stage in the past year, including: a strong desire or compulsion to take the substance; impaired control over the its use; a withdrawal syndrome on ceasing or reducing its use; tolerance to the effects of the drug, such that larger doses are required to achieve the desired effect; a disproportionate amount of the user's time spent obtaining, using and recovering from drug use; and the user continuing to take other drugs despite associated problems (9). Risk of dependence is elevated by injection, but still considerable for smoking (10-13).

Effective treatments for opioid dependence – such as opioid substitution treatment – are available and affordable (14), and providing these reduces the burden of harm (15-17). Currently there is a global effort from many countries, international organisations, development and other funding agencies (such as the Global Fund for HIV/AIDS, TB and Malaria) to assist countries to scale up their treatment of opioid dependence, largely driven by the associated HIV epidemic. To make accurate treatment provisions it is necessary to know how many users are dependent, but monitoring of opioid use and dependence at the global level is weak. UNODC uses data reported to the United Nations by Member States through the Annual Reports Questionnaire. Although a very important data source, estimation methods and other details of the studies upon which these estimates are based are not reported by many Member States.

The estimation method is quality of critical influence on the quality and reliability of prevalence data. The widely used 'direct' methods (general population and school surveys) are prone to potentially serious underestimation of levels of drug use and dependence, particularly for less commonly used drugs such as opioids (18, 19). This is because they depend on self-report of often highly stigmatised behaviour (20) and they exclude marginalised groups (e.g. homeless) in which rates of drug use are higher (21). Indirect methods (including capture-recapture and multiplier methods) do not rely on self-reports but extrapolate prevalence from observed cases. These methods are widely considered the preferred method for estimating dependence (22-24). Indirect studies may produce estimates of the number of dependent heroin users that are 7-10 times greater (25) than those found using direct methods, although this ratio is likely to be country-specific and depend on available datasets and survey methods.

At present no peer-reviewed publication exists regarding the extent of use and dependence of heroin/opioids at the global level. To address this need for information, we present the first systematic review of prevalence estimates, across all 229 UN Member States (referred to

hereafter as countries), for heroin/opioid use and dependence. We include all countries' most recent estimates, with methodological details, for the prevalence of use and dependence on heroin (or other opioids, if heroin estimates were unavailable). We also suggest priorities for improving data quality and coverage.

2. METHOD

According to an approach being used across searches undertaken for the 2005 Global Burden of Disease project (GBD), a systematic review was undertaken for opioid dependence and use. Standardised approaches to literature searches, search terms, data collection, data extraction, consistency and error checking, and expert consultation and review were taken. These are mentioned below and are all documented in further detail on the methodology page of the GBD expert group's website: http://www.gbd.unsw.edu.au/gbdweb.nsf/page/Methodology

2.1. Peer reviewed literature

The search was conducted through numerous stages (see **Text Box 1**). First, searches in the peer-reviewed literature were conducted using a strategy consistent with the methodology recommended by the Meta-analysis of Observational Studies in Epidemiology (MOOSE) group (26) using a broad search string to interrogate three electronic databases: Medline, EMBASE and PsycINFO. These databases were chosen after consultation with a qualified archivist. Searches focused on studies of human subjects published between 1990 and 2008 inclusive. No limitations were set on language of publication. Search strings, tailored to each database (including keywords, MeSH terms, EMTREE terms and explode terms) were devised for different subjects areas (see **Appendix A** for search strings and **Appendix B** for search string combinations).

Researchers searched LILACS, an online multilingual database, so that articles were not limited to English. Other means to overcome the language limitation were; consulting with experts who spoke languages other than English and conduct research in non-English speaking countries; and asking experts from non-English speaking countries to translate their data or reports into English when data could not be located for that country.

Text Box 1: STAGES OF WORK

Systematic Search

1. Three electronic databases were searched (Medline, EMBASE, PsycINFO)
2. Hand searching of reference lists of review articles and articles of importance
3. Initial cull of peer reviewed literature
4. Short list of peer reviewed studies reviewed
5. Grey literature web-based searches
6. Short list of grey literature studies reviewed
7. *Expert comment* (including members of the Mental Disorders and Illicit Drug Use Expert Group) on completeness of included studies from electronic database search and grey literature search.

Data Extraction

8. Data extraction into Microsoft Access Database®
9. Cross-checking of extracted data
10. Web-wide searches for any evidence of use for countries without available prevalence estimates
11. De-duplication of studies reported in multiple publications

Expert consultation

12. Data requests sent to UNODC and WHO
13. List of included studies sent to other researchers with expertise in the area
14. Coverage of data reviewed by ATS experts at UNODC
15. Email sent to email lists and posted on drug research information websites requesting additional data for countries where no estimates were located

Second, lists of review articles and recommended articles from experts were individually screened for studies that may not have been identified by the electronic database search. Third, abstracts of the identified articles were read and excluded if they did not: focus on opioid or prevalence or incidence, include raw data (review articles), include general population samples (school studies were included), included data before 1990 or comprised multiple articles reporting from the same cohort (in which case only the most recent or relevant article was included). Nationally representative studies were preferred over sub-national studies: sub-national studies were conducted in cities which were nationally unrepresentative (typically the largest or capital city).

2.2. Grey Literature

The second stage of the systematic search, conducted during 2008, covered the grey literature. A systematic approach (described in (27)) was used to search databases and websites of government agencies and non-government organisations to identify reports and statistics. Data were collected by one research team member and cross checked by another member of the research team.

2.3. Data Extraction

In the data extraction stage we obtained information about study design and participants as recommend by the Strengthening the Reporting if Observational Studies in Epidemiology (STROBE) guidelines (28, 29), parallel to the CONSORT guidelines for reporting of randomised trials (30).

A Quality Index (see **Appendix C**) was modelled on one developed by John McGrath and Sukanta Saha (31, 32) and modified via the 'Delphi method' following consultation with, and

consensus agreement by, the Expert Group (see Acknowledgements) and central GBD project personnel. Quality variable responses were assigned scores that were summed to create a Quality Index score that ranged from 0 to 15, for each study. Highest scores were achieved by general population based cohort studies that provided age and sex disaggregated prevalence estimates. Additional text was also included in the extraction process to capture the diversity of reported methodology. This was used to determine if any studies with a low numeric quality index score should also be included.

A tri-level Microsoft Access© database was designed to accommodate the illicit drugs data, which allowed computerised cross-checking of data entered; in addition, a random sample of 10% of data sources was cross-checked by another research team member to check consistency and accuracy of data extraction. Quality assurance was also built into the database by using drop down boxes and restricted entry of characters. Data entry was manualised (see **Appendix D** for database manual including data entry rules). Queries were written to export complete datasets from the database into Microsoft Excel©.

2.4. Searching for evidence of use in countries without prevalence estimates

Searches for "any evidence of meth/amphetamine use" were conducted using several major approaches. First, reports and surveys that were referenced in the 2008 World Drug Report (33) were sourced. Second, reports and peer-reviewed articles that did not meet inclusion criteria as sources of prevalence estimates, but which include data on the use of amphetamines, were used.

Finally, the Internet was used to search databases and search engines. Searches were also conducted using the following databases: WorldCat, PsycINFO and PubMed; and the following search engines: Google and GoogleScholar, with searches targeted at drug use in specific countries (see **Appendix E** for search strings used). These databases and search engines allowed for the inclusion of a broad range of information sources. Evidence of meth/amphetamine use was identified in a number of grey literature sources, including UNODC reports, government reports, surveys, news reports and journal articles (See Supplementary Table); this "evidence" included data on treatment, seizures, registered drug users and reports of meth/amphetamine use occurring.

2.5. Expert consultation

Experts were consulted at every stage during this process. Lists of articles were emailed to check for completeness on several occasions during the review. Summary tables of country coverage of dependence, use and any evidence of use were emailed to opioid experts and contacts at the UNDOC, asking them to identify additional studies to fill gaps. Updated summary tables were emailed on several occasions to the expert group, core GBD personnel and other personnel to confirm data coverage and accuracy.

In May 2009, a "viral email" was sent out to known email lists, experts and interest groups in the area of illicit drug or HIV research, advocacy, or policy, listing the countries for which we had no data on the prevalence of amphetamine use and/or dependence, with invitations for comment or submission of additional data for a final check of data coverage. This resulted in a number of additional recent reports (largely from low and middle income countries) that had recently been completed.

2.6. Data Grading

Data were hierarchically graded according to study source/methodology (adapted from (34); see **Text Box 2**). Data were displayed for each country, grouped according to GBD study-defined regions (see **Appendix F** for countries/regions). We categorised estimates of use imputed by UNODC and reported in the 2008 World Drug Report with no details as "evidence of use" (graded "E" estimates), because they did not meet the primary inclusion criteria requiring details of methods used (or data sources and methodology used to impute estimates; see Supplementary Table).

Text box 2: HIERARCHICAL GRADING SYSTEM	
A1	Multiple and varied methods of indirect prevalence estimation
A2	Three sample capture-recapture, multivariate indicator or back projection method of prevalence estimation. Multiple but similar methods of indirect prevalence estimation.
A3	Two sample capture-recapture or multiplier method of prevalence estimation
B1	General population survey
B2	School survey
B3	University sample
B4	Convenience sample
C1	Expert consensus (including Delphi)
C2	Rapid assessment or other documented 'expert' judgement
D1	Government registration of drug users
D2	Official government estimate with no methodology reported not including government registration of drug users
E	Estimate with methodology unknown

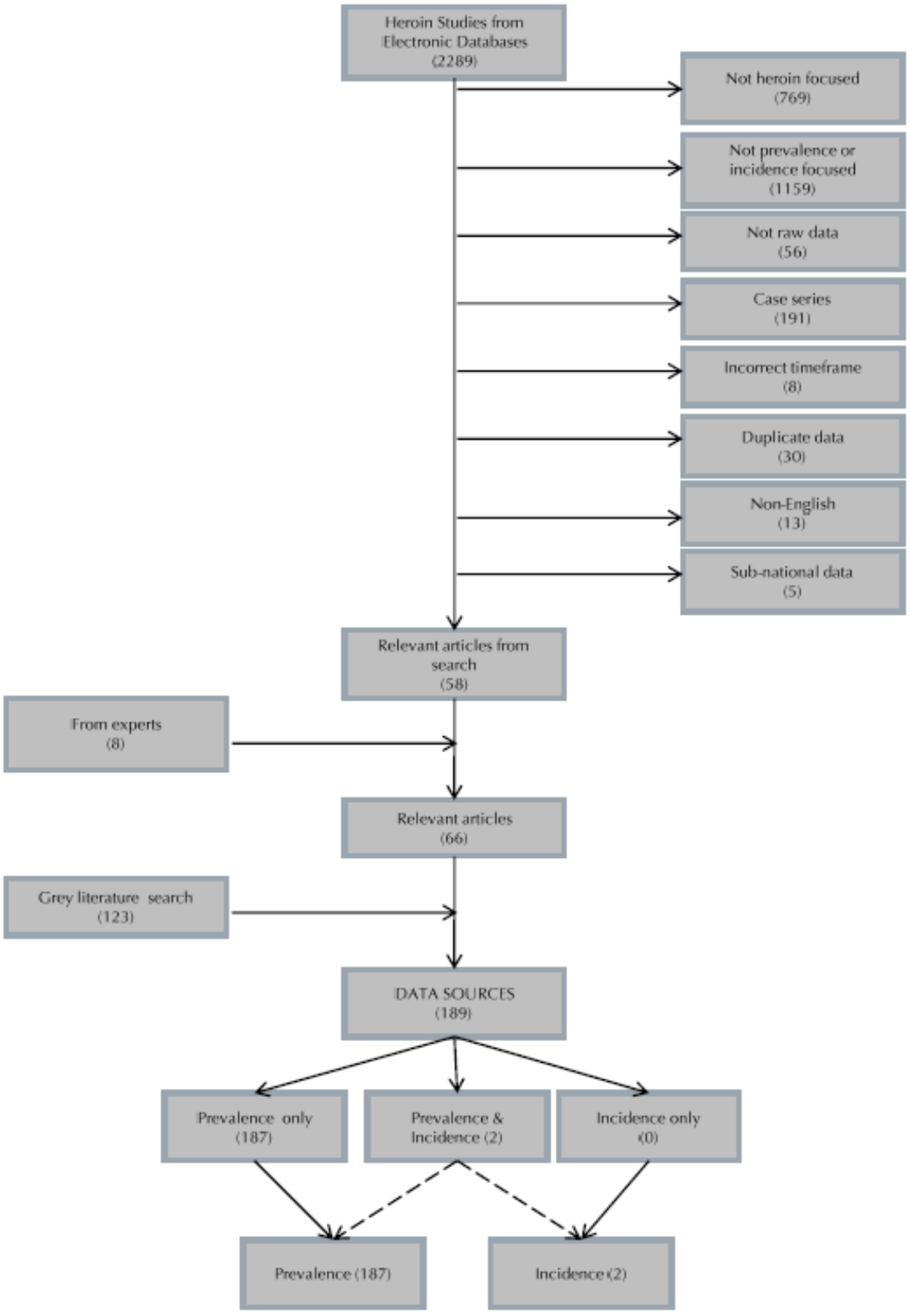
2.7. Searches

Figure 1 shows the overall search/cull process.

The proportion of the world population (in total, and of that aged between 15-64 years/WP15-64) covered by these estimates was calculated using population data provided by the UN for the Global Burden of Disease project. These are presented in **Table 1** along with the population covered by the most recent overall and age- and sex-specific estimates and the year of the estimates.

This paper reports each country's most recent national heroin prevalence estimate for dependence (general population), and use (from general population, and from school surveys). Where a subnational but not national estimate was available for a given country, we report this instead. Where an estimate of other opioid use/dependence but not heroin use/dependence was available, we report this instead. We report estimates for both heroin use/dependence and other opioid use/dependence for some countries. For dependence estimates, we report point or past month prevalence unless only a past year or lifetime prevalence estimate was available (see **Table 2**). For estimates of use (see **Table 3**), we report both past year and lifetime estimates; past month estimates were reported (if available) for countries that did not have past year estimates. Some countries did not have any estimates of use or dependence. Table 3 reports information on other evidence of use in these countries, if available.

Figure 1: Flowchart of search strategy for prevalence of opioid use and dependence



Note. This flowchart show all articles identified for the GBD study. Included in this manuscript are the most recent indirect prevalence, general population and/or school surveys for each country.

3. RESULTS

3.1. Evidence of heroin/opioid use and dependence

Evidence of heroin/opioid use or dependence was found for 192 out of 229 countries, comprising 99.8% of the world population aged 15-64 years (WP15-64; **Table 1**). In 101 countries (16.8% WP15-64) there was evidence of use (**Table 3)** but no estimate of use or dependence (**Tables 2 and 3**). This included most countries in South and Central Asia, the Middle East, the Caribbean, Oceania and Africa). Most countries had national estimates (71 out of 91 representing 81.6% WP15-64). Around half the prevalence estimates were quite recent (relating to use or dependence in 2005 or later).

Table 1. Coverage of the world population by prevalence estimates of heroin/opioid use and dependence

	Number of countries	Total population covered*	Population aged 15-64 years covered*
Evidence of use and dependence**			
Prevalence estimate of use or dependence	91	81.56%	83.00%
Evidence of use but no prevalence estimates	101	18.16%	16.76%
No evidence of use	37	0.28%	0.24%
Total	229	100%	100%
Coverage of the world population by differing study samples and estimate types			
Dependence: all estimates			
National	18	12.44%	12.61%
Subnational only	7	21.05%	20.74%
Total	25	33.49%	33.35%
Use: all estimates			
National	77	52.02%	51.98%
Subnational only	12	26.72%	28.32%
Total	89	78.74%	80.3%
Use: general population estimates			
National	49	44.80%	44.65%
Subnational only	5	3.87%	3.49%
Total	54	48.67%	48.14%
Use: school survey estimates			Percentage 15-19 years
National	52	14.17%	11.55%
Subnational only	13	30.48%	28.89%
Total	65	44.65%	40.44%
Dependence: sex-specific estimates			
National	3	5.55%	5.74%
Subnational only	3	18.76%	18.32%
Total	6	24.31%	24.06%
Use: sex-specific estimates			
National	50	18.64%	19.12%
Subnational only	9	26.11%	28.33%
Total	59	44.75%	47.45%
Dependence: age-specific estimates (general population)			
National	2	4.89%	5.05%
Subnational only	1	1.07%	1.14%
Total	3	5.96%	5.19%
Use: age-specific estimates (general population)			
National	13	3.42%	2.13%
Subnational only	3	3.59%	2.22%
Total	16	7.01%	4.35%
Date of most recent prevalence estimates			
2005-2007	41	18.62%	19.01%
2000-2004	29	33.56%	33.03%
Before 2000	19	26.57%	28.26%

Note. Estimates may be lifetime, past year, point or past month estimates. *National population numbers were used to calculate the population covered, whether estimates were national or subnational. **Subnational studies are included only for countries with no national data.

3.2. Direct and indirect estimates of heroin/opioid dependence

Of the 25 countries with dependence estimates (33.4% WP15-64), there were 18 national estimates (12.6% WP15-64), including 17 made using indirect (gold standard) methods – these constituted just 7.9% WP15-64. Only the US and Iran had not used indirect methods. Just 20% of dependence estimates were heroin-specific, the remainder assessing other/all/unspecified opioids. Six dependence studies reported sex-specific estimates; only three reported age-specific estimates.

Most prevalence estimates for heroin/opioid dependence come from Europe. The highest national estimate for opioid dependence was found in Luxembourg (0.82%) and for heroin the highest was Malta (0.57%). The Finnish opioid and Czech heroin estimates (0.12% and 0.11% respectively) were the lowest indirect national estimates. The highest was a direct, subnational estimate from Iran for opium (at 8%, it was an order of magnitude higher than most). No other estimate exceeded 1%.

Table 2. Most recent prevalence estimate of heroin/opioid dependence for each country.

Country	Prevalence (95% CI)**	Year of estimate	Age (yrs)	Grade	Quality score	Source(s)
Australia	0.3# (NR) PY-DP;	1997;	18-54;	B1;	10;	(35);
	0.4# (NR)	2002	15-54	A3	15	(36)
Austria	0.54# (0.50-0.57)	2004	15-64	A3	13	(37)
Canada	0.49# (NR)^	2003	15-49	A1	13	(38)
Cyprus	0.11 (0.10-0.14)	2006	15-64	A3	13	(37)
Czech Republic	0.14# (0.12-0.17)	2006	15-64	A3	13	(39)
Denmark	1.00# (NR)*	1997-98	15-64	A2	11	(40)
Finland	0.12# (0.11-0.14)	2005	15-54	A3	13	(37)
France	0.68# (0.49-0.87)*	2007	15-64	A1	5	(41)
Germany	0.26# (0.23-0.29)	2006	15-54	A1	13	(37)
Greece	0.27# (0.25-0.30)	2006	15-64	A3	14	(37)
India	0.10# (NR) DP*	1993	10+	B1	13	(42)
Iran	8.8# (NR) DP*	2003	15+	B1	12	(43)
Ireland	0.57# (0.52-0.61)	2001	15-64	A3	13	(37)
Italy	0.54# (0.50-0.59)	2006	15-64	A1	13	(37)
Luxembourg	0.82# (0.56-0.90)^	1999	15-64	A1	12	(24)
Malta	0.57 (0.55-0.60)	2006	15-64	A3	13	(37)
Netherlands	0.26# (0.24-0.28)	1999	15-64	A3	12	(24)
Pakistan	0.70# (0.40-1.00)	2006-07	0-99	A2	12	(44)
Slovakia	0.27# (0.20-0.49)	2006	15-64	A3	13	(37)
Spain	0.36# (0.26-0.37)^	2002	15-64	A1	13	(37)
Switzerland	0.57 (NR)*	2004	0-99	A3	13	(45)
Taiwan	*Males* 0.72 (0.54-0.97)*	2002	15-54	A3	14	(46)
Thailand	0.479# (0.42-0.54)*	2001	15-44	A3	11	(47)
United Kingdom	0.53# (NR);	1996;	0-99;	A2;	12;	(48);
	0.86# (0.85-0.90)*	2005-06	15-64	A1	8	(49)
United States of	0.34# (NR) PY-DP;	2001-02;	18+;	B1;	12;	(50);
America	0.10 (NR) PY-DP	2005	12+	B1	10	(51)

Estimates are national, indirect, point prevalence, percentage estimates of heroin use, unless specified. #opiates/opioids. ^median prevalence estimate. PY=Past year. DP=Direct prevalence. NR=Not reported. *subnational (national unavailable). **In many cases the interval is not strictly a 95%CI but is derived from sensitivity analysis using different modelling assumptions

3.3. Heroin/opioid use estimates

Eighty-nine countries (80.3% WP15-64) had estimates of use, including 77 national estimates using direct methods. More than 90% of use estimates related specifically to heroin (and not other opioids). Estimates were grouped according to *lifetime* (ever used) or *past year* use; *past month* use was rarely assessed outside of Europe, and is reported only twice in **Table 3**, where an equivalent past year estimate was unavailable (China's school and India's general population surveys, both of which were subnational).

Figure 2 shows the available estimates of lifetime heroin/opioid use for the general population, to give an impression of the levels documented across countries. Estimates of heroin use are reported in the first instance; estimates of other opioid use may be reported are only for countries without an estimate of heroin use. The figure should be interpreted with reference to the age range, methodology, year of estimate and quality score, all of which differed across studies and are presented in Table 3. Lifetime use is not necessarily relevant for policy-making but is often the only indicator that surveys measure due to the very low past year and past month prevalence of heroin/opioid use.

There is clear geographic variation in the estimated levels of lifetime heroin/opioid use. Among national surveys of the general population, the lowest lifetime estimates were for Japan and some Central American countries. The highest was for New Zealand, with heroin at 2.9% and 'all opiates' at 4.3%. Several European countries, Australia and the US reported national lifetime estimates greater than 1%. Some subnational estimates were very high; lifetime opium use in one Iranian province was 17%. Austria's (heroin, 1.7%) and Lao PDR's (opium, 3%) estimates were by far the highest national past year estimates.

The distribution of use of different opioid types was not always similar between countries. For example, lifetime use of opioids other than heroin and morphine for the general population in Guatemala and El Salvador (shown in **Table 3** for illustrative purposes) were more than double than those for either heroin or morphine.

Among national surveys of school students (**Table 2**, **Figure 1**) zero-use estimates were reported for some European countries. Europe also had some of the highest rates (>=2%), for example for Lithuania (heroin, 4.8%). Very high subnational estimates of heroin use among students were reported for Myanmar and southwest China (around 3% lifetime prevalence). The extreme estimates from Tanzania may relate to the very wide age range used (10-21 years). Finally, at 3% Israel's past year estimate of opioid use was more than 2.5 times the magnitude of any other past year estimate.

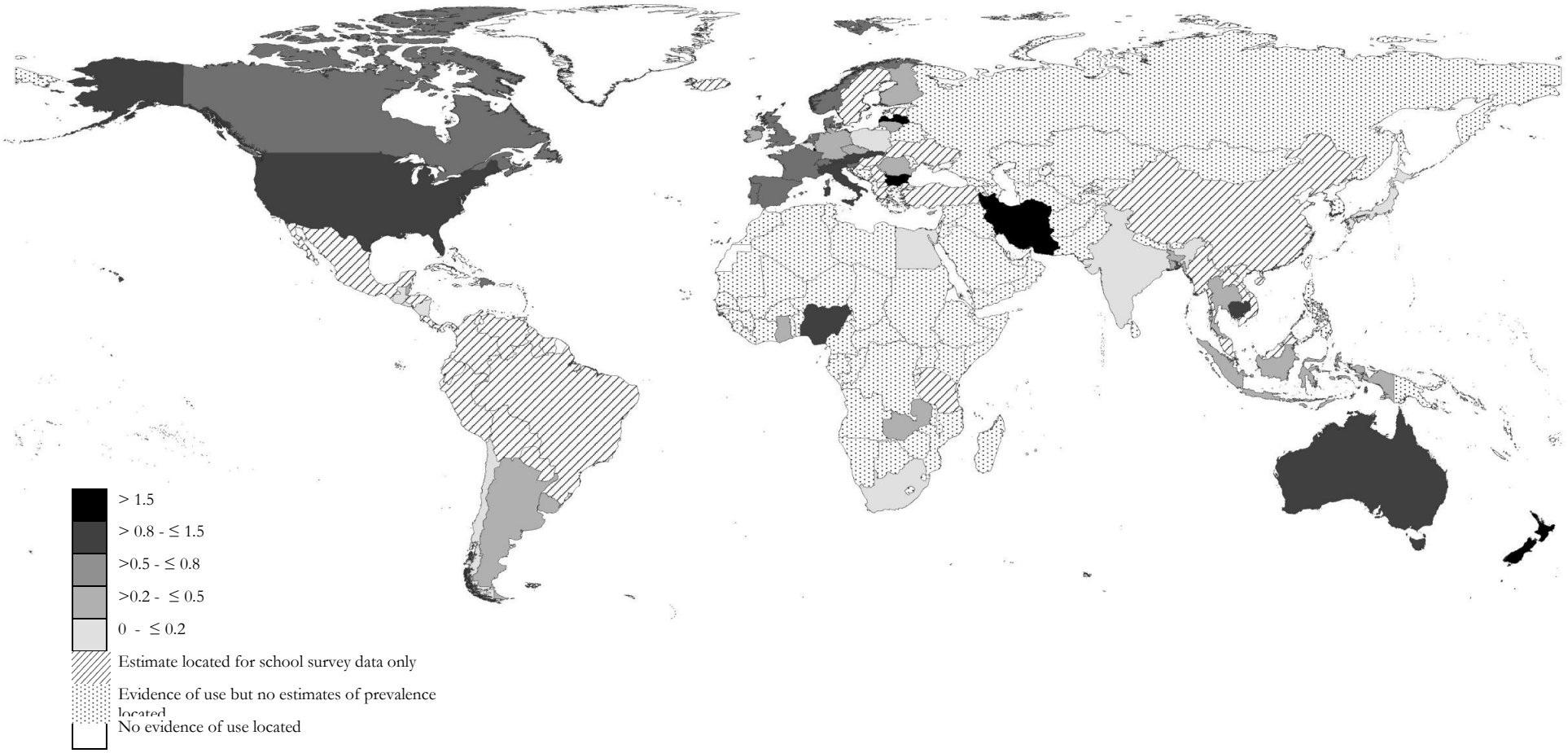
Geographically, use appears to be highest in countries close to the source of opium production (Asia) and transit countries (e.g. Eastern Europe). School and general population results are difficult to compare against one another, however, as most countries did not report both types of estimate. High student rates may suggest high general population rates (see for example Brazil), but a direct relationship between such different sample types cannot be assumed due to potentially different age/ period/cohort effects between countries.

Of the most recent prevalence estimates of use across 89 countries, 41 of the 89 related to the years 2005-07 (19% WP15-64). More countries had estimates using school surveys (65; 40.4% of the world population aged 15-19 years) than general population surveys (54; 48.1% WP15-64). Age- and sex-specific estimates were rarely reported. Age ranges were also often not specified. Sixteen general population surveys reported age-specific and 59 reported sex-specific estimates for use. School surveys are considered age-specific and most reported sex-specific estimates. The

age ranges employed in both survey types varied greatly, however. General population studies were usually around 15-60 years, but ranged from 15-24 to 'all ages' thereby greatly influencing prevalence. School surveys had extremes of 12-14 (during which ages opioid use is zero, in most countries) and 10-23 (which covers the average ages of initiation of opioid use of around 18-21 years.

In the Caribbean and Latin American countries that estimated heroin and morphine use, morphine was usually less prevalent than heroin. Guyana's national school estimates for lifetime use were an exception (1.5% morphine, 0.7% heroin). Lifetime morphine use was higher than lifetime heroin use in some countries, but past year heroin estimates consistently exceeded those for morphine.

Figure 2: Available estimates of the lifetime prevalence of heroin/opioid use among the general population



Note: For all countries, national prevalence estimates for heroin use are presented if available; for countries without national prevalence estimates, sub-national estimates may be represented in the map. This is for illustrative purposes and details should be examined in Table 3, including age ranges and type(s) of opioid assessed; these differ across studies in this map.

Table 3. Most recent general population and school survey prevalence estimate of heroin/opioid use (or evidence of use) for each country.

Region/Country	Past year use	Year of estimate	Age	Grade	Quality score	Source/s	Lifetime** use (95% CI)	Year of estimate	Age	Grade	Quality Score	Source/s	Evidence of use if no prevalence estimate~	Grade	Source
ASIA PACIFIC, HIGH INCOME															
Brunei	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Japan	--	--	--	--	--	--	0.06	2001	NR	B1	8	(53)			
Republic of Korea	--	--	--	--	--	--	--	--	--	--	--	--	Treatment admissions	D1	(54)
Singapore	--	--	--	--	--	--	--	--	--	--	--	--	Treatment admissions	D1	(55)
ASIA, CENTRAL															
Armenia	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Azerbaijan	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(54)
Georgia	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(57)
Kazakhstan	--	--	--	--	--	--	--	--	--	--	--	--	Registered drug users	D1	(55)
Kyrgyzstan	--	--	--	--	--	--	--	--	--	--	--	--	Registered drug users	D1	(55)
Mongolia	--	--	--	--	--	--	--	--	--	--	--	--	Evidence of use	E	(58)
Tajikistan	--	--	--	--	--	--	--	--	--	--	--	--	Registered drug users	D1	(55)
Turkmenistan	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(59)
Uzbekistan	--	--	--	--	--	--	--	--	--	--	--	--	Registered drug users	D1	(55)
ASIA, EAST															
China	0.1* PMP	<1999	16-17	B2	10	(60)	3.1*	<1999	16-17	B2	10	(60)			
Dem. People's Republic of Korea	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hong Kong	--	--	--	--	--	--	0.2	1996	11-18	B2	8	(61)			
							0.2#	1996	11-18	B2	8	(61)			
Taiwan^	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ASIA, SOUTH															
Afghanistan	--	--	--	--	--	--	--	--	--	--	--	--	Number of users	C2	(62)
Bangladesh	--	--	--	--	--	--	0.3[a]	2004	15-54	B1	8	(63)			
Bhutan	--	--	--	--	--	--	--	--	--	--	--	--	Evidence of use	C2	(64)
India^	0.2[a] PMP	2000-01	12-60	B1	11	(65)	0.1[a]	2000-01	12-60	B1	12	(65)			
	0.7#[a] PMP	2000-01	12-60	B1	11	(65)									
Nepal	--	--	--	--	--	--	--	--	--	--	--	--	Number of users	C2	(66)
Pakistan^	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ASIA, SOUTHEAST															
Cambodia	--	--	--	--	--	--	1.2*	2002	14-22	B1	8	(67)			

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Region/Country	Past year use	Year of estimate	Age	Grade	Quality score	Source/s	Lifetime** use (95% CI)	Year of estimate	Age	Grade	Quality Score	Source/s	Evidence of use if no prevalence estimate~	Grade	Source
Indonesia	0.14	2005	10-60	B1	8	(68)	0.31	2005	10-60	B1	8	(68)			
Lao PDR	3##	2004	NR	B1	8	(67)	--	--	--	--	--	--	--	--	--
Malaysia	--	--	--	--	--	--	0.7*	2001	12-19	B2	7	(69)			
Maldives	--	--	--	--	--	--	--	--	--	--	--	--	Drug use in user population	C2	(70)
Mauritius	--	--	--	--	--	--	1.2	2004	15-18	B2	7	(71)			
Mayotte	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Myanmar	2.57*	2004	13-21	B2	7	(72)	2.88*	2004	13-21	B2	7	(72)			
	1.71##*	2004	13-21	B2	7	(72)	2.44##*	2004	13-21	B2	7	(72)			
Philippines	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Seychelles	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Sri Lanka	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Thailand^	--	--	--	--	--	--	0.4	2003	12-65	B1	9	(67)			
							0.7##	2003	12-65	B1	9	(67)			
Timor Leste	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Viet Nam	0.1*	2000	NR	B2	7	(73)	0.2*	2000	NR	B2	7	(73)			
AUSTRALASIA															
Australia^	0.2	2007	14+	B1	12	(74)	1.6	2007	14+	B1	12	(74)			
New Zealand	0.1;	2001;	15-45;	B1;	14;	(75);	0.7, 4.3#;	2001;	15-45;	B1;	14;	(75);			
	1#	2001	15-45	B1	14	(75)	2.9 (2.5-3.3)	2003-04	16+	B1	13	(76)			
CARIBBEAN															
Anguilla	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antigua and Barbuda	--	--	--	--	--	--	0.9	2005	NR	B2	8	(77)			
							1.1###	2005	NR	B2	8	(77)			
Aruba	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(78)
Bahamas	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Barbados	--	--	--	--	--	--	0.1	2005	NR	B1	8	(79)			
							1	2006	13-17	B2	8	(80)			
							1.2###	2006	13-17	B2	8	(80)			
Belize	0.3	2005	12-65	B1	9	(81)	0.2	2005	12-65	B1	9	(81)			
Bermuda	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(78)
British Virgin Islands	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(78)
Cayman Islands	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(78)
Cuba	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(78)
Dominica							0.3	2006	13-17	B2	8	(82)			
							0.1###	2006	13-17	B2	8	(82)			
Dominican Republic	--	--	--	--	--	--	1	1999	21-31	B1	8	(83)			

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Region/Country	Past year use	Year of estimate	Age	Grade	Quality score	Source/s	Lifetime** use (95% CI)	Year of estimate	Age	Grade	Quality Score	Source/s	Evidence of use if no prevalence estimate~	Grade	Source
French Guiana	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grenada	--	--	--	--	--	--	--	--	--	--	--	--	Evidence of use	D2	(79)
Guadaloupe	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(78)
Guyana	0.3	2002	13-17	B2	8	(84)	0.7	2002	13-17	B2	8	(84)			
	0.1###	2002	13-17	B2	8	(84)	1.5###	2002	13-17	B2	8	(84)			
Haiti	1.2	2005	11-25	B2	8	(85)	--	--	--	--	--	--	--	--	--
	1.2###	2005	11-25	B2	8	(85)									
Jamaica	--	--	--	--	--	--	1.5*	1995	16-17	B2	8	(86)			
							1.2##*	1995	16-17	B2	8	(86)			
Martinique	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Montserrat	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Netherlands Antilles	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(57, 78)
Saint Kitts and Nevis	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
St. Lucia	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(78)
St. Vincent	--	--	--	--	--	--	0.2	2005	13-17	B2	8	(87)			
							0.29##	2005	13-17	B2	8	(87)			
							0.11###	2005	13-17	B2	8	(87)			
Suriname	0	2006	13-17	B2	7	(88)	0.5	2006	13-17	B2	7	(88)			
	0###	2006	13-17	B2	7	(88)	0.3###	2006	13-17	B2	7	(88)			
Trinidad and Tobago	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Turks and Caicos Islands	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
EUROPE, CENTRAL															
Albania	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Bosnia and Herzegovina	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Bulgaria	--	--	--	--	--	--	1.3	2005	18-60	B1	8	(89)			
Croatia	--	--	--	--	--	--	1	1995	15-16	B2	7	(90)			
Czech Republic^	0	2004	18-64	B1	11	(39)	0.5	2004	18-64	B1	9	(39, 91)			
Hungary	--	--	--	--	--	--	0	1995	15-16	B2	8	(90)			
Poland	--	--	--	--	--	--	0.1	2006	35+	B1	7	(92)			
							2	2003	17-18	B2	8	(93)			
Romania	--	--	--	--	--	--	0.2	2004	15-64	B1	8	(94)			
Serbia and Montenegro	--	--	--	--	--	--	1.5*	2005	16	B2	7	(95)			
Slovakia^	--	--	--	--	--	--	1.1	2004	15-64	B1	8	(96)			
							1	2003	17-18	B2	8	(93)			
Slovenia	--	--	--	--	--	--	0.6	1999	18+	B1	8	(97)			
							1	1995	15-16	B2	7	(90)			
FYROM (Macedonia)	--	--	--	--		--	1.14	1999	16+	B2	7	(98)			

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Region/Country	Past year use	Year of estimate	Age	Grade	Quality score	Source/s	Lifetime** use (95% CI)	Year of estimate	Age	Grade	Quality Score	Source/s	Evidence of use if no prevalence estimate~	Grade	Source
					--										
EUROPE, EASTERN															
Belarus	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Estonia	0	2003	15-64	B1	8	(99)	0	1995	15-16	B2	7	(90)			
Latvia	--	--	--	--	--	--	2.6#	2003	15-64	B1	9	(100)			
							1.8	2003	17-18	B2	8	(93)			
Lithuania	--	--	--	--	--	--	0.3	2004	15-64	B1	10	(101)			
							4.8	1999	15-16	B2	10	(101)			
Republic of Moldova	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Russian Federation	--	--	--	--	--	--	--	--	--	--	--	--	Drug use in user population	C2	(102)
Ukraine	--	--	--	--	--	--	0	1995	15-16	B2	7	(90)			
EUROPE, WESTERN															
Andorra	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Austria^	1.7	2006	15-59	B1	8	(103)	2#*	2005	15+	B1	8	(104)			
Belgium	--	--	--	--	--	--	0.04*	1994	18-65	B1	8	(105)			
Channel Islands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyprus^	--	--	--	--	--	--	0.5	2003	15-65	B1	8	(106)			
							2	1995	15-16	B2	9	(90)			
Denmark^	--	--	--	--	--	--	0.6	2005	16-24	B1	8	(107)			
							2	1995	15-16	B2	9	(90)			
Faeroe Islands	--	--	--	--	--	--	1	1995	15-16	B2	9	(90)			
Finland^	--	--	--	--	--	--	0.5	2004	15-34	B1	8	(108)			
							0	1995	15-16	B2	9	(90)			
France^	--	--	--	--	--	--	0.8	2005	15-64	B1	8	(109)			
							1	2003	17-18	B2	8	(93)			
Germany^	0.2	2003	18-59	B1	10	(110)	0.3	2004	12-25	B1	8	(111)			
Gibraltar	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Greece^	0.2	2002-03	15-24	B1	8	(112)	1	2003	17-18	B2	7	(93)			
Greenland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Holy See	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iceland	--	--	--	--	--	--	1	1995	15-16	B2	9	(90)			
Ireland^	0.1	2006-07	15-64	B1	11	(113)	0.4	2006-07	15-64	B1	9	(113)			
							1	1998	9-18	B2	7	(114)			
Isle of Man	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Israel	3#	2001	12-18	B2	--	(115)									
Italy^	--	--	--	--	--	--	1.3	2005	15-64	B1	8	(116)			
							3	2003	17-18	B2	7	(93)			

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Liechtenstein	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Luxembourg^	--	--	--	--	--	--	2.4	1999	26-40	B1	8	(117)			
Malta^	--	--	--	--	--	--	1	1995	15-16	B2	9	(90)			
Monaco	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Netherlands^	0	2005	19+	B1	8	(118)	0.6	2005	15+	B1	8	(118, 119)			
							1.1	1999	12-18	B2	7	(118, 120)			
Norway	--	--	--	--	--	--	0.9	2005	15-20	B1	8	(121)			
							1	1995	15-16	B2	9	(90)			
Portugal	--	--	--	--	--	--	0.7	2002	15-64	B1	8	(122)			
							0	1995	15-16	B2	9	(90)			
Saint Pierre et Miquelon	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Marino	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Spain^	0.1	2007-08	15-64	B1	10	(123)	0.8	2007-08	15-64	B1	10	(123)			
							0.2*	1994-95	14-18	B2	8	(124)			
Sweden	--	--	--	--	--	--	1	2003	17-18	B2	7	(93)			
Switzerland^	--	--	--	--	--	--	1	1998	15-39	B1	8	(125)			
							0.55*	2002	16-20	B2	8				
United Kingdom^	0.1*	2006-07	16-59	B1	11	(126)	0.7*	2006-07	16-59	B1	11	(126)			
	0.7#*	2006	11-15	B2	8	(127)	2	1995	15-16	B2	7	(90)			
LATIN AMERICA, ANDEAN															
Bolivia	0.5	2004	13-18	B2	8	(128)	--	--	--	--	--	--			
	0.5###	2004	13-18	B2	8	(128)									
Ecuador	--	--	--	--	--	--	1.1	2005	13-17	B2	8	(129)			
							0.5###	2005	13-17	B2	8	(129)			
Peru	--	--	--	--	--	--	1	2005	13-17	B2	8	(130)			
							0.86###	2005	13-17	B2	8	(130)			
LATIN AMERICA, CENTRAL															
Colombia	0.06	1993	NR	B1	8	(131)	1.3	2004	13-17	B2	8	(132)			
	1.2	2004	13-17	B2	8	(132)	1.1###	2004	13-17	B2	8	(132)			
	1###	2004	13-17	B2	8	(132)									
Costa Rica	--	--	--	--	--	--	0.05	1995	10-23	B2	9	(83)			
El Salvador	0	2005	12-65	B1	9	(133)	0.09	2005	12-65	B1	9	(133)			
	0###	2005	12-65	B1	9	(133)	0.18##	2005	12-65	B1	9	(133)			
	0.2	2003	12+	B2	8	(134)	0.09###	2005	12-65	B1	9	(133)			
	0.2###	2003	12+	B2	8	(134)	1.2	2000	12-20	B2	9	(83)			
Guatemala	0	2005	12-65	B1	9	(135)	0.05	2005	12-65	B1	9	(135)			

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	0###	2005	12-65	B1	9	(135)	0.13##	2005	12-65	B1	9	(135)			
	0.3	2003	12+	B2	8	(134)	0.03###	2005	12-65	B1	9	(135)			
	0.1###	2003	12+	B2	8	(134)	0.7	1999	11-23	B2	9	(83)			
Honduras	--	--	--	--	--	--	0.3	1999	13-20	B2	9	(83)			
Mexico	0.4#	1998	12-65	B1	11	(136)	0.12*	1991	13-19	B2	6	(137)			
Nicaragua	0.02	2006	12-65	B1	8	(138)	0.05	2006	12-65	B1	8	(138)			
	0###	2006	12-65	B1	8	(138)	0.04###	2006	12-65	B1	8	(138)			
	0.2	2003	12+	B2	8	(134)	0.6	1999	11-20	B2	9	(83)			
	0.1###	2003	12+	B2	8	(134)									
Panama	0.1	2003	12+	B2	8	(134)	0.4	2003	12+	B2	9	(83)			
	0.1###	2003	12+	B2	8	(134)									
Venezuela	0.27	2005	13-17	B2	8	(139)	0.34	2005	13-17	B2	8	(139)			
LATIN AMERICA, SOUTHERN															
Argentina	--	--	--	--	--	--	0.4	2006	12-65	B1	9	(140)			
							0.1###	2006	12-65	B1	9	(140)			
							0.8	2006	13-17	B2	8	(140)			
							0.9###	2006	13-17	B2	8	(140)			
Chile	0.04	2006	15-64	B1	9	(141)	0.1	2006	12-64	B1	9	(141)			
Falkland Islands (Malvinas)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uruguay	0.3	2003	12+	B2	8	(134)	0.2	2006	12-65	B1	9	(142)			
	0.3###	2003	12+	B2	8	(134)	0.1###	2006	12-65	B1	9	(142)			
							0.2	2005	13-17	B2	8	(142)			
							0.3###	2005	13-17	B2	8	(142)			
LATIN AMERICA, TROPICAL															
Brazil	0.5*	2001	NR	B2	7	(143)	1.2*	2001	NR	B2	7	(143)			
Paraguay	0.1	2003	12+	B2	8	(134)	0.3	2005	13-17	B2	8	(144)			
	0.1###	2003	12+	B2	8	(134)	0.2##	2005	13-17	B2	8	(144)			
							0.5###	2005	13-17	B2	8	(144)			
NORTH AFRICA/MIDDLE EAST															
Algeria	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Bahrain	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Egypt	--	--	--	--	--	--	0.08	2003-05	NR	B1	9	(145)			
							0.26##	2003-05	NR	B1	9	(145)			
Islamic Republic of Iran^	--	--	--	--	--	--	17.9##*	2003	15+	B1	12	(43)			
							3.5#*	2000	13-24	B2	12	(146)			

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Region/Country	Past year use	Year of estimate	Age	Grade	Quality score	Source/s	Lifetime** use (95% CI)	Year of estimate	Age	Grade	Quality Score	Source/s	Evidence of use if no prevalence estimate~	Grade	Source
Iraq	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Jordan	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Kuwait	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Lebanon	--	--	--	--	--	--	0.8	2001	NR	B2	NR	(147)			
Libyan Arab Jamahiriya	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Morocco	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Occupied Palestinian Territory	--	--	--	--	--	--	--	--	--	--	--	--	Evidence of use	E	(148)
Oman	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Qatar	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Saudi Arabia	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Syrian Arab Republic	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Tunisia	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Turkey	--	--	--	--	--	--	1*	1995	15-16	B2	9	(90)			
United Arab Emirates	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(57)
Western Sahara	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yemen	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
NORTH AMERICA HIGH INCOME															
Canada^	0.9	2007	13-18	B2	10	(149)	0.9	2004	15+	B1	10	(150, 151)			
							1#	2002	12-14	B2	8	(151)			
United States of America^	0.1	2007	12+	B1	11	(152)	1.5	2007	12+	B1	11	(152)			
	0.9	2006	15-16	B2	14	(51)	1.4	2006	15-16	B2	14	(51)			
OCEANIA															
American Samoa	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cook Islands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fiji	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(153)
French Polynesia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Guam	--	--	--	--	--	--	--	--	--	--	--	--	Drug trafficking	E	(154)
Kiribati	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Marshall Islands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Federated States of Micronesia	--	--	--	--	--	--	--	--	--	--	--	--	Reports of use	E	(153)
Nauru	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
New Caledonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Niue	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Northern Mariana Islands	--	--	--	--	--	--	--	--	--	--	--	--	Drug trafficking	E	(154)
Palau	--	--	--	--	--	--	--	--	--	--	--	--	Treatment admissions	D1	(153)

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Region/Country	Past year use	Year of estimate	Age	Grade	Quality score	Source/s	Lifetime** use (95% CI)	Year of estimate	Age	Grade	Quality Score	Source/s	Evidence of use if no prevalence estimate~	Grade	Source
Papua New Guinea	--	--	--	--	--	--	--	--	--	--	--	--	Drug trafficking	E	(154)
Pitcairn	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Samoa	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solomon Islands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tokelau	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tonga	--	--	--	--	--	--	--	--	--	--	--	--	Drug trafficking	E	(154)
Tuvalu	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanuatu	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(153)
Wallis and Futuna Islands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SUB-SAHARAN AFRICA, CENTRAL															
Angola	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Central African Republic	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Congo	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Dem. Republic of the Congo	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Equatorial Guinea	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Gabon	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
SUB-SAHARAN AFRICA, EAST															
Burundi	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Comoros	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Djibouti	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Eritrea	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethiopia	--	--	--	--	--	--	--	--	--	--	--	--	Number of users	C2	(155)
Kenya	--	--	--	--	--	--	--	--	--	--	--	--	Number of users	C2	(156)
Madagascar	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Malawi	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Mozambique	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(57)
Rwanda	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Somalia	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Sudan	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Uganda	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
United Republic of Tanzania	3.7*	2001	10-21	B2	NR	(157)	9.1*	2001	10-21	B2	NR	(157)			
Zambia	--	--	--	--	--	--	0.3*	2001	NR	B1	NR	(157)			
SUB-SAHARAN AFRICA, SOUTHERN															
Botswana	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(54)
Lesotho	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Namibia	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
South Africa							0.1#	2005	2+	B1	8	(158)	--	--	--

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Region/Country	Past year use	Year of estimate	Age	Grade	Quality score	Source/s	Lifetime** use (95% CI)	Year of estimate	Age	Grade	Quality Score	Source/s	Evidence of use if no prevalence estimate~	Grade	Source
Swaziland	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Zimbabwe	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
SUB-SAHARAN AFRICA, WEST															
Benin	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(57)
Burkina Faso	--	--	--	--	--	--	--	--	--	--	--	--	Drug use in user population	D1	(159)
Cameroon	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Cape Verde	--	--	--	--	--	--	--	--	--	--	--	--	Drug use in user population	D1	(160)
Chad	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Cote d'Ivoire	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Gambia	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Ghana	--	--	--	--	--	--	0.4	2001	15-24	B1	10	(161)			
Guinea	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Guinea-Bissau	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liberia	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Mali	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Mauritania	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)
Niger	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Nigeria	--	--	--	--	--	--	1.1*	1998	16-47	B1	NR	(162)			
Saint Helena	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sao Tome and Principe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Senegal	--	--	--	--	--	--	--	--	--	--	--	--	Derived estimate	C2	(56)
Sierra Leone	--	--	--	--	--	--	--	--	--	--	--	--	Number of users	D1	(163)
Togo	--	--	--	--	--	--	--	--	--	--	--	--	Drug seizures	D2	(52)

Note: National estimates of heroin use unless specified. #opiates/opioids, ##opium, ###morphine, [a]Estimate population male. PMP = Past Month Prevalence. NR = Not reported. ^ Dependence estimate for this country in Table 2. *subnational (national unavailable). **Lifetime prevalence indicates cumulative probability for that parameter (the most common nomenclature in the reviewed data). ~All derived estimates are for opiate use.

A1: Multiple and varied methods of indirect prevalence estimation; **A2:** Three sample capture-recapture, multivariate indicator or back projection method of prevalence estimation. Multiple but similar methods of indirect prevalence estimation; **A3:** Two sample capture-recapture or multiplier method of prevalence estimation; **B1:** General population survey; **B2:** School survey; **B3:** University sample; **B4:** Convenience sample; **C1:** Expert consensus (including Delphi); **C2:** Rapid assessment or other documented 'expert' judgement; **D1:** Government registration of drug users; **D2:** Official government estimate with no methodology reported not including government registration of drug users; **E:** Estimate with methodology unknown

4. DISCUSSION

Our study provides evidence that opioids are used in most countries (including almost all of the world population aged 15-64 years/WP15-64). Where estimates exist, the characteristics of the studies varied significantly, as did their quality, making it very difficult to compare one estimate with another. Many countries had at least one estimate providing some crude evidence of use, but just 16, covering 5.6% WP15-64 had a national estimate of dependence using indirect methods, as well as a national estimate of use in the general population using survey methods. To accurately assess the size of their heroin/opioid problem, countries need to make dependence estimates using multiple indirect methods, and including confidence intervals. Other estimates may not be valid, depending on the survey methodology used; for further discussion see (164) as there is no space in this review. Overall data coverage was better than for the other illicit drug types being reviewed for GBD2005, and at least twice as many countries have estimated the extent of heroin/opioid dependence than cannabis, cocaine, or amphetamine dependence (165-167).

4.1. Limitations in the methodology of studies examining heroin/opioid use and dependence

Inconsistent, incomplete, outdated and unclear collection and reporting of estimates restricts our ability to make cross-national prevalence comparisons and assess the extent of regional variation. The limited estimates that have been made are often difficult to compare due to the different definitions and types of opioids assessed. Some general population surveys fail to assess specific types of dependence, for example the World Mental Health Surveys (WMHS) have surveyed representative samples of the general adult population in over 20 countries, but have only measured any illicit drug dependence and not heroin/opioid use or dependence specifically. Many dependence estimates from Europe are similarly reported as 'problem drug use' even if in practice they may often mainly relate to dependent opioid users (who mostly also use other drugs). Some studies that do assess heroin/opioids fail to disaggregate the types of opioids being used; others do not provide an aggregated total for all opioid use. These issues are common to prevalence data for other drug types (165-167).

Few countries for which an estimate of heroin use was lacking had estimated other illicit opioid use. Many had made multiple estimates (e.g. for heroin, and opium) but typically did not provide aggregated estimates (i.e. 'all opioids'). Aggregated estimates are important, but may not be directly calculated from disaggregated estimates, as opioid users often use more than one type of opioid (168, 169).

Many countries had made age and/or sex-specific estimates at some stage, but rarely in their most recent studies. Most did not report confidence intervals for their use estimates although most did do so for their dependence estimates. Some had collected information on use and/or dependence, but failed to report prevalence estimates or provide sufficient detail (e.g. numerators) to enable us to calculate estimates. Such reporting limitations are easily corrected.

Prescription opioids were not specifically assessed by this review, and had not been explicitly included in most of the estimates that were reviewed. It should be noted, however, that Canada, Europe, Australia, and in particular the US have experienced a significant increase in the rates of non-medical use of prescription opioids. A separate review of pharmaceutical opioid diversion and use found considerable gaps in our understanding of the levels of this kind of use in most countries (170).

4.2. Limitations in the method of estimating heroin/opioid use and dependence

In countries where national estimates of dependence were available, apart from the US, more sophisticated indirect methods of prevalence estimation had been used, but most countries did not have any estimate of dependence. As previously noted, 'direct' surveys may grossly underestimate the prevalence of use and dependence. Other limitations of existing studies included: variations in survey methodologies and response rates; use of subnational samples, when geographic variations in use or dependence were likely; inconsistent time periods for measurement; and, the reporting of estimates to an insufficient level of precision. National lifetime rates of use and dependence for heroin/opioids are often less than 1%, so reporting to the nearest integer can create significant rounding artefacts. These limitations are described further in (164).

4.3. Recommendations for future studies examining heroin/opioid use and dependence

Given that the gaps in coverage were so marked, including in the regions that are thought to have the largest problems related to heroin/opioid use, there is a clear imperative for more work. While standardised methods have been developed in high income, high capacity countries for population surveys of alcohol (171-173), tobacco (174) and illicit drug use (175), there has been limited use of these protocols in countries with insufficient resources and expertise to undertake population level assessments of illicit drug use (173, 176). There is a need for agreement on valid simple methods for collection of these data in lower income countries to increase the number of countries measuring dependence. Indirect prevalence estimates are much more economical and are likely less biased than general population surveys and should be prioritised in future studies. There is also an imperative – endorsed by a recent meeting of the Commission on Narcotic Drugs (177) – to provide these countries with assistance in this regard.

The utility of survey-derived heroin/opioid estimates could be easily enhanced by collecting and reporting clearly defined aggregated estimates (all opioids, to give an indication of the overall size of the problem) and disaggregated estimates on all forms of opioid (e.g. heroin). Given the additional and specific risks posed by injecting, studies should distinguish between injecting and non-injecting use of opioids. It is also crucial to report estimates with 95% confidence intervals, or at least with credibility intervals derived from sensitivity analysis. Reporting only midpoint estimates could easily be misleading, given the often very large uncertainty surrounding even the 'gold standard' indirect estimates. Zero-estimates may also reflect small sample sizes, unreliable self-reports, or integer-only presentation of data (164). Finally, studies also need to be up-to-date and regular given that rates of use often change as drug supply and drug epidemics vary across time (178-180); the sharp drop in heroin use following the Australian heroin shortage provides a good example of this phenomenon (36).

The process of improving data and reporting is a long term project that involves setting up national and international networks and capacity and requires substantial resources. With most estimates coming from the grey literature (164), establishing basic reporting standards worldwide will be a formidable task without work to ensure communication and agreement across countries in indicator reporting. At the global level, agencies such as WHO and UNODC can play a key role in this normative development. One region that has put considerable effort into developing cross-nationally comparable methodology is the European Union, through the European

Monitoring Centre on Drugs and Drug Addiction (EMCDDA) which works to enhance availability and quality of these data (181-184).

4.4. Limitations of this review

Our review was subject to similar limitations as described by Mathers et al (185). One was the lag between the conduct and publication of research in peer-reviewed journals. We addressed this by surveying experts in the field about unpublished studies and reviewing the 'grey' literature, from which two out of three estimates used in this review were sourced. Grey literature reports are, however, difficult to access and many are not available in English. Concerted efforts are needed to make this source of information more available electronically (see (27)). The documents we reviewed were primarily in English but abstracts of many non-English language peer-reviewed articles were also reviewed and translation undertaken for relevant papers. Estimates were also reviewed by UN staff with access to non-English language material.

4.5. Conclusions

Epidemiological data on the prevalence of use and dependence of heroin/opioids, are weak, incomplete or absent for many countries, including those in regions with potentially the highest rates of use. Few countries have reliable, recent national estimates of both use and dependence and where these exist about half are incompatible between one another, while even fewer countries still disaggregate their estimates by age and sex. Overall data coverage was better than for the other illicit drugs reviewed for GBD2005 (165-167), but remains incommensurate with the burden of harm and public anxiety related to heroin/opioids. There is a serious need to develop more capacity for primary data collection at country level as well as for more thorough investigations on the quality and reliability of general population and school surveys with regard to opioid use. In addition, rigorous, transparent and regular collection and reporting of these data at the international level are needed to enable the size of the problem and trends to be analysed. Such data is vital to the effective planning of efforts to improve access to effective treatment. Only then can the treatments that we know are effective be scaled and adjusted to meet demand.

5. REFERENCES

1. WORLD HEALTH ORGANISATION/UNITED NATIONS OFFICE OF DRUGS AND CRIME/ JOINT UNITED NATIONS PROGRAMME ON HIV/AIDS (2004) WHO/UNODC/UNAIDS position paper: Substitution maintenance therapy in the management of opioid dependence and HIV/AIDs prevention (Geneva, World Health Organisation).
2. WALL, R., REHM, J., FISCHER, B. et al. (2000) Social costs of untreated opioid dependence, *Journal of Urban Health*, 77, 688-722.
3. WHITE, A. G., BIRNBAUM, H. G., MAREVA, M. N. et al. (2005) Direct costs of opioid abuse in an insured population in the United States, *Journal of Managed Care Pharmacy*, 11, 469-479.
4. DEGENHARDT, L., HALL, W., LYNSKEY, M. & WARNER-SMITH, M. (2004) Chapter 13. Illicit drug use, in: Ezzati, M., Lopez, A. D., Rodgers, A. & Murray, R. (Eds.) *Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*, pp. 1109-1176 (Geneva, World Health Organization).
5. DEGENHARDT, L., HALL, W. & WARNER-SMITH, M. (2006) Using cohort studies to estimate mortality among injecting drug users that is not attributable to AIDS. , *Sexually Transmitted Infections*, 82, 56-63.
6. WORLD HEALTH ORGANIZATION (2004) Neuroscience of psychoactive substance use and dependence.
7. DEGENHARDT, L., LARANCE, B., MATHERS, B. et al. (2009) Benefits and risks of pharmaceutical opioids: Essential treatment and diverted medication. A global review of availability, extra-medical use, injection and the association with HIV. (Sydney, Australia, NDARC).
8. DRUGS AND CRIME PREVENTION COMMITTEE (2006) Inquiry into the misuse/abuse of benzodiazepines and other forms of pharmaceutical drugs in Victoria. Interim Report. (Melbourne, DCPC, Parliament of Victoria).
9. WORLD HEALTH ORGANIZATION (1993) *The ICD-10 Classification of Mental and Behavioural Disorders - Diagnostic Criteria for Research.* (Geneva, World Health Organization).
10. GOSSOP, M., GRIFFITH, P., POWIS, B., & STRANG, J. (1992) Severity of dependence and route of administration of heroin, cocaine and amphetamines, *British Journal of Addiction*, 87, 1527-1536.
11. STOHLER, R., DURSTELER-MAC FARLAND, K. M., GRAMESPACHER, C. et al. (2000) A comparison of heroin chasers with heroin injectors in Switzerland, *Eur Addict Res*, 6, 154-9.
12. SWIFT, W., MAHER, L. & SUNJIC, S. (1999) Transitions between routes of heroin administration: a study of Caucasian and Indochinese heroin users in south-western Sydney, Australia, *Addiction*, 94, 71-82.
13. DARKE, S., HETHERINGTON, K., ROSS, J., LYNSKEY, M. & TEESSON, M. (2004) Non-injecting routes of administration among entrants to three treatment modalities for heroin dependence, *Drug and Alcohol Review*, 23, 177-183.
14. WORLD HEALTH ORGANIZATION (2009) Guidelines for the Psychosocially Assisted Pharmacological Treatment of Opioid Dependence (Department of Mental Health and Substance Abuse, World Health Organization).
15. INSTITUTE OF MEDICINE COMMITTEE ON THE PREVENTION OF HIV INFECTION AMONG INJECTING DRUG USERS IN HIGH RISK COUNTRIES (2007) Preventing HIV infection among injecting drug users in high risk countries: an assessment of the evidence. (Washington, DC).

16. GOWING, L., FARRELL, M., BORNEMANN, R., SULLIVAN, L. & ALI, R. (2006) Substitution treatment of injecting opioid users for prevention of HIV infection (Review), *Cochrane Library*, 4, 1-58.
17. MATTICK, R., BREEN, C., KIMBER, J. & DAVOLI, M. (2003) Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence, *Cochrane Database Syst Rev*, 2.
18. HICKMAN, M. & TAYLOR, C. (2005) Indirect methods to estimate prevalence, in: Sloboda, Z. (Ed.) *Epidemiology of drug abuse.*, pp. 113-131 (New York, Springer).
19. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2009) World Drug Report 2009 (Vienna, United Nations).
20. MAGURA, S. & KANG, S. Y. (1996) Validity of self-reported drug use in high risk populations: a meta-analytical review, *Substance Use & Misuse*, 31, 1131-1153.
21. LAW, M. G., LYNSKEY, M., ROSS, J. & HALL, W. (2001) Back-projection estimates of the number of dependent heroin users in Australia, *Addiction*, 96, 433-43.
22. SMIT, F., VAN LAAR, M. & WIESSING, L. (2006) Estimating problem drug use prevalence at national level: Comparison of three methods, *Drugs-Education Prevention and Policy*, 13, 109-120.
23. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2003) Estimating Prevalence: Indirect Methods for Estimating the Size of the Drug Problem *Global Assessment Programme on Drug Abuse (GAP) Toolkit Module 2* (Vienna, United Nations Office on Drugs and Crime).
24. KRAUS, L., AUGUSTIN, R., FRISCHER, M. et al. (2003) Estimating prevalence of problem drug use at national level in countries of the European Union and Norway, *Addiction*, 98, 471-485.
25. MAAG, V. (2003) Estimated trends in the prevalence of heroin addiction in Switzerland: A multiple-indicator approach, *European Addiction Research*, 9, 176-181.
26. STROUP, D. F., BERLIN, J. A., MORTON, S. C. et al. (2000) Meta-analysis of observational studies in epidemiology: A proposal for reporting, *JAMA*, 293, 2008-12.
27. CALABRIA, B., PHILLIPS, B., SINGLETON, J. et al. (2008) Searching the grey literature to access information on drug and alcohol research: A resource to identify drug related databases and websites *National Drug and Alcohol Research Centre Technical Report Number 293* (Sydney).
28. VANDENBROUCKE, J. P., VON ELM, E., ALTMAN, D. G. et al. (2007) Strengthinging the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and elaboration, *PLOS Medicine*, 4, 1628-1654.
29. VON ELM, E., ALTMAN, D. G., EGGER, M. et al. (2007) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies, *The Lancet*, 370, 1453-1457.
30. MOHLER, D. M., SCHULZ, K. F., ALTMAN, D. G. & FOR THE CONSORT GROUP (2001) The CONSORT statement: Revisisted recomendations for improving the quality of reports of parallel-group randomised trials, *The Lancet*, 357, 1191-1194.
31. SAHA, S., BARENDREGT, J. J., VOS, T., WHITEFORD, H. & MCGRATH, J. (2008) Modelling disease frequency measures in schizophrenia epidemiology, *Schizophrenia Research*, 104, 246-254.
32. MCGRATH, J., SAHA, S., WELHAM, J. et al. (2004) A systematic review of the incidence of schizophrenia: The distribution of rates and the influence of sex, urbanicity, migrant staus and methodology, *BMC Medicine*, 2, 1741.
33. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2008) World Drug Report 2008 (Vienna, United Nations).
34. MATHERS, B., M., DEGENHARDT, L., PHILLIPS, B. et al. (2008) Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review, *The Lancet*, 371, 1733-1745.

35. TEESSON, M., BAILLIE, A., LYNSKEY, M., MANOR, B. & DEGENHARDT, L. (2006) Substance use, dependence and treatment seeking in the United States and Australia: A cross-national comparison, *Drug and Alcohol Dependence*, 81, 149-155.
36. DEGENHARDT, L., RENDLE, V., HALL, W., GILMOUR, S. & LAW, M. (2004) Estimating the number of current regular heroin users in NSW and Australia 1997-2002. NDARC Technical Report No. 198 (Sydney, National Drug and Alcohol Research Centre, University of New South Wales).
37. EMCDDA (2008) Table PDU-102. Prevalence of problem drug use at national level (Lisbon, Lisbon).
38. POPOVA, S., PATRA, J., MOHAPATRA, S., FISCHER, B. & REHM, J. (2009) How many people in Canada use prescription opioids non-medically in general and street drug using populations?, *Canadian Journal of Public Health*, 100.
39. UZIS CR (INSTITUTE OF HEALTH INFORMATION AND STATISTICS OF THE CZECH REPUBLIC) (2006) Sample Survey of the Health Status and Live Style of the Population in the Czech Republic Focused on Drug Abuse (Říjen).
40. ISHOY, T., HAASTRUP, L. & HAY, G. (2004) Estimating the prevalence of problem opioid use in Copenhagen 1997-1998, *Danish Medical Bulletin*, 51, 114-116.
41. EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION (2008) 2008 National Report (2007 data) to the EMCDDA. France: New developments, trends and in-depth information in selected issues (Reitox National Focal Point).
42. MOHAN, D., CHOPRA, A. & SETHI, H. (2001) A rapid assessment study on prevalence of substance abuse disorders in metropolis Delhi, *Indian Journal of Medical Research*, 114, 107-114.
43. AHMADI, J., PRIDMORE, S., ALIMI, A. et al. (2007) Epidemiology of opium use in the general population, *American Journal of Drug and Alcohol Abuse*, 33, 483-491.
44. UR-REHMAN, N. (2006-07) Highlights from National Drug Assessment Study Pakistan 2006-07 (UNDOC, Ministery of Narcotics Control, and Anti-Narcotics Force: Government of Pakistan).
45. NORDT, C. & STOHLER, R. (2008) Estimating heroin epidemics with data of patients in methadone maintenance treatment, collected during a single treatment day, *Addiction*, 103, 591-597.
46. CHIANG, S. C., CHEN, C. Y., CHANG, Y. Y., SUN, H. J. & CHEN, W. J. (2007) Prevalence of heroin and methamphetamine male users in the northern Taiwan, 1999-2002: Capture-recapture estimates, *BMC Public Health*, 7.
47. BOHNING, D., SUPPAWATTANABODEE, B., KUSOLVISITKUL, W. & VIWATWONGKASEM, C. (2004) Estimating the number of drug users in Bangkok 2001: A capture-recapture approach using repeated entries in one list, *European Journal of Epidemiology*, 19, 1075-1083.
48. FRISCHER, M., HICKMAN, M., KRAUS, L., MARIANI, F. & WIESSING, L. (2001) A comparison of different methods for estimating the prevalence of problematic drug misuse in Great Britain, *Addiction*, 96, 1465-1476.
49. HAY, G., GANNON, M., MACDOUGALL, J. et al. (2007) National and regional estimates of the prevalence of opiate use and/or crack cocaine use 2005/06: a summary of key findings (London, Home Office).
50. LYNSKEY, M. & AGRAWAL, A. (2007) Psychometric properties of DSM assessments of illicit drug abuse and dependence: Results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), *Psychological Medicine*, 37, 1345-1355.
51. SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES ADMINISTRATION (2006) Results from the 2005 National Survey on Drug Use and Health: National Findings *NSDUH Series H-30* (Rockville, MD, Office of Applied Studies).
52. UNITED NATIONS OFFICE DRUGS AND CRIME RAS Online Database of Illicit Drug Seizure Reports.

53. YAMAMOTO, J. (2004) Recent trends of drug abuse in Japan, *Annals of the New York Academy of Sciences*, 1025, 430-438.
54. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2007) World Drug Report.
55. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2008b) Illicit Drug Trends in Central Asia.
56. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2008) World Drug Report.
57. INTERNATIONAL NARCOTICS CONTROL BOARD (2007) Annual Report.
58. NATIONAL DRUG AND ALCOHOL RESEARCH CENTRE (2006) A Rapid Assessment and Response to HIV and Drug Use in Mongolia, Prepared for the World Health Organisation Regional Office for the Western Pacific by the Program of International Research and Training, National Drug and Alcohol Research Centre, University of New South Wales, Australia.
59. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2007) Regional Office for Central Asia Compendium of Drug Related Statistics, 1996-2007.
60. ZHIMIN, L., WEIHUA, Z., ZHI, L. et al. (2001) The use of psychoactive substances among adolescent students in an area in the south-west of China, *Addiction*, 96, 247-250.
61. LAIDLER, K. A. J., HODSON, D. & TRAVER, H. (2000) The Hong Kong drug market: Report for the UNICRI on the INDCP global study in illicit drug markets.
62. UNITED NATIONS OFFICE ON DRUGS AND CRIME/ GOVERNMENT OF AFGHANISTAN MINISTRY OF COUNTER NARCOTICS (2005) Afghanistan Drug Use Survey.
63. KHAN, M., AKLIMUNNESSA, K., KABIR, M., KABIR, M. & MORI, M. (2006) Tobacco consumption and its association with illicit drug use among men in Bangladesh, *Addiction*, 101, 1178-1186.
64. UNITED NATIONS OFFICE DRUGS AND CRIME (2008) Rapid situation and response assessment of drugs and HIV in Bangladesh, Bhutan, India, Nepal and Sri Lanka.
65. UNITED NATIONS OFFICE ON DRUGS AND CRIME /MINISTRY OF SOCIAL JUSTICE AND EMPOWERMENT (2004) The extent, patterns and trends of drug abuse in India - National Survey.
66. CHATTERJEE, A., UPRETY, L., CHAPAGAIN, M. & KAFLE, K. (1996) Drug abuse in Nepal: a rapid assessment study., *Bulletin on Narcotics*, 48, 11-33.
67. UNITED NATIONS OFFICE DRUGS AND CRIME (2005) Patterns and Trends in Amphetamine type stimulants in East Asia and the Pacific: Findings from the 2004 Regional ATS Questionnaire.
68. PADMOHOEDOJO, P. G. (2005) National Survey of Illicit Drug use and Trafficking among household groups in Indonesia (Indonesia, National Narcotics Board).
69. LEE, L. K., CHEN, P. C. Y., LEE, K. K. & KAUR, J. (2006) Premarital sexual intercourse among adolescents in Malaysia: A cross-sectional Malaysian school survey, *Singapore Medical Journal*, 47, 476-481.
70. NARCOTICS CONTROL BOARD REPUBLIC OF MALDIVES/UNITED NATIONS DEVELOPMENT PROGRAM (2006) Rapid Situation Assessment of Drug Abuse in Maldives.
71. SULLIMAN & AMEERBEG, E. A. (2004) Mauritius RSA report.
72. PHYU, T. T., WIN, S. S., OO, T. & OO, S. S. (2004) Study on prevalence of amphetamine type substance use among high school students in Yangon (Unpublished manuscript).
73. SUBREGIONAL PROJECT FOR THE DEVELOPMENT OF INSTITUTIONAL CAPACITY FOR THE DEMAND REDUCTION AMONG HIGH RISK GROUPS (C75), THE MINISTRY OF LABOUR OF INVALIDS AND SOCIAL AFFAIRS & THE STANDING OFFICE FOR DRUG CONTROL (2002) Drug Use by the Youth of Vietnam: In School and Out (United Nations International Drug Control Programme).
74. AUSTRALIAN INSTITUTE OF HEALTH AND WELFARE (2008) 2007 National Drug Strategy Household Survey: first results *Drug Statistics Series number 20* (Canberra, AIHW).

75. WILKINS, C., CASSWELL, S., BHATTA, K. & PLEDGER, M. (2002) Drug Use in New Zealand: National Surveys Comparison 1998 & 2001 (Auckland, Alcohol & Public Health Research Unit).
76. WELLS, J. E., MCGEE, M. A., BAXTER, J., AGNEW, F. & KOKAUA, J. (2009) Onset and lifetime use of drugs in New Zealand: Results from Te Rau Hinengaro: The New Zealand Mental Health Survey 2003 - 2004., *Drug and Alcohol Review*, 29, 166-174.
77. ORGANIZATION OF AMERICAN STATES (2006) Antigua and Barbuda: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
78. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2003) Caribbean Regional Office: Caribbean drug trends 2001-2002.
79. YEARWOOD, J. (2007) National Household Survey Report, Paper presented at the *Caricom/CICAD Demand Reduction Training Workshop and Meeting of Caribbean National Observatories on Drugs*, St. George's, Grenada.
80. ORGANIZATION OF AMERICAN STATES (2006) Barbados: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
81. ORGANIZATION OF AMERICAN STATES (2006) Belize: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
82. ORGANIZATION OF AMERICAN STATES (2006) Dominica (Commonwealth of): Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
83. DORMITZER, C. M., GONZALEZ, G. B., PENNA, M. et al. (2004) The PACARDO research project: Youthful drug involvement in Central America and the Dominican Republic, *Revista Panamericana de Salud Publica/Pan American Journal of Public Health*, 15, 400-416.
84. ORGANIZATION OF AMERICAN STATES (2006) Guyana: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
85. ORGANIZATION OF AMERICAN STATES (2006) Haiti: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
86. SOYIBO, K. & LEE, M. G. (1999) Use of illicit drugs among high-school students in Jamaica *Bulletin of the World Health Organization*, pp. 258-62.
87. ORGANIZATION OF AMERICAN STATES (2006) Saint Vincent and the Grenadines: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Control Commission).
88. ORGANIZATION OF AMERICAN STATES (2006) Suriname: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Control Commission.).
89. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2000) National Report on the Drugs Situation in Bulgaria.
90. HIBELL, B., ANDERSSON, B., BJARNASON, T. et al. (1997) The 1995 ESPAD Report: Alcohol and other drug use among students in 26 European Countries (ESPAD).
91. EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION (2005) Annual Report: The Czech Republic - 2004 Drug Situation., in: Mravčík, V., Korčišová, B., Lejčková, P., Miovská, L., Škrdlantová, E., Petroš, O., Sklenář, V., Vopravil, J. (Ed.) (Prague, Office of the Government of the Czech Republic).
92. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2007) 2007 National Report (2006 data) to the EMCDDA. Poland: New Development, Trends and In-depth Information on Selected Issues. (The Reitox National Focal Point).

93. ANDERSSON, B., HIBELL, B., BECK, F. et al. (2007) Alcohol and drug use among European 17-18 year old students: Data from the ESPAD project (ESPAD).
94. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2005) 2005 National Report (2004 data) to the EMCDDA. Romania: New Development, Trend and in-depth Information on Selected Issues. (The Reitox National Focal Point).
95. MANZONI, J., BJEGOVIC, V., CIRIC-JANKOVIC, S. & PREPELICZAY, S. (2005) School Survey of Psychoactive Substance Abuse among Adolescents in Serbia 2005 (Siberia).
96. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2006) 2006 National Report (2005 data) to the EMCDDA. Slovak Republic: New Development, Trends and In-depth Information On Selected Issues (Reitox National Focal Point).
97. INSTITUTE OF PUBLIC HEALTH OF THE REPUBLIC OF SLOVENIA (2002) Report to the EMCDDA. The Republic of Slovenia Drug Situation 2002 (Institute of Public Health of the Republic of Slovenia and Reitox National Focal Point).
98. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2000) National Report on the Drugs Situation in The Former Yugoslav Republic of Macedonia, 2000.
99. AVE TALU, A., ABEL, K., AHVEN, A., NEUMAN, A. & LAASTICK L. (2004) 2004 National Report to the EMCDDA. Estonia: New development, trends and in-depth information about selected issues (Reitox National Focal Point).
100. IHUNWO, A. O., KAYANJA, F.I.B. & AMADI-IHUNWO, U.B. (2004) Use and perception of the psychostimulant, khat (catha edulis) among three occupational groups in south western Uganda *East African Medical Journal* 81, 468-473.
101. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2005) 2005 National Report to the EMCDDA. Lithuania: New Development, Trends and in-depth Information on Selected Issues (National Durg Control Department, under the Goverment of the Republic of Lithuania.).
102. PLATT, L., WALL, M., RHODES, T., JUDD, A., HICKMAN, M., JOHNSTON, L. G., RENTON, A., BOBROVA, N., SARANG, A. (2006) Methods to recruit hard-to-reach groups: Comparing two chain referral sampling methods of recruiting injecting drug users across nine studies in Russia and Estonia, *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 83, i39-i52.
103. HAAS, S., BUSCH, M., HORVATH, I. et al. (2007) Report on the Drug Situation 2007 (Vienna, Austrian Federal Ministry for Health, Family and Youth and EMCDDA).
104. HAAS, S., BUSCH, M., HORVATH, I. et al. (2006) Report to the EMCDDA. Austria Drug Situation 2006 (Vienna, Reitox National Focal Point).
105. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2000) Report to the EMCDDA. Belgium: Drug Situation 2000 (Belgian Information Reitox Network).
106. EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION (2004) 2004 National Report to the EMCDDA. Cyprus: New Development, trends and in-depth information on selected issues (Reitox National Focal Point).
107. EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION (2006) 2006 National Report (2005 data) to the EMCDDA. Denmark: New development, trends and in-depth information on selected issues (Reitox National Focal Point).
108. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2006) National Report (2005 data) to the EMCDDA. Finland Drug Situation: New Developments, Trends and In-depth Information on Selected Issue.
109. EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION (2006) 2006 National Report (2005 data) to the EMCDDA. France: New developments, trends and in-depth information in selected issues (Reitox National Focal Point).
110. KRAUS, L., AUGUSTIN, R. & ORTH, B. (2005) Illicit drugs use, age of onset and trends. Results of the 2003 Epidemiological Survey of Substance Abuse. [German], *Sucht*, 51, S19-S28.

111. SIMON, R., DAVID-SPICKERMANN, M. & FARKE, W. (2005) 2005 National Report to the EMCDDA by the REITOX National Focal Point - Germany: New Developments, Trends and in-depth information on selected issues - Drug Situation 2004.
112. STEPHANIS, C. N. (2006) 2006 National Report to the EMCDDA. Greece: New development, trends and in-depth in formation on selected issues (Athens, Reitox National Focal Point).
113. NATIONAL ADVISORY COMMITTEE ON DRUGS (NACD) & DRUG AND ALCOHOL INFORMATION AND RESEARCH UNIT (DAIRU) (2008) Drug Use in Ireland and Northern Ireland 2006/2007: First Results from the 2006/2007 Drug Prevalence Survey *Bulletin 1*.
114. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2000) Report to the EMCDDA. Ireland: Drug Situation 2000 (Drug Misuse Research Division of the Health Research Board).
115. ISRAEL ANTI-DRUG AUTHORITY Psychoactive Substance Use in Israel: Epidemiological Surveys 1989 - 2003.
116. EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION (2006) 2006 National Report (2005 data) to the EMCDDA. Italy: New developments, trends and in-depth information about selected issues (Reitox National Focal Point).
117. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2007) 2007 National Report to the EMCDDA. "Grand Duchy of Luxembourg": New Development, Trends and In-depth Information on Selected Issues.
118. TRIMBOS INSTITUTE (2007) The Netherlands National Drug Monitor - Annual Report 2006, in: van Laar, M. W., Cruts, A. A. N., Verdurmen, J. E. E., van Ooyen-Houben, M. M. J. & Meijer, R. F. (Eds.) (Netherlands Institute of Mental Health and Addiction).
119. EUROPEAN MONITORING CENTER FOR DRUGS AND DRUG ADDICTION (2006) Report to the EMCDDA. The Netherlands: Drug Situation 2006 (Nationale Drug Monitor (NDM)).
120. KUIPERS, S. B. M. & DE ZWART, W. M. (1999) Trends and patterns in illicit drug use among students aged 12 to 18 in the Netherlands, *Journal of Drug Issues*, 29, 549-564.
121. BRYHNI, A. (2007) Alcohol and Drugs in Norway 2007, in: Bryhni, A. (Ed.) (Oslo, Norwegian Institute for Alcohol and Drug Research).
122. EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION (2002) Annual Report on the Drug Phenomena to the EMCDDA. Portugal 2002.
123. GOVERNMENT DELEGATION FOR THE NATIONAL DRUG PLAN (2008) Home of the survey report on Alcohol and drugs in Spain (ages) 2007/08.
124. RIBERA, M. A. & GONZALEZ, P. K. (1998) [The consumption of tobacco, alcohol and noninstitutionalized-use drugs by middle-school students of Terrassa], *Gaceta Sanitaria*, 12, 241-7.
125. DE PREUX, E., DUBOIS-ARBER, F. & ZOBEL, F. (2004) Current trends in illegal drug use and drug related health problems in Switzerland, *Swiss Medical Weekly*, 134, 313-321.
126. MURPHY, R. & ROE, S. (2007) Drug Misuse Declared: Findings from the 2006/07 British Crime Survey - England and Wales (Home Office - Research, Development and Statistics Directorate).
127. (2007) Smoking, drinking and drug use among young people in England in 2006: Headline figures (United Kingdom, The National Centre for Social Research).
128. ORGANIZATION OF AMERICAN STATES (2006) Bolivia: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
129. ORGANIZATION OF AMERICAN STATES (2006) Ecuador: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).

130. ORGANIZATION OF AMERICAN STATES (2006) Peru: Evaluation of Progress in Drug Control (Organization of American States, Inter-American Drug Abuse Conrol Commission).
131. ALONSO CASTANO, G. (2002) Heroin consume in Columbia. [Spanish], *Adicciones*, 14, 87-90.
132. ORGANIZATION OF AMERICAN STATES (2006) Colombia: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
133. ORGANIZATION OF AMERICAN STATES (2006) El Salvador: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
134. CICAD (2004) Comparative Report on Nationwide School Surveys in Seven Countries: El Salvador, Guatemala, Nicaragua, Panama, Paraguay, Dominican Republic, and Uraguay (Washington DC, Inter-American Drug Abuse Control Commission).
135. ORGANIZATION OF AMERICAN STATES (2006) Guatemala: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
136. MEDINA MORA, M. E. (2008) Encuesta Nacional de Adicciones, 1998 (National Survey on Addictions) (Secretaría de Salud).
137. GUIOT, E. R., REYES, J. G., GARCIA, S. C., VELASQUEZ, J. V. & ET AL. (1993) Prevalence of drug use among high school students in Mexico, *Salud Mental*, 16, 1-7.
138. ORGANIZATION OF AMERICAN STATES (2006) Nicaragua: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
139. ORGANIZATION OF AMERICAN STATES (2006) Venezuela: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
140. ORGANIZATION OF AMERICAN STATES (2006) Argentina: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
141. ORGANIZATION OF AMERICAN STATES (2006) Chile: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
142. ORGANIZATION OF AMERICAN STATES (2006) Uruguay: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
143. WAGNER, G. A., STEMPLIUK, V. D. A., ZILBERMAN, M. L., BARROSO, L. P. & DE ANDRADE, A. G. (2007) Alcohol and drug use among university students: Gender differences, *Revista Brasileira de Psiquiatria*, 29, 123-129.
144. ORGANIZATION OF AMERICAN STATES (2006) Paraguay: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
145. YOUSUF, J. (2007) Use of neuroactive substances among university students: preliminary indicators, in: Fund for the Control and Treatment of Addiction and Abuse (Ed.) (Cairo, National Council for the Control and Treatment of Addiction).
146. AHMADI, J. & HASANI, M. (2003) Prevalence of substance use among Iranian high school students, *Addictive Behaviors*, 28, 375-379.
147. UNODC (2003) Substance use and misuse in Lebanon, in: The Regional Office for the Middle East and North Africa of the United Nations Office on Drugs and Crime (UNODC), I. I. f. D., Research and Applied Care) (Ed.).

148. AFIFI, M., AL-ZUHEIRI, M., FASHEH, V. & EL-SOUSI, S. (2002) Drug Abuse: Problems, Policies, and Programs in Palestine, in: Isralowitz, R., Afifi, M & Rawson, R. (Ed.) *Drug Problems: Cross-cultural policy and program development* (Westport, Greenwood Publishing Group).
149. ADLAF, E. M. & PAGLIA-BOAK, A. (2007) Drug use among Ontario students 1977-2007: Detailed OSDUHS Findings *CAMH Research Document Series* (Centre for Addiction and Mental Health).
150. ADLAF, E. M., BEGIN, P. & SAWKA (EDS)., E. (2005) Canadian Addiction Survey (CAS): A National Survey of Canadians' use of Alcohol and other drugs: Prevalence of use and related harms: Detailed Report (Ottawa, Canadian Centre on Substance Abuse).
151. ORGANIZATION OF AMERICAN STATES (2006) Canada: Evaluation of Progress in Drug Control 2005-2006 (Organization of American States, Inter-American Drug Abuse Conrol Commission).
152. SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES ADMINISTRATION (2007) The National Survey on Drug Use and Health 2007.
153. DEVANEY, M., REID, G. & BALDWIN, S. (2006) Situational Analysis of Illicit Drug Issues and Responses in the Asia-Pacific Region. Canberra: Australian National Council on Drugs.
154. UNITED NATIONS OFFICE OF DRUGS AND CRIME (2003) Pacific Islands Regional Profile. Bangkok: United Nations International Drug Control Programme Regional Centre for East Asia and the Pacific, 2003.
155. SELASSIE, S. G. & GEBRE, A. (1996) Rapid assessment of drug abuse in Ethiopia., *Bulletin on Narcotics*, 48, 53-63.
156. MWENESI, H. A. (1996) Rapid assessment of drug abuse in Kenya, *Bulletin on Narcotics*, 48, 65-78.
157. WORLD HEALTH ORGANIZATION (2003) Substance Use in Southern Africa: Knowledge, Attitudes, Practices and Opportunities for Intervention (WHO/UNDCP Global Initiative on Primary Prevention of Substance Abuse.).
158. SHISANA O, R. T., SIMBAYI, LC, PARKER W, ZUMA K, BHANA A, CONNOLLY C, JOOSTE S, & PILLAY V ET AL. (2005) South African National HIV prevalence, HIV incidence, behaviour and communication survey, 2005. (Cape Town, HSRC).
159. UNHCR/WHO & MACDONALD, D. (2006) Rapid assessment of substance use in conflict-affected and displaced populations: Libera.
160. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2008) Study on the Situation of Drug Abuse and Drug Related HIV/AIDS in Cape Verde Rapid Situation Assessment (United Nations Office on Drugs and Crime, Ministry of Justice Cape Verde, Commission for Drug Control Coordination).
161. DENNIS-ANTWI, J. (2003) A national survey on prevalence and social consequences of substance(drug) use among second cycle and out of school youth in Ghana (Ministry of Health, Ghana).
162. ADELKAN, M. L., NDOM, R. J. E., MAKANJUOLA, A. B. et al. (2000) Trend Analyses of Substance Use among Undergraduates of Illorin, Nigeria: 1988-1998, *African Journal of Drug and Alcohol Studies*, 1, 39-52.
163. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2006) Assessment of the Trends and Patterns of the Drug Abuse and HIV/AIDS Situation in the Communities and Prisons of Sierra Leone (United Nations Office on Drugs and Crime, National Drugs Control Agency).
164. NELSON, P., MCLAREN, J., DEGENHARDT, L. et al. (2009) Methodology used in a systematic review of evidence on the prevalence of heroin and other opioid use and dependence. Global Burden of Disease Mental Disorders and Illicit Drug Use Expert

group. Illicit drugs discussion paper No. 16. (Sydney, National Drug and Alcohol Research Centre, University of NSW).
165. DEGENHARDT, L., CALABRIA, B., NELSON, P. et al. (under review) What do we know about the extent of amphetamine use and dependence? Results of a global systematic review.
166. CALABRIA, B., DEGENHARDT, L., NELSON, P. et al. (under review) What do we know about the extent of cannabis use and dependence? Results of a global systematic review.
167. BUCELLO, C., DEGENHARDT, L., CALABRIA, B. et al. (under review) What do we know about the extent of cocaine use and dependence? Results of a global systematic review.
168. ROSENBLUM, A., PARRINO, M., SCHNOLL, S. H. et al. (2007) Prescription opioid abuse among enrollees into methadone maintenance treatment, *Drug and Alcohol Dependence*, 90, 64-71.
169. MARSDEN, J., GOSSOP, M., STEWART, D., ROLFE, A. & FARRELL, M. (2000) Psychiatric symptoms among clients seeking treatment for drug dependence - Intake data from the National Treatment Outcome Research Study, *British Journal of Psychiatry*, 176, 285-289.
170. DEGENHARDT, L. & LARANCE, B. (2009) Phama - TBA, *Addiction*, submitted.
171. CLARK, W. B. (1966) Operational definition of drinking problems and associated prevalence rates *Quarterly Journal of Studies on Alcohol*, 27, 648-668.
172. CAHALAN, D. & ROOM, R. (1974) Problem Drinking among American Men. Monograph No. 7 (New Brunswick, NJ, Rutgers Center of Alcohol Studies).
173. ROOM, R. (1988) Cross-cultural research in alcohol studies: research traditions and analytical issues, in: Harford, T. & Towle, L. (Eds.) *Cultural influences and drinking patterns: a focus on Hispanic and Japanese populations. NIAAA Research Monograph No. 19*, pp. 9-40 (Rickville, MD, National Institute of Alcohol Abuse and Alcoholism).
174. NICOLAIDES-BOUMAN, A., WALD, N., FOREY, B. & LEE, P. (1993) *International smoking statistics* (Oxford, Oxford University Press).
175. ROBINS, L. N. (1966) *Deviant children grown up: a sociological and psychiatric study of sociopathic personality* (Baltimore, MD, Williams & Wilkins).
176. ROOM, R., JANCA, A., BENNETT, L., SCHMIDT, L. & SARTORIUS, N. (1996) WHO cross-cultural applicability research on diagnosis and assessment of substance use disorders: an overview of methods and selected results, *Addiction*, 91, 199-220.
177. UNITED NATIONS ECONOMIC AND SOCIAL COUNCIL (2009) E/CN.7/2009/L.24/Rev.1: Improving the collection, reporting and analysis of data to monitor the implementation of the Political Declaration and Plan of Action on International Cooperation towards an Integrated and Balanced Strategy to Counter the World Drug Problem. http://daccessdds.un.org/doc/UNDOC/LTD/V09/818/59/PDF/V0981859.pdf?OpenElement, Paper presented at the *52nd Session of the Commission on Narcotic Drugs, March 11-20 2009*, Vienna, Austria.
178. DEGENHARDT, L. & DAY, C. (2004) The course and consequences of the heroin shortage in New South Wales. NDLERF Monograph No. 4 (Adelaide, Australasian Centre for Policing Research).
179. DEGENHARDT, L., RENDLE, V., HALL, W., GILMOUR, S. & LAW, M. (2004) Estimating the number of heroin users in NSW and Australia, 1997-2002. NDARC Technical Report No. 198 (Sydney, National Drug and Alcohol Research Centre, University of NSW).
180. DEGENHARDT, L., RENDLE, V., HALL, W., GILMOUR, S. & LAW, M. (2004) Estimating the size of a heroin using population after a marked reduction in heroin supply. NDARC Technical Report No. 197 (Sydney, National Drug and Alcohol Research Centre, University of NSW).
181. AHLSTRÖM, S., BLOOMFIELD, K. & KNIBBE, R. (2001) Gender Differences in Drinking Patterns in Nine European Countries: Descriptive Findings., *Substance Abuse*, 22, 69-85.

182. OBOT, I. S. & ROOM, R. (2003) Alcohol, Gender and Drinking Problems: Perspectives from Low and Middle Income Countries (Geneva, World Health Organization).
183. LEIFMAN, H. (2002) A comparative analysis of drinking patterns in six EU countries in the year 2000, *Contemporary Drug Problems*, 2002.
184. BLOOMFIELD, K., GMEL, G., NEVE, R. & MUSTONEN, H. (2001) Investigating gender convergence in alcohol consumption in Finland, Germany, the Netherlands and Switzerland: A repeated survey analysis, *Substance Abuse*, 22, 39-53.
185. MATHERS, B., DEGENHARDT, L., PHILLIPS, B. et al. (2008) Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review, *The Lancet*, 372, 1733-1745.

APPENDIX A: SEARCH STRINGS FOR PEER-REVIEWED SEARCHES

Database	Search group	Search terms
Medline*	Heroin/Opioids	heroin or opium or opiate$ Exp Opium/ or exp Narcotics/ or exp Heroin Dependence/ or exp Heroin/ or exp Morphine/ or exp Opioid-Related Disorders/ or exp Opiate Alkaloids/ or exp Methadone/ or exp Analgesics, Opioid/
	Gold standard Epidemiology	"prevalence" OR "inciden$" OR "epidemiolog$" OR "history" or "patterns" OR "survey$" OR "data collection$" OR "screening" OR "cohort" OR "population study" OR "population sample" OR "surveillance" OR "community sample" OR "statistics" OR "duration" OR "severity" OR "chronic" OR "long-term" OR "prolonged" exp Epidemiology/ or Exp prevalence/ or exp Incidence/ or exp sex distribution/ or exp age distribution/ or exp epidemiologic methods/ or exp ethnology/ or exp Statistics/ or exp data collection/ or exp health surveys/ or exp health care surveys/ or exp interviews/ or exp narration/ or exp questionnaires/ or exp records/ or exp registries/ or exp disease notification/ or exp epidemiologic studies/ or exp cohort studies/ or exp longitudinal studies/ or exp follow-up studies/ or exp prospective studies/ or exp cross-sectional studies/ or exp sampling studies/ or exp focus groups/
	Basic epidemiology	(inciden$ or prevalen$ or epidemiolog$) Exp Epidemiology/ or exp prevalence/ or exp Incidence/
	Cohort	"cohort" OR "longitudinal" OR "incidence" OR "prospective" OR "follow-up" exp cohort studies/ or exp longitudinal studies/ or exp follow-up studies/ or exp prospective studies/
	Drug Use	drug abuse$ OR drug use$ OR drug misuse$ OR drug dependenc$ OR substance abuse$ OR substance use$ OR substance misuse$ OR substance dependenc$ OR addict$ Exp Substance-related disorders/
EMBASE#	Heroin/Opioids	"heroin" or "opioid$" or "opiate$" or "opium" exp Diamorphine/ or exp Opiate/ or exp METHADONE TREATMENT/ or exp METHADONE/
	Gold standard Epidemiology	"prevalence" OR "incidence" OR "epidemiolog$" OR "data collection" Or "Survey" OR "surveillance" OR "screening" OR "population study" OR "population sample" OR "population survey" OR "population surveillance" OR "community sample" OR "RAR" OR "rapid assessment" OR "situation$ assessment" OR "statistics" exp PREVALENCE/ or exp INCIDENCE/ or exp EPIDEMIOLOGY/ or exp Age Distribution/ or exp Sex Difference/ or exp biostatistics/ or exp health statistics/ or exp epidemiological data/ or exp geographic distribution/ or exp field study/ or exp observational study/ or exp panel study/ or exp pilot study/ or exp prevention study/ or exp trend study/ or

Database	Search group	Search terms
		exp case finding/ or exp exploratory research/ or exp multimethod study/ or exp naturalistic inquiry/ or exp qualitative research/ or exp quantitative study/ or exp sample size/ or exp secondary analysis/ or exp technique/ or exp triangulation/ or exp "medical record review"/ or exp semi structured interview/ or exp structured interview/ or exp unstructured interview/ or exp observational method/ or exp questionnaire/ or exp open ended questionnaire/ or exp structured questionnaire/ or exp model/
	Basic Epidemiology	(inciden$ or prevalen$ or epidemiolog$) Exp Epidemiology/ or exp prevalence/ or exp Incidence/
	Cohort	"cohort" OR "longitudinal" OR "incidence" OR "prospective" OR "follow-up" exp COHORT ANALYSIS/ or exp LONGITUDINAL STUDY/ or exp PROSPECTIVE STUDY/ or exp Follow Up/
	Drug Use	Drug abuse OR drug use$ OR drug misuse OR drug dependenc$ OR substance abuse OR substance use$ OR substance misuse OR substance dependenc$ OR addict$ exp substance abuse/ or exp drug abuse/ or exp analgesic agent abuse/ or exp drug abuse pattern/ or exp drug misuse/ or exp drug traffic/ or exp multiple drug abuse/ or exp addiction/ or exp drug dependence/ or exp opioid dependence/ or narcotic dependence/ or exp heroin dependence/ or exp morphine addiction/ or exp opiate addiction/
PsycINFO^	Heroin/Opioids	"heroin" or "opium" or "opiate$" or "methadone" exp Opiates/ or exp METHADONE/ or exp HEROIN ADDICTION/ or exp HEROIN
	Gold standard epidemiology	"prevalence" OR "incidence" OR "epidemiolog$" OR "data collection" Or "Survey" OR "surveillance" OR "screening" OR "population study" OR "population sample" OR "population survey" OR "population surveillance" OR "community sample" OR "RAR" OR "rapid assessment" OR "situation$ assessment" OR "statistics" Exp epidemiology/ or exp STATISTICS/ or exp "POPULATION (STATISTICS)"/ or exp disease course/ or exp statistical analysis/
	Basic epidemiology	Prevalen$ or inciden$ or epidemiolog$ Exp epidemiology/
	Cohort	"cohort" OR "longitudinal" OR "incidence" OR "prospective" OR "follow-up" Exp age differences/ or exp cohort analysis/ or exp human sex differences
	Drug Use	Drug abuse OR drug use$ OR drug misuse OR drug dependenc$ OR substance abuse OR substance use$ OR substance misuse OR substance dependenc$ OR addict$ Exp drug abuse/ or exp drug addiction/ or exp addiction/ or exp drug usage

* 'key-words' in lowercase, 'MeSH' terms in bold
# 'key-words' in lowercase, 'EMTREE' terms in bold
^ 'key words' in lowercase, explode terms in bold

APPENDIX B: SEARCH STRING COMBINATIONS

	Search terms		Database		
			Medline	EMBASE	PsycINFO
1.	Heroin/ opioids	+ gold standard epidemiology	7850	8133	1453
2.	Heroin/ opioids	+ gold standard epidemiology + cohort	2274	1336	328
3.	Heroin/ opioids	+ basic epidemiology	1920	4889	933
4.	Heroin/ opioids	+ basic epidemiology + cohort	925	1492	244

APPENDIX C: ILLICIT DRUGS QUALITY INDEX

1. Case ascertainment

2	• Nationwide survey/register/database (not for a specific population) • Multiple institutions/centres
1	• Regional • Case/death registers • One treatment institution/hospital etc.
0	• Not specified

2. Measurement instrument

3	• Interview/self-reported drug use (comment about reporting type, eg. self-report or standardised interview) • In treatment for drug dependence
2	• Systematic case note/database/reports review • Blood and/or urine toxicology screen
1	• Chart diagnosis
0	• Not specified

3. Diagnostic criteria

1	• Any diagnostic system reported for drug dependence or abuse (not use) eg., DSM, ICD, RDC (comment, eg. DSM) • Dependence inferred from type of sample population (comment, eg. treatment centre)
0	• Drug use • Own system • Symptoms described • No system • Not specified

4. Estimate

1	• Yes (comment on what type of estimate, eg. relative risk, SMR, prevalence, incidence)
0	• No

5. Numerator and denominator presented?

1	• Yes
0	• No

6. Numerator and denominator based on identical epochs and identical catchment areas?

1	• Yes
0	• N

7. Completeness of follow-up in cohort studies and response for cross-section studies

2	• High response rate/inclusion of defined sample population (>80%)
1	• Moderate response rate (60% - 79%) • Exclusions made
0	• Poor response rate (<60%)

8. Representative of the catchment area?

2	• Well represented • National registers • Multiple institutions across states
1	• Small area • Not representative of nation • One treatment centre • Registers of specific populations, eg. pilots
0	• Convenient sampling • Other (comment)

9. Age/sex specific values presented?

2	• Yes
1	• Some (eg. sex and 2 broad age ranges only)
0	• No

10. Quality of methods of reporting

Text	• Eg. translation of tools, interviewer's quality, quality control monitoring, limitations of data, high quality methods used etc

11. Duration of follow-up

Text	• Eg. Number of years at follow-up – small sample size over a number of years etc.

APPENDIX D: ACCESS DATABASE MANUAL AND DATA ENTRY RULES

Global Burden of Disease study: Overview

We are collecting data to generate regional estimates of:
Prevalence;
Incidence;
Remission;
Duration; and
Mortality,

For 5 different types of drug dependence:
Amphetamine-type stimulants (ATS);
Benzodiazepine;
Cannabis;
Cocaine; and
Heroin and other opioids.

Estimates need to be made for 1990 and 2005, reflecting the general population.

Ideally raw data should be used, however in cases where the study is a comparison against a survey that we cannot otherwise access, then it is appropriate to enter the reported (not raw) data but make sure that a comment is added in the estimates comment box (eg. "data from 2006 report") to note that this data is not raw and that it was used to avoid missing out on the data completely. Please keep note (on paper) of the years of data extracted from the report and give to XX.

Data extraction

- Endnote libraries contain the data sources that need to be extracted for each parameter (PDFs are attached to each reference).
- Prevalence and Incidence data sources will be in the same library
- Remission and duration sources will be in the same library
- Mortality sources are in their own library

Interns: please enter data into the **1st entry windows only**

Estimates will be entered as 1st Entry by the first person that looks at the data, then a second time in the 2nd Entry by the person who is looking at the data. The Final Entry will function to cross-check the data entered for a source. Make sure that the second entry of an estimate is matched with second entry of the same estimate.
Only enter raw data.
Do not process any calculations; only enter what is presented in the publication.
Once you start entering information from a data source, you must extract ALL the data from the data source (please do not partially enter data from a source).
Data must be entered in ALL fields. If a field is not applicable or data is missing, please enter "999" (see General GBD Database Rules).

If an article reports on data from more than one country – an entirely new entry needs to be created from the Studies Summary window

Once extracted, please make a note in the endnote library under Research Notes "extracted by *insert name here*, *insert date here dd month year*", eg. "extracted by Bianca Calabria, 16 June 2008". If you start creating the final entries for a data source (automatically cross-checking the 2 previous entries or copying the first entry to the final entry), you must complete all the final entries of each estimate for that data source.

Prevalence and Incidence specifics:

RAW DATA ONLY

Many articles will report older data for comparisons. Please only extract the data which were the product of the **current** study or survey. However, at present (due to time constraints), when a report displays estimates from previous years of the same survey please extract all years of data. For previous survey year data enter a comment in the estimate comments box, "data from the 2006 report", for example. Please keep note (on paper) of the years of data extracted from the report and give to Bianca.

ALL PREVALENCE ESTIMATES

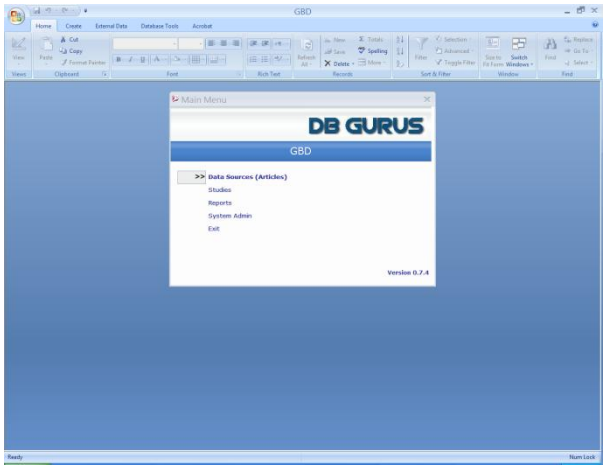
Drug use prevalence can be measured in several ways:
Lifetime Prevalence (LT) (ie: has the person ever tried the drug, even once)
Past year prevalence (PYP): has the person used the drug in the previous 12 months
Past month prevalence (PMP): also Past 30 day Prevalence (has the person used the drug in the last month/30 days)
For the GBD we are most interested in PMP, however, **we need to collect data on all three types of prevalence**, whenever they are reported. So, if an article reports on all three – please extract them ALL.

WEIGHTED AND UNWEIGHTED ESTIMATES

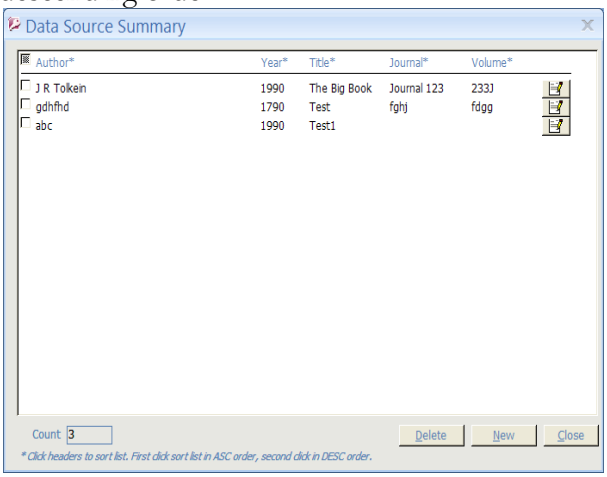
Some papers will report both weighted and unweighted estimates. Weighted estimates have been adjusted so that the sample is representative of the general population.
Please extract BOTH WEIGHTED and UNWEIGHTED.
Weighted estimates should have the Standardised box ticked, with a comment about how and why the statistics were weighted (if possible)

GBD Database Instructions
DO NOT USE ROLLER ON MOUSE

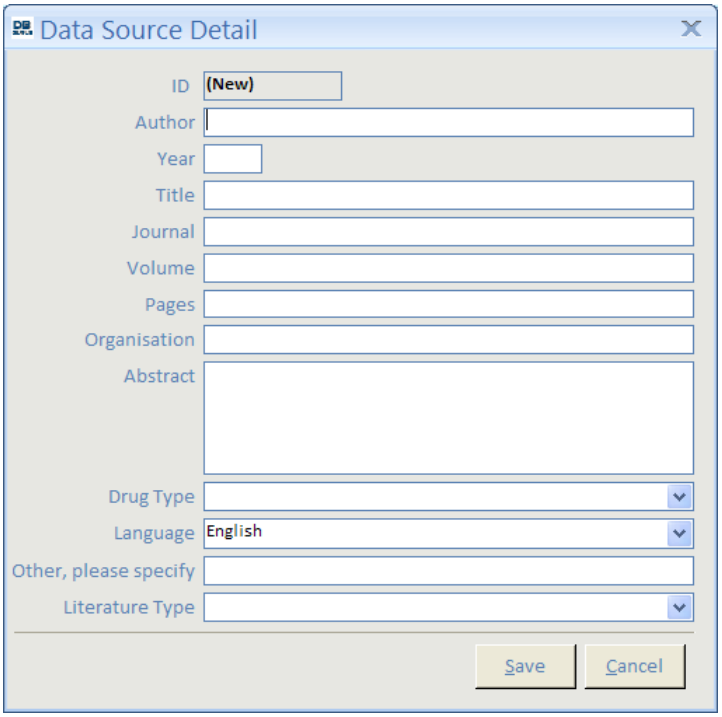
Open the GBD database (front end) file, to the main menu. Clicking once is enough, double clicking is not necessary.



Data Source (Articles)
Click once on ***Data Sources (Articles)*** to view the ***Data Source Summary***.
Headers can be clicked once to sort lists in ascending order, a second click will sort in descending order.



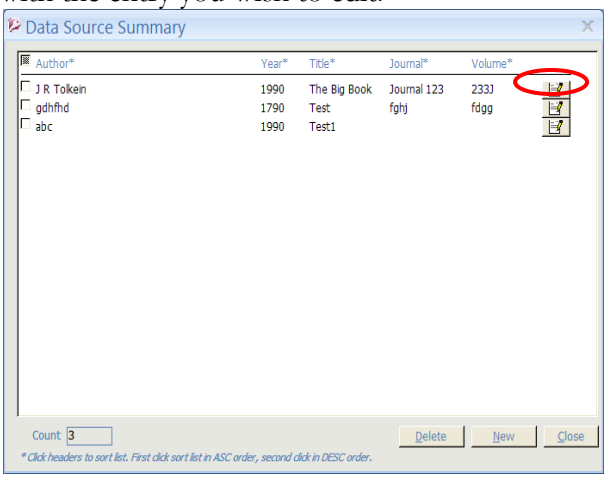
Create a new article entry
To create a new article entry click **new** at the bottom right of the screen.



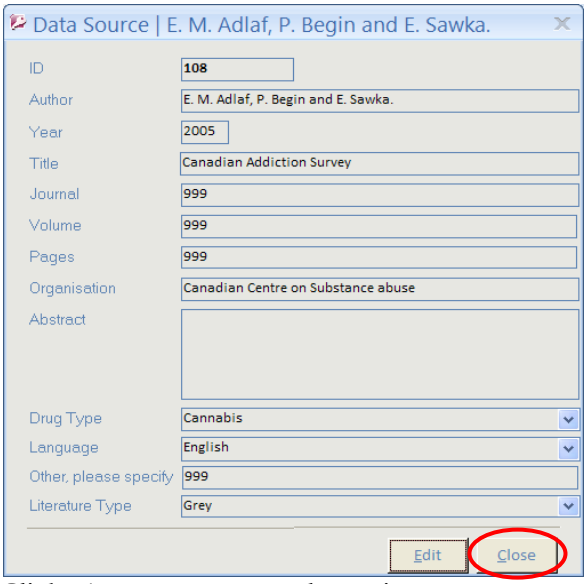
Enter data in ALL fields, then click **save** and **close** (abstract field can be left blank).
Click **close** in the ***Data Source Summary*** screen to return to the main menu.

Edit an existing article entry

To edit an existing article entry click on the icon on the far right of the screen that is associated with the entry you wish to edit.



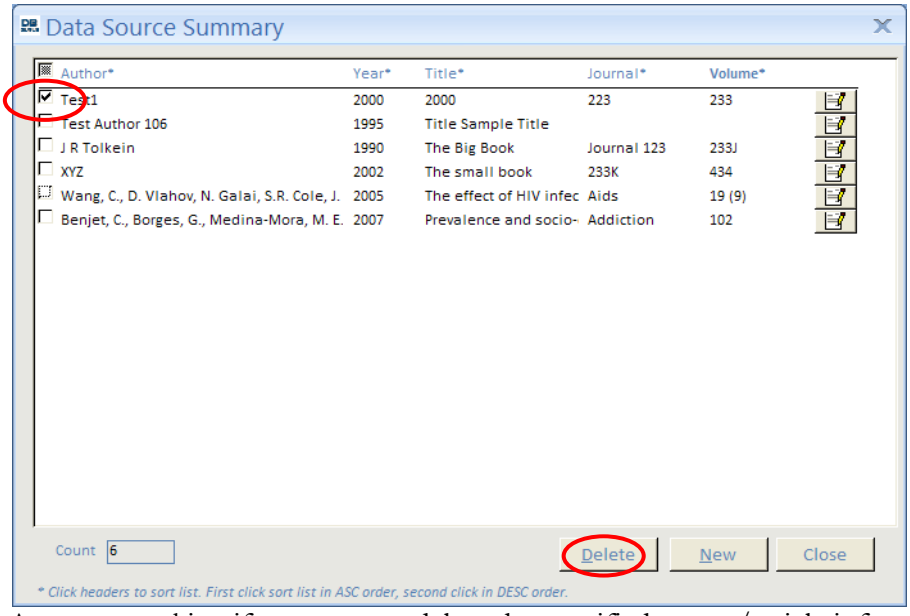
Then
Click **edit** on the bottom of the ***Data Source*** screen to edit existing information.
Click **save** and **close**.



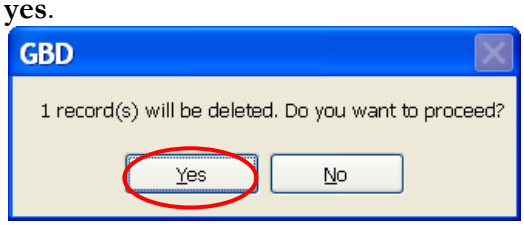
Click **close** to return to the main menu.

<u>Deleting report/article information</u>

In the ***Data Source Summary*** screen select the report/article you wish to delete by ticking the box to the left of the report/article information. Then click **delete** at the bottom right of the screen.



A message asking if you want to delete the specified report/article information will appear, click **yes**.

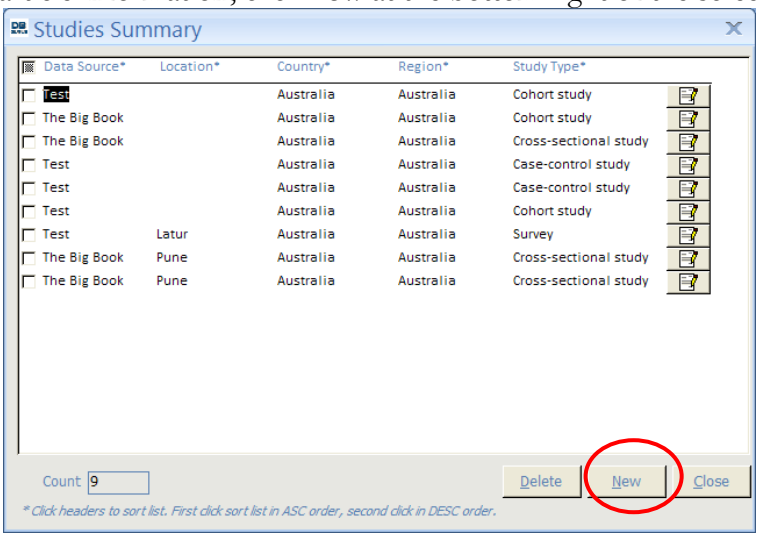


Studies

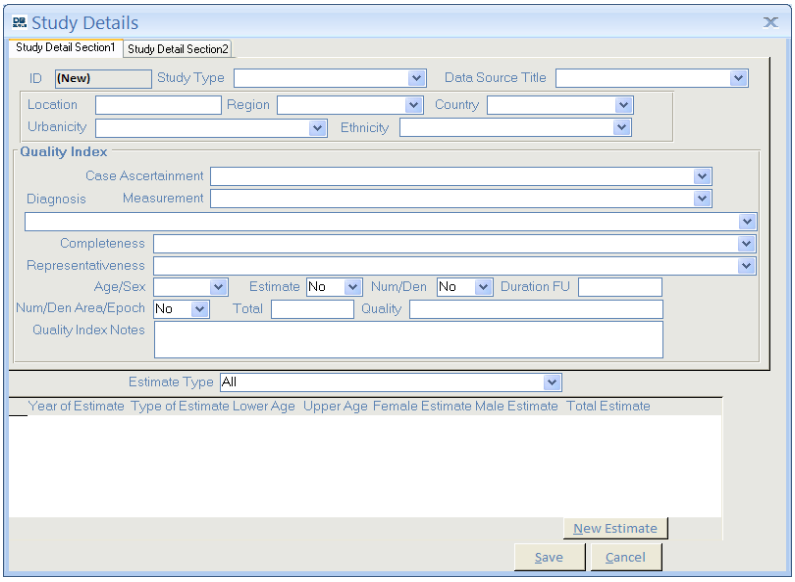
From the Main Menu click once on ***Studies*** to view the ***Studies Summary***.

Creating new study information (following on from creating new article entry)

To create a new study entry, that is new study information following on from entering the new article information, click **new** at the bottom right of the screen.

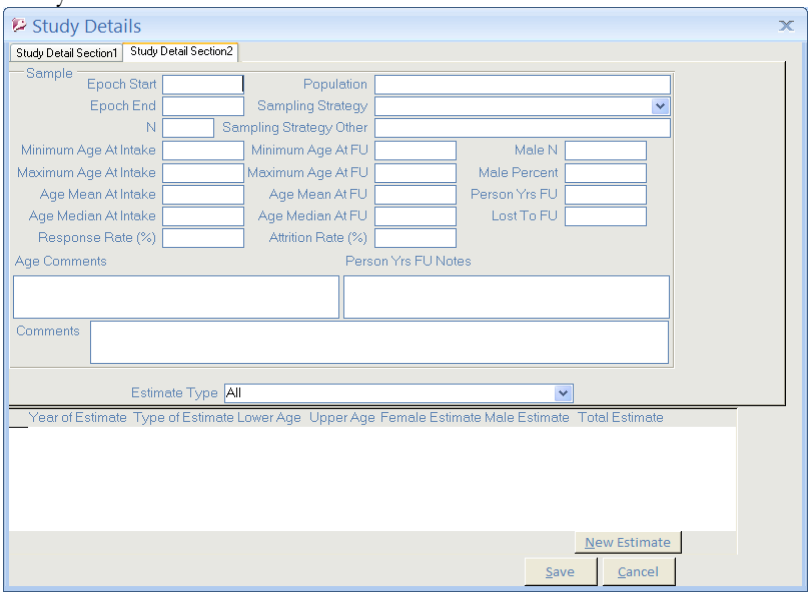


Study Detail Section 1



First select the authors of the particular article from the *Data Source Title* drop down box.
Enter data in ALL remaining fields on the ***Study Detail Section 1*** screen.
Select the ***Study Detail Section 2*** screen by clicking on the labelled tab at the top left of the screen.

Study Detail Section 2

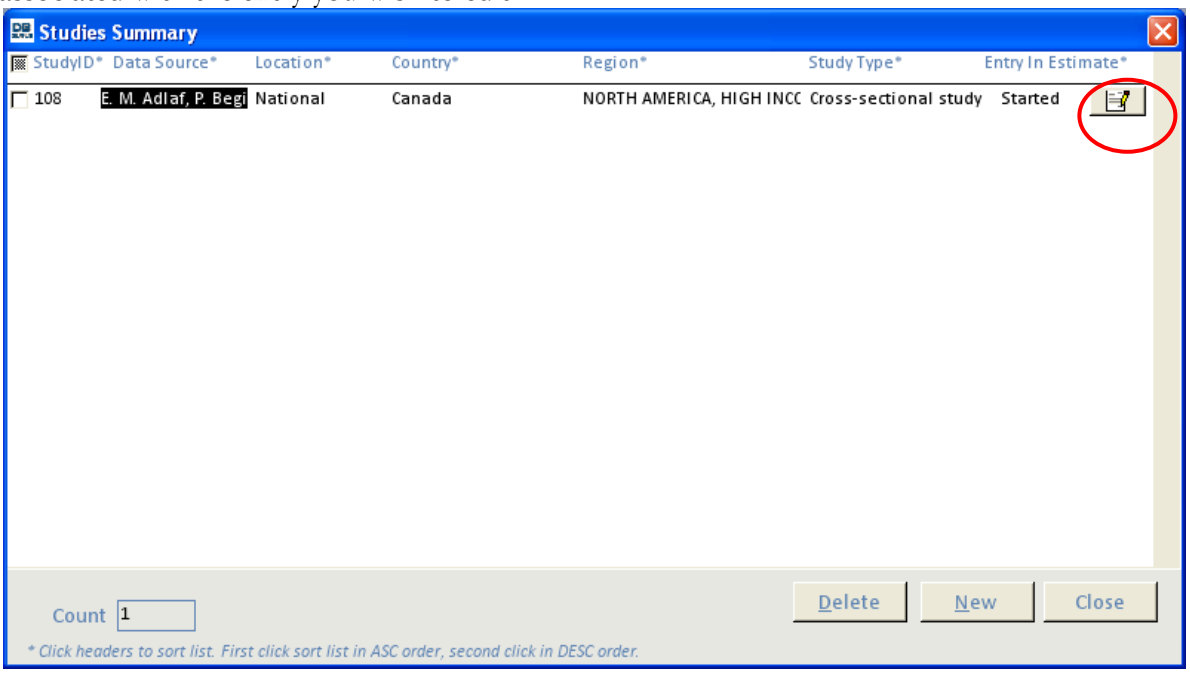


Enter data in ALL fields on the ***Study Detail Section 2*** screen (including *Estimate Type*).
Click **save.**

<u>Reports/articles that present data on more than one country.</u>
Click **new** at the bottom right of the ***Studies Summary*** screen. Select the appropriate author/date from the ***Study Detail Section 1*** screen and enter data for one of the countries reported on. Click **save** and **close**.
To enter the data for a different country presented in the same report/article, need to make a new record. Click **new** from the Studies Summary screen, select the appropriate author/date in the ***Study Details Section 1*** screen and input data. Click **save** and **close**.
In the ***Studies Summary*** screen the data source will be displayed twice, with the different country shown for each display.

Editing existing study information

To edit existing study information click on the icon on the far right of the screen that is associated with the entry you wish to edit.

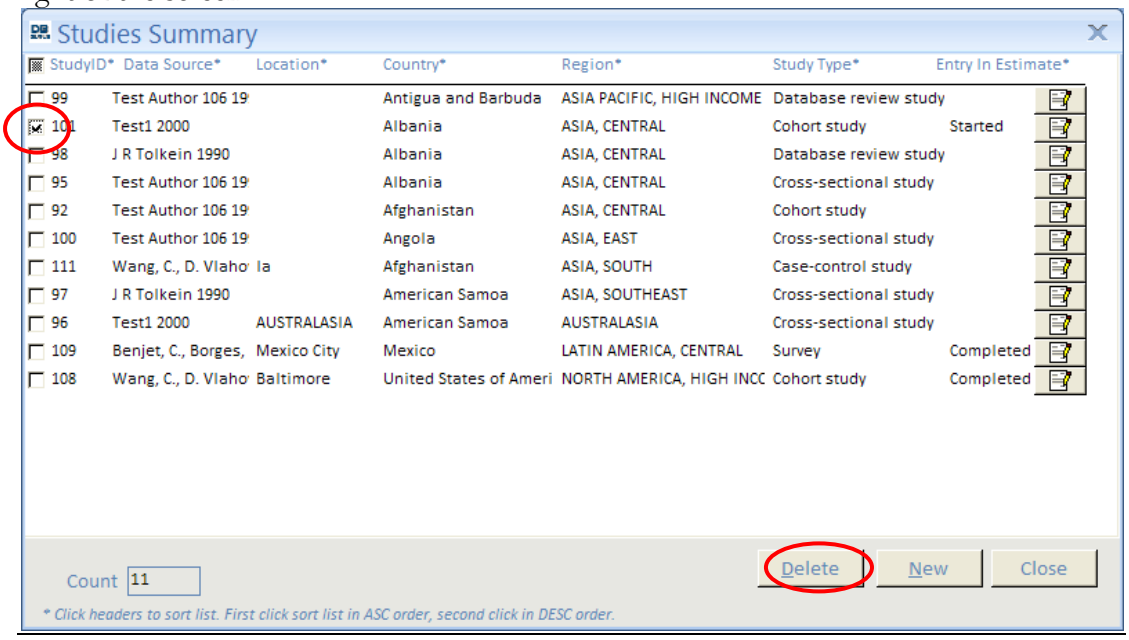


Click **edit** on the bottom of the ***Study Details*** screen to edit existing information (***Study Detail Section 1*** and ***Study Detail Section 2*** may both be edited, change between screens by clicking on the appropriately labelled tab at the top left of the screen).

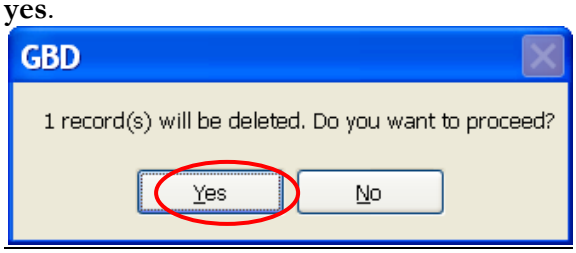
Click **save** and **close**.

Deleting study information

In the ***Study Summary*** screen select the report/article you wish to delete study information for by ticking the box to the left of the report/article information. Then click **delete** at the bottom right of the screen.



A message asking if you want to delete the specified report/article information will appear, click **yes**.

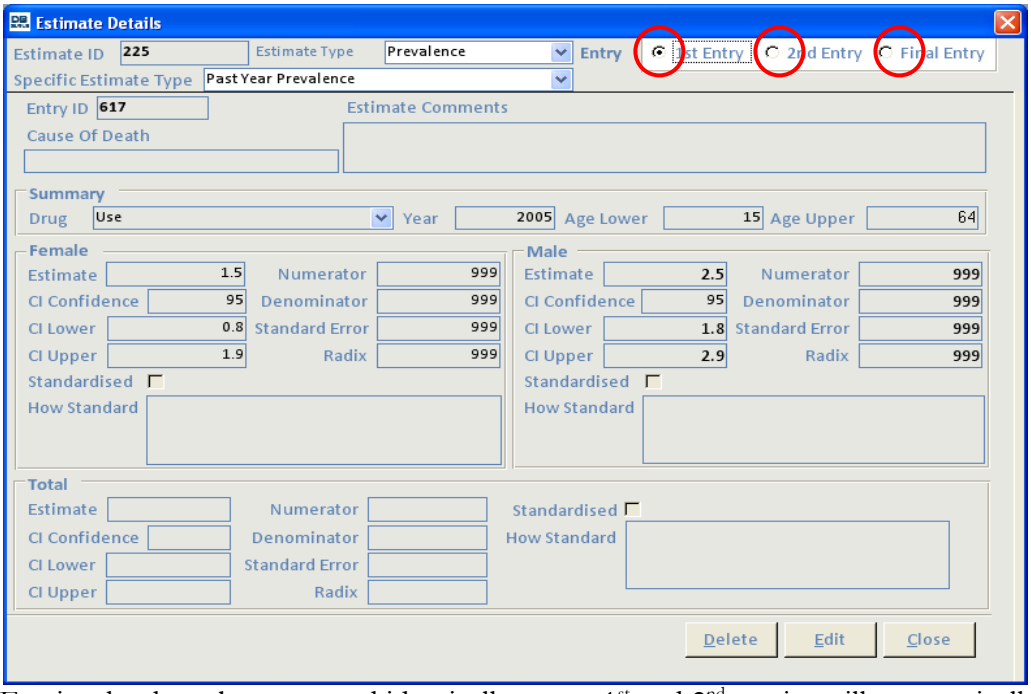


Estimate Details

Creating a new estimate entry (following on from creating new study information)
In the Studies Summary screen, click on the icon on the far right of the screen that is associated with the entry you wish to add an estimate.
Click **edit**, at the bottom right of the ***Study Details*** screen.
Click **New Estimate**, at the bottom right of the ***Study Details*** screen.
The ***1st Entry*** radio button should be selected if this is the first time data has been extracted from an article/report, ***2nd Entry*** radio button should be selected if this is the second time data has been extracted from the same article/report (not by the same person that entered the 1st entry), the final entry functions to compare the 1st and 2nd entries.
Only estimate information is entered into the database in the second entry, however, article/report and study information should be visually checked for errors by the second person entering estimate information.
Once data has been entered in ALL the fields click save and close.
In the ***Study Details*** screen click **save** and **close** to return to the ***Studies Summary*** screen.

Deleting estimate information
To delete an estimate, open up the estimate and click the delete button situated at the bottom right of the box.

Comparing the 1st Entry and the 2nd Entry
In the ***Studies Summary*** screen, click on the icon on the far right of the screen that is associated with the entry for which estimates you would like to compare.
In the ***Study Details*** screen click **edit** at the bottom right of the screen.
In the estimate summary section at the bottom of the screen, click on the icon on the far right of the screen that is associated with the estimate that comparison of entries is required.
Check that both the 1st and 2nd entries have been completed by clicking the radio buttons at the top right of the screen. If both are complete click on the radio button for the ***Final Entry***, then click **edit**.

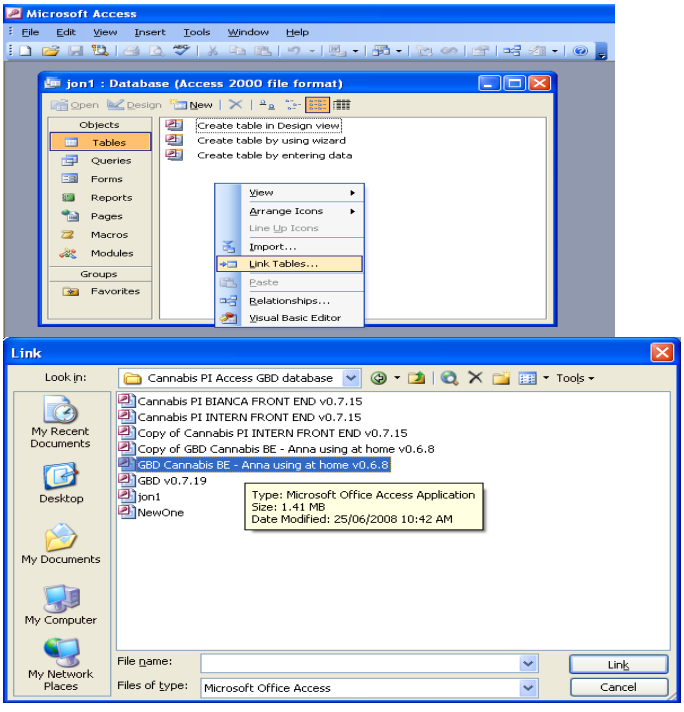


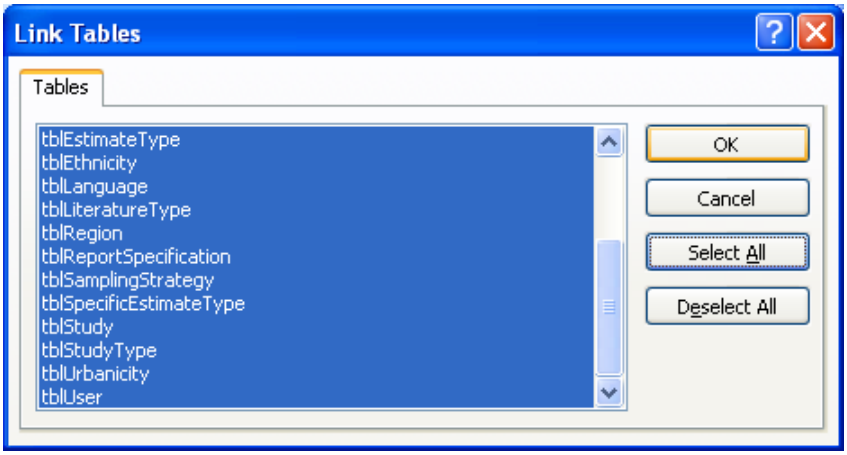
Entries that have been entered identically across 1st and 2nd entries will automatically appear in the final entry. Fields highlighted in pink do not match across 1st and 2nd entries and must be checked and correct responses entered manually.
Click **save** and **close**.

Queries

Linking tables from the Access database that holds the data to the new Access database that holds the queries:

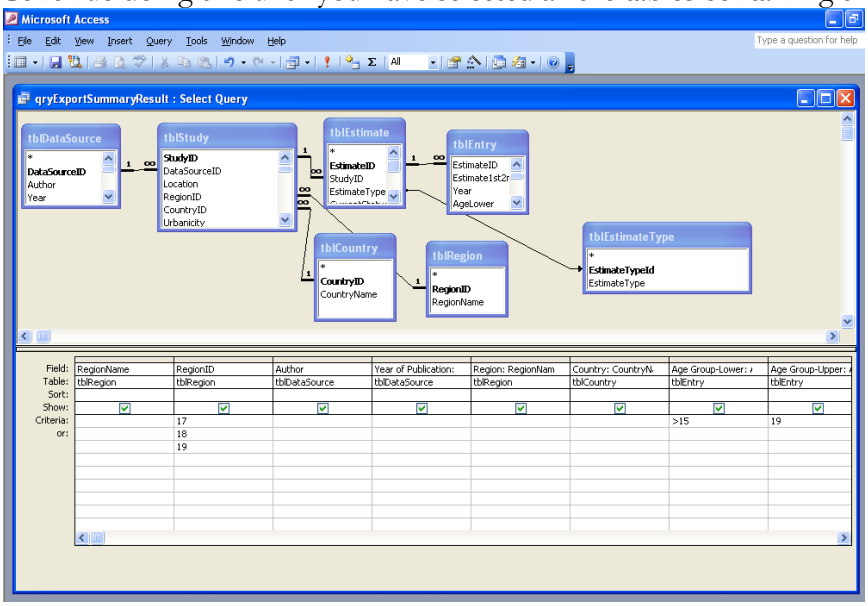
Open a new Access file
Highlight Tables in the left hand list
Right click and select: "Link tables"
Choose folder containing the Back End
Double click on the back end file





Choose "Select all"
Click "OK"

To make a query:
choose Queries from the left hand list
Select "New"
Select "Design view"
Right click over the blank area and choose "Show Table"
Choose the table that contains the data you want to run reports from
Continue doing this until you have selected all the tables containing the data you want to pull



Use the drop down box in the Table row to select the relevant Table
Use the drop down box in the Field Row to choose the specific information
Press the red exclamation mark on the toolbar to run the report

GBD Database - Data Entry Rules

Data Source (Articles)

Variable	Database Rules
*****All relevant text can (and should!) be copied and pasted directly from Endnote*****	
Author/s	First author surname, 1st initial., second author surname, 1st initial., & final author surname, 1st initial. 2nd initial. Eg. Singleton, J., Calabria, B., & Roberts, A. S. Insert editors if no authors are stated with "eds." after their names For EMCDDA reports without authors or editors, type EMCDDA – *country of report.* If there is no Author, enter the Data Source ID (which is the top field in the Data Source Detail window) and the Country. Eg. "131 Australia" When multiple entries have the same authors (eg. Monitoring the Future) enter 1st author name, volume of report (if applicable) and year of publication, followed by list a all authors (as would usually be entered).
Year	Year of Publication Year of Publication can be copied and pasted from Endnote
Title	Title of article/report
Journal	Name of Journal (if applicable) For non-journal sources enter 999
Volume	Journal Volume(Issue) [if applicable] Eg. 118(4) Journal Volume: Issue can be copied and pasted from Endnote For non-journal sources enter 999
Pages	Start page – end page (if applicable) Eg. 115-118 Start and end page can be copied and pasted from Endnote For non-journal sources enter 999
Organisation	For grey literature publications indicate the organisation that is
Abstract	Article abstract (if applicable)
Drug Type	Chose from drop down box NB: If cocaine powder and crack are reported separately, you will need to type this into the "Estimate Comments" box on the Estimate Details window
Language	Determines which language the article/report is written in. Select from drop down box English Other (specify other language in *Other, please specify* field)
Other, please specify	For languages other than English specify which language the article/report is written in (Other should have been selected from the *Language* drop down box)
Literature type	Indicate whether the literature type is white (peer reviewed) or grey (material that is not formally published by commercial publishers). Select from drop down box Grey White

Studies

Study Detail Section 1

Variable	Database Rules
Data Source Title	Select correct authors from drop down box
Study Type	Select study type from drop down box: Cohort study Cross-sectional study Case-control study Database review study Survey Indirect prev est (e.g., capture-recapture, multiplier)
Location	Type specific location of the study. If countrywide, type "National"
Region	Select appropriate GBD region from drop down box
Country	Select country were study took place from drop down box
Urbanicity	Select from drop down box Urban/metropolitan Rural Mixed/Other – suburban, etc. Only select an option if specifically reported in data source. Otherwise leave blank.
Ethnicity	Leave blank
QUALITY INDEX NOTE: For mortality extraction, there is a different quality index	
Case ascertainment	Ascertainment of cases nationwide or regionally? Select from drop down box Community/nationwide survey/register/database Case registers/Regional death registers/One treatment institution/hospital Not specified **NOTE:** For studies using indirect prevalence estimation (e.g., capture-recapture), choose 'Community/nationwide survey/register/database'
Measurement	Measurement instrument to determine cannabis use or dependence. Select from drop down box Interview/self-reported drug use/In treatment for drug dependence Systematic case note/database/reports review/blood and/or urine toxicology screen Chart diagnosis Not specified **NOTE:** For studies using indirect prevalence estimation (e.g., capture-recapture), choose 'Interview/self-reported drug use/In treatment for drug dependence'

Variable	Database Rules
Diagnosis	Indicates whether cannabis dependence was diagnosed. Select from drop down box Any diagnostic system reported for drug dependence or abuse/Dependence inferred from type of sample population Drug use/Own system/Symptoms described If not reported, leave blank and make note in quality index comments that "Diagnosis" not reported. **NOTE:** For studies using indirect prevalence estimation (e.g., capture-recapture), choose 'Any diagnostic system reported for drug dependence or abuse/Dependence inferred from type of sample population'
Estimate	Estimate presented (e.g. prevalence, incidence, mortality, relative risk, etc.) Select from drop down box Yes No
Num/Den	Was the numerator and denominator presented for **ALL** the estimates of interest? Select from drop down box Yes No
Num/Den Area/Epoch	Were the numerator and denominator based on identical epochs and identical catchment areas for estimate of interest? That is, was the estimate (prevalence for example) calculated based on the sample (YES) or by use of population numbers for the denominator from the same year and area (YES)? Choose NO if the denominator is from a different year or area from the sample. Select from drop down box Yes No
Completeness	Captures response rates and attrition rates. Select from drop down box High response rate/inclusion of defined sample population (>80%) Moderate response rate (60% - 79%) Exclusions Poor response rate (<60%)made If response rate is not reported, please select "Exclusions Poor response rate (<60%) made" as this option is scored as 0 and make a comment in the quality index comments box that completeness was not reported. **NOTE:** For studies using indirect prevalence estimation (e.g., capture-recapture), choose 'High response rate/inclusion of defined sample population (>80%)'

Variable	Database Rules
Representativeness	Determines generalisability of the sample to the population Select from drop down box Well represented/National registers/Multiple institutions across states Small area/Not representative of nation/One treatment centre/Registers of specific populations Convenient sampling/Other If not reported, leave blank and make note in quality index comments that "Representativeness" not reported. **NOTE:** For studies using indirect prevalence estimation (e.g., capture-recapture), choose 'Well represented/National registers/Multiple institutions across states'
Age/sex	Identifies whether age and/or sex specific values were reported. Select from drop down box Yes (estimates dived by age and sex) Some (eg. sex and 2 broad age ranges only) No
Quality	To capture methods that were not reported on by other variables (free text)
Duration FU	To obtain more information about follow-up periods and sample sizes when doing so (free text)
Total	Automatically calculates the total Quality Index Score
Quality Index Notes	Insert any other quality information that has not been captured by other variables. For example, note whether the study is one that uses indirect prevalence methods, and state which data sources were used for this.
Estimate type	No need to choose an option here.

Study Detail Section 2

Variable	Database Rules
Epoch start	Year that the study started. If the study only extends over one year enter the same year in Epoch start and Epoch end.
Epoch end	Year that the study ended. If the study only extends over one year enter the same year in Epoch start and Epoch end.
N	Total number of people in the sample. If the number of people who responded to the drug use questions is reported, and this is different to the overall N, put in the drug response N here and make a note in the comments. Enter the total N in the Comments. Otherwise enter total sample N here.
Population	Specific information about the type of population. For a representative sample enter "general population".

Variable	Database Rules
Sampling strategy	Select from drop down box Simple random sampling Stratified random sampling Cluster sampling Systematic sampling Other Other (Matching Other (Snowballing) Other (Convenience) Other (please specify) Census If sampling strategy is not reported, select "Other" and enter "Not reported" in the Sampling strategy Other box.
Sampling strategy Other	If *Other* is selected from *Sampling Strategy*, indicate sampling strategy used here If Sampling Strategy was not reported enter "Not reported" here
Minimum Age at Intake	The minimum age of the total sample at intake. Enter section/survey data into intake fields. If the study does not report the youngest age, enter "0" and make a comment in the *age comments* box indicating no minimum age reported. See end of manual for ages of U.S high school and college students.
Maximum Age at Intake	The maximum age of the total sample at intake. Enter section/survey data into intake fields. If no maximum age is reported, enter "99" and make a comment in the *age comments box* indicating no maximum age reported. See end of manual for ages of U.S high school and college students.
Age Mean at Intake	The mean age of the total sample at intake. Enter section/survey data into intake fields.
Age Median At Intake	The median age of the total sample at intake. Enter section/survey data into intake fields.
Response Rate (%)	Response rate, reported as a percent. If reported for different age groups enter highest reported, then make comment in *studies comment* box indicating all response rates reported.
Minimum Age at FU	The minimum age of the total sample at follow-up. See end of manual for ages of U.S high school and college students.
Maximum Age at FU	The maximum age of the total sample at follow-up. If no maximum age is reported, enter "99" and make a comment in the *age comments box* indicating no maximum age reported. See end of manual for ages of U.S high school and college students.
Age Mean at FU	The mean age of the total sample at follow-up.
Age Median FU	The median age of the total sample at follow-up.
Attrition Rate (%)	The attrition rate, reported as a percent.
Male N	Number of males in the sample.
Male Percent	Percent of males in the sample.
Person Yrs FU	Total person years follow up (this is mainly relevant for cohort studies) If person years of follow up are reported by age and/or sex, please record this in the Person Yrs FU Notes box
Lost To FU	What % of the sample is lost to follow up?
Age Comments	Additional comments about age.

Variable	Database Rules
Person Yrs FU Notes	If person years of follow up are reported by age and/or sex, please record this here.
Comments	If a peer reviewed article reports on an aspect of a larger survey, note which survey the data comes from in the comments box. Must enter text or alternatively "999" if no comments are required.
Estimate Type	Select type of estimate from drop down box Duration Incidence Mortality Prevalence Remission

Estimate Details

Variable	Database Rules
Entry	Click the radio button for 1st Entry for the first time the data is entered for and article, 2nd entry for the second time the data is entered for the same article and final entry when you want to compare the 1st and 2nd entries.
Estimate Type	Select estimate type from drop down box Duration Incidence Mortality Prevalence Remission
Specific Estimate Type	Select specific estimate type from drop down box Duration Incidence Cumulative incidence Past Year Incidence Mortality CMR (Crude Mortality Rate) SMR (Standardised Mortality Ratio) RR (Relative Risk) OR (Odds Ratio) HR (Hazard Ratio) CFR (Case Fatality Ratio) Other, please specify (specify in *Estimate Comments*) Prevalence Lifetime Prevalence Past Year Prevalence Past Month Prevalence Remission Abstinent Still using, not dependent Still met criteria for dependence Relapsed
Cause of Death	For mortality estimates only. If mortality, "other, please specify" put details in *Estimates Comments*

Variable	Database Rules
Estimate Comments	Add extra information that is not captured by other variables. If cocaine powder and crack cocaine are reported separately, type "Crack cocaine" or "Cocaine powder" here
SUMMARY	
Drug	Indicates use or dependence, select from drop down box Use Dependence Other (eg. abuse – specify in *Estimate Comments*)
Year	Year of estimate If data were collected across 2 years (eg: July 2004 until May 2005) enter "0405" (this includes mortality cohorts). If no year of estimate is stated then insert the publication year minus 2 years
Age Lower	Minimum age of age group for which estimate is reported. If only reporting for one age, put the same age in *Age Lower* and *Age Upper*. If estimate applies to entire sample, enter the youngest age from the age range If the study does not report the youngest age, enter "0" and make a comment in the *age comments* box indicating no minimum age reported. See end of manual for ages of U.S high school and college students.
Age Upper	Maximum age of age group for which estimate is reported. If only reporting for one age, put the same age in *Age Lower* and *Age Upper*. If estimate applies to entire sample, enter the oldest age from the age range If no maximum age is reported, enter "99" and make a comment in the *age comments box* indicating no maximum age reported. See end of manual for ages of U.S high school and college students.
FEMALE	
Estimate	Estimate reported for females (eg. past year prevalence)
CI Confidence	Type of confidence interval used, as a percent. Eg. For a 95% CI, 95 would be entered
CI Lower	Lower limit of the confidence interval
CI Upper	Upper limit of the confidence interval
Numerator	Numerator of the estimate, if reported.
Denominator	Denominator **of the estimate**, if reported.
Standard error	Standard error of the estimate.
Radix	Indicate how estimates are given, uniformly per 10* of population. e.g. per 100000 or 100
Standardised	Tick box if the estimate standardised. Leave the box blank if the estimate is not standardised.
How Standard	If the estimate is standardised, indicate how/ by what.
MALE	
Estimate	Estimate reported for males (eg. past year prevalence)
CI Confidence	Type of confidence interval used, as a percent. Eg. For a 95% CI, 95 would be entered
CI Lower	Lower limit of the confidence interval
CI Upper	Upper limit of the confidence interval
Numerator	Numerator of the estimate, if reported.
Denominator	Denominator of the estimate, if reported.
Standard error	Standard error of the estimate.

Variable	Database Rules
Radix	Indicate how estimates are given, uniformly per 10* of population. e.g. per 100000 or 100
Standardised	Tick box if the estimate standardised. Leave the box blank if the estimate is not standardised.
How Standard	If the estimate is standardised, indicate how/ by what.
TOTAL	
Estimate	Estimate reported for both males and females combined (eg. past year prevalence)
CI Confidence	Type of confidence interval used, as a percent. Eg. For a 95% CI, 95 would be entered
CI Lower	Lower limit of the confidence interval
CI Upper	Upper limit of the confidence interval
Numerator	Numerator of the estimate, if reported.
Denominator	Denominator of the estimate, if reported.
Standard error	Standard error of the estimate.
Radix	Indicate how estimates are given, uniformly per 10* of population. e.g. per 100000 or 100
Standardised	Tick box if the estimate standardised. Leave the box blank if the estimate is not standardised.
How Standard	If the estimate is standardised, indicate how/ by what.

General GBD Database Rules

Situation	Entry	Comments
Missing data/not applicable	999	All fields in the database must be completed. Enter the missing data code if field is not applicable or study does not report on a particular variable
For EMCDDA Data; These are the standardised rules for entering EMCDDA		
Location	"National" unless otherwise specified	
Urbanicity	"Mixed/other" unless otherwise specified	
Ethnicity	Left blank as no general rule is applicable	
Case Ascertainment	"Community/Nationwide survey/Register/Database"	
Measurement	"Interview/Self-reported Drug Use/In treatment for Drug Dependence	
Diagnosis	"Drug use/own system/ symptoms described"	
Completeness	Left blank unless specified	
Representativeness	"Well represented/ national registers/ multiple institutions across states"	

Ages for U.S High School and College Students

	High school students		College students
	8th grade	13-14 years	
Freshman	**9th grade**	14-15 years	18-19 years
Sophomores	**10th grade**	15-16 years	19-20 years
Juniors	**11th grade**	16-17 years	20-21 years
Seniors	**12th grade**	17-18 years	21-22 years

For further information data extraction and the Access database see also:
http://www.gbd.unsw.edu.au/gbdweb.nsf/resources/Methodology_pt3c_Drugs/$file/GBD_Methodology_pt3b_IllicitDrugs_08Oct08.pdf

APPENDIX E: SEARCH STRINGS FOR ANY EVIDENCE OF USE IN SPECIFIC COUNTRIES

Databases/Search Engine	Search Group	Search terms
GoogleScholar	Opioid	Opioid
	Drug use	"drug use" OR "drug abuse" OR "substance use" OR "substance abuse"
	Country	*"country name"*
WorldCat/ PubMed/ PsycINFO	Opioid	Opioid
	Drug use	"drug use" OR "drug abuse" OR "substance use" OR "substance abuse"
	Country	"*country name*"

APPENDIX F: GBD COUNTRY AND REGION LIST

ASIA PACIFIC, HIGH INCOME
Brunei
Japan
Republic of Korea
Singapore

ASIA, CENTRAL
Armenia
Azerbaijan
Georgia
Kazakhstan
Kyrgyzstan
Mongolia
Tajikistan
Turkmenistan
Uzbekistan

ASIA, EAST
China
Democratic People's Republic of Korea
Hong Kong
Taiwan

ASIA, SOUTH
Afghanistan
Bangladesh
Bhutan
India
Nepal
Pakistan

ASIA, SOUTHEAST
Cambodia
Indonesia
Lao People's Democratic Republic
Malaysia
Maldives
Mauritius
Mayotte
Myanmar
Philippines
Seychelles
Sri Lanka
Thailand
Timore Leste
Viet Nam

AUSTRALASIA
Australia
New Zealand

CARIBBEAN
Anguilla
Antigua and Barbuda
Aruba
Bahamas
Barbados
Belize
Bermuda
British Virgin Islands
Cayman Islands
Cuba
Dominica
Dominican Republic
French Guiana
Grenada
Guadaloupe
Guyana
Haiti
Jamaica
Martinique
Montserrat
Netherlands Antilles
Saint Kitts and Nevis
St. Lucia
St. Vincent
Suriname
Trinidad and Tobago
Turks and Caicos Islands

EUROPE, CENTRAL
Albania
Bosnia and Herzegovina
Bulgaria
Croatia
Czech Republic
Hungary
Poland
Romania
Serbia and Montenegro
Slovakia
Slovenia
Former Yugoslav Republic of Macedonia

EUROPE, EASTERN
Belarus
Estonia
Latvia
Lithuania
Republic of Moldova
Russian Federation
Ukraine

EUROPE, WESTERN
Andorra
Austria
Belgium
Channel Islands
Cyprus
Denmark
Faeroe Islands
Finland
France
Germany
Gibraltar
Greece
Greenland
Holy See
Iceland
Ireland
Isle of Man
Israel
Italy
Liechtenstein
Luxembourg
Malta
Monaco
Netherlands
Norway
Portugal
Saint Pierre et Miquelon
San Marino
Spain
Sweden
Switzerland
United Kingdom

LATIN AMERICA, ANDEAN
Bolivia
Ecuador
Peru

LATIN AMERICA, CENTRAL
Colombia
Costa Rica
El Salvador
Guatemala
Honduras
Mexico
Nicaragua
Panama
Venezuela

LATIN AMERICA, SOUTHERN
Argentina
Chile
Falkland Islands (Malvinas)
Uruguay

LATIN AMERICA, TROPICAL
Brazil
Paraguay

NORTH AFRICA / MIDDLE EAST
Algeria
Bahrain
Egypt
Iran (Islamic Republic of)
Iraq
Jordan
Kuwait
Lebanon
Libyan Arab Jamahiriya
Morocco
Occupied Palestinian Territory
Oman
Qatar
Saudi Arabia
Syrian Arab Republic
Tunisia
Turkey
United Arab Emirates
Western Sahara
Yemen

NORTH AMERICA, HIGH INCOME
Canada
United States of America

OCEANIA
American Samoa
Cook Islands
Fiji
French Polynesia
Guam
Kiribati
Marshall Islands
Micronesia (Federated States of)
Nauru
New Caledonia
Niue
Northern Mariana Islands
Palau
Papua New Guinea
Pitcairn
Samoa
Solomon Islands
Tokelau
Tonga
Tuvalu
Vanuatu
Wallis and Futuna Islands

SUB-SAHARAN AFRICA, CENTRAL
Angola
Central African Republic
Congo
Democratic Republic of the Congo
Equatorial Guinea
Gabon

SUB-SAHARAN AFRICA, EAST
Burundi
Comoros
Djibouti
Eritrea
Ethiopia
Kenya
Madagascar
Malawi
Mozambique
Rwanda
Somalia
Sudan
Uganda
United Republic of Tanzania
Zambia

SUB-SAHARAN AFRICA, SOUTHERN
Botswana
Lesotho
Namibia
South Africa
Swaziland
Zimbabwe

NATIONAL DRUG AND ALCOHOL RESEARCH CENTRE

The National Drug and Alcohol Research Centre (NDARC) is a premier research institution in Australia and is recognised internationally as a Research Centre of Excellence. The Centre is multidisciplinary and collaborates with medicine, psychology, social science and other schools of the University of NSW, as well as with a range of other institutions and individuals in Australia and overseas.

The overall mission of NDARC is to conduct high quality research and related activities that increases the effectiveness of Australian and International treatment and other intervention responses to alcohol and other drug related harm.

In addition to the research conducted at the Centre, other NDARC activities include an Annual Symposium and a range of special conferences and educational workshops. As well as contributing to scientific journals and other publications, NDARC produces its own Research Monographs and Technical Report Series. In conjunction with the National Drug Research Institute in Perth, NDARC also produces a free quarterly newsletter, CentreLines, to increase communication between the national research centres, other researchers and workers in the alcohol and other drug field.

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