Global Burden of Disease

Mental Disorders and Illicit Drug Use Expert Group

Paul Nelson, Jennifer McLaren, Louisa Degenhardt,

Chiara Bucello, Bianca Calabria, Anna Roberts,

Christina Briegleb, Nico Clark, and Lucas Wiessing

Methodology used in a systematic review of evidence on the prevalence of heroin/opioids use and dependence

Illicit Drugs Discussion Paper No.16

METHODOLOGY USED IN A SYSTEMATIC REVIEW OF EVIDENCE ON THE PREVALENCE OF HEROIN/OPIOID USE AND DEPENDENCE

Illicit Drugs Discussion Paper no.16

Paul Nelson, Jennifer McLaren, Louisa Degenhardt, Chiara Bucello, Bianca Calabria, Anna Roberts, Christina Briegleb, Nico Clark, and Lucas Wiessing

Recommended citation:

The reference is: Nelson, P., McLaren, J., Degenhardt, L., Bucello, C., Calabria, B., Roberts, A., Briegleb, C., Clark, N., and Wiessing, L. (2009). Methodology used in a systematic review of evidence on the prevalence of heroin/opioid use and dependence. Global Burden of Disease Mental Disorders and Illicit Drug Use Expert group. Illicit drugs discussion paper No. 16. National Drug and Alcohol Research Centre, University of NSW: Sydney.

ISBN: xxxxxxxxxx

Table of Contents

Detailed description of methods....4
Appendix B: Search string combinations....17
Appendix C: Illicit Drugs Quality Index....18
Appendix D: Access database manual and data entry rules....20
Appendix E: Search strings for any evidence of use in specific countries....42
Appendix F: Global Burden of Disease country and region list....43

Detailed description of methods

According to an approach being used across searches undertaken for the 2005 Global Burden of Disease project (GBD), a systematic review was undertaken for heroin and other opioid (heroin/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.

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 (1), 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, **Appendix B** for search string combinations).

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 (as per protocol (2))
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/territories without available prevalence estimates (See **Appendix E**)
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/territories where no estimates were located

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. Next, abstracts of the identified articles were read and excluded if they met any of the following exclusion criteria: not focussed on heroin/opioid prevalence or incidence; include only secondary data (review articles; the original was sourced instead); not

include general population samples (school studies were included); include data collected before 1990; comprise multiple articles reporting from the same cohort (in which case only the most recent or relevant article was included). Nationally representative studies were used unless only sub-national studies were available: most sub-national studies were conducted in cities (typically the largest, or capital) which were nationally unrepresentative.

Grey Literature

The second stage of the systematic search, conducted during 2008, covered the grey literature. A systematic approach (described in (2)) 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 the research team leader.

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 (3-4), parallel to the CONSORT guidelines for reporting of randomized trials (5).

A Quality Index (see **Appendix C**) was modeled on one developed previously (6-7) and modified via the 'Delphi method' following consultation with, and consensus agreement by, the Expert Group 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. The highest scores were achieved by general population based cohort studies that provided age and sex disaggregated prevalence estimates, although indirect methods are the gold standard for prevalence estimates of opioids use. 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©.

Decisions on extracting information on opioids other than heroin

In the first instance, we sought estimates of heroin use and dependence, but for countries/territories that had not estimates of heroin use and dependence we sought estimates of other opioid use and dependence.

Other opioids includes other specific opioids (e.g. opium, morphine); 'all opioids' (studies often asked respondents about any opioid/any opiate use); and 'other opioids' (which could mean, for example, opioids other than heroin, in studies reporting a specific estimate for heroin use). Amongst countries/territories that had made estimates of heroin/opioid use, more than 90% had made estimates of heroin use specifically. This pattern applied in general population, school, lifetime and past year estimates. Few that did *not* report on heroin use or dependence *did* report on other opioids. We observed that pharmaceutical opioids, however, were often not included in studies' definitions of 'opioid' and therefore many countries/territories' estimates may under-represent the actual overall prevalence of opioid use and dependendence.

Searching for evidence of use in countries/territories without prevalence estimates

Searches for "any evidence of heroin/opioid use" were conducted using several major approaches. First, reports and surveys that were referenced in the 2008 World Drug Report (8) 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 heroin/opioids, were used. Finally, the Internet was used to search databases and search engines. Searches were also conducted using the following databases: WorldCat, PsychINFO and PubMed; and the following search engines: Google and GoogleScholar, with searches targeted at drug use in specific countries/territories (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 heroin/opioid use was identified in a number of grey literature sources, including UNODC reports, government reports, surveys, news reports and journal articles; this "evidence" included data on treatment, seizures, registered drug users and reports of heroin/opioid use occurring.

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/territory coverage of dependence, use and any evidence of use were emailed to heroin/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/territories for which we had no data on the prevalence of heroin/opioid 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/territories) that had recently been completed.

Data grading

Data were hierarchically graded according to study source/methodology (adapted from (9); see **Text Box 2**). Data were displayed for each country/territory, grouped according to GBD study-defined regions (see **Appendix F** for countries/territories/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).

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

Issues relating to direct and indirect prevalence estimation

Maag (2003) estimates that the number of dependent heroin users is 7-10 times higher than the number of participants reporting heroin use in community surveys (10). Warner et al (11) investigated prevalence and correlates of drug use and dependence in the United States and found 14.7% of lifetime drug users met criteria for lifetime drug dependence; 3.5% of lifetime users met criteria for past 12 months drug dependence. Further, the proportion of lifetime users with lifetime or past year dependence may be higher for opioids than for other drug types including stimulants and cannabis. Comparison of the US National Survey on Drug Use and Health (NSDUH) and the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) found that the ratio of NSDUH and NESARC was approximately 5:1 for lifetime and past year use of heroin, and for past year prevalence of heroin use disorder (12). [NSDUH estimates were also higher than NESARC estimates for alcohol and other drug use, and for cocaine use disorder]. The 2002 NSDUH reported lifetime prevalence of heroin use to be 1.7% (95%CI: 1.5-2.0), and past year to be 0.17% (95%CI: 0.1-0.2). The past year prevalence of heroin dependence was 0.11% (95%CI: 0.07-0.16). Thus, the prevalence of lifetime use was 15.5 times higher than past year dependence, and the prevalence of past year use was 1.6 times higher than past year dependence. (These calculations should be cautiously interpreted as they can strongly depend on new trends in use and dependence. The 2001-2002 NESARC survey reported lifetime prevalence of heroin use to be 0.33% (95%CI: 0.33-0.39), and past year to be 0.03% (95%CI: 0.01-0.05). The past year prevalence of heroin dependence was 0.02% (95%CI: 0.00-0.05).

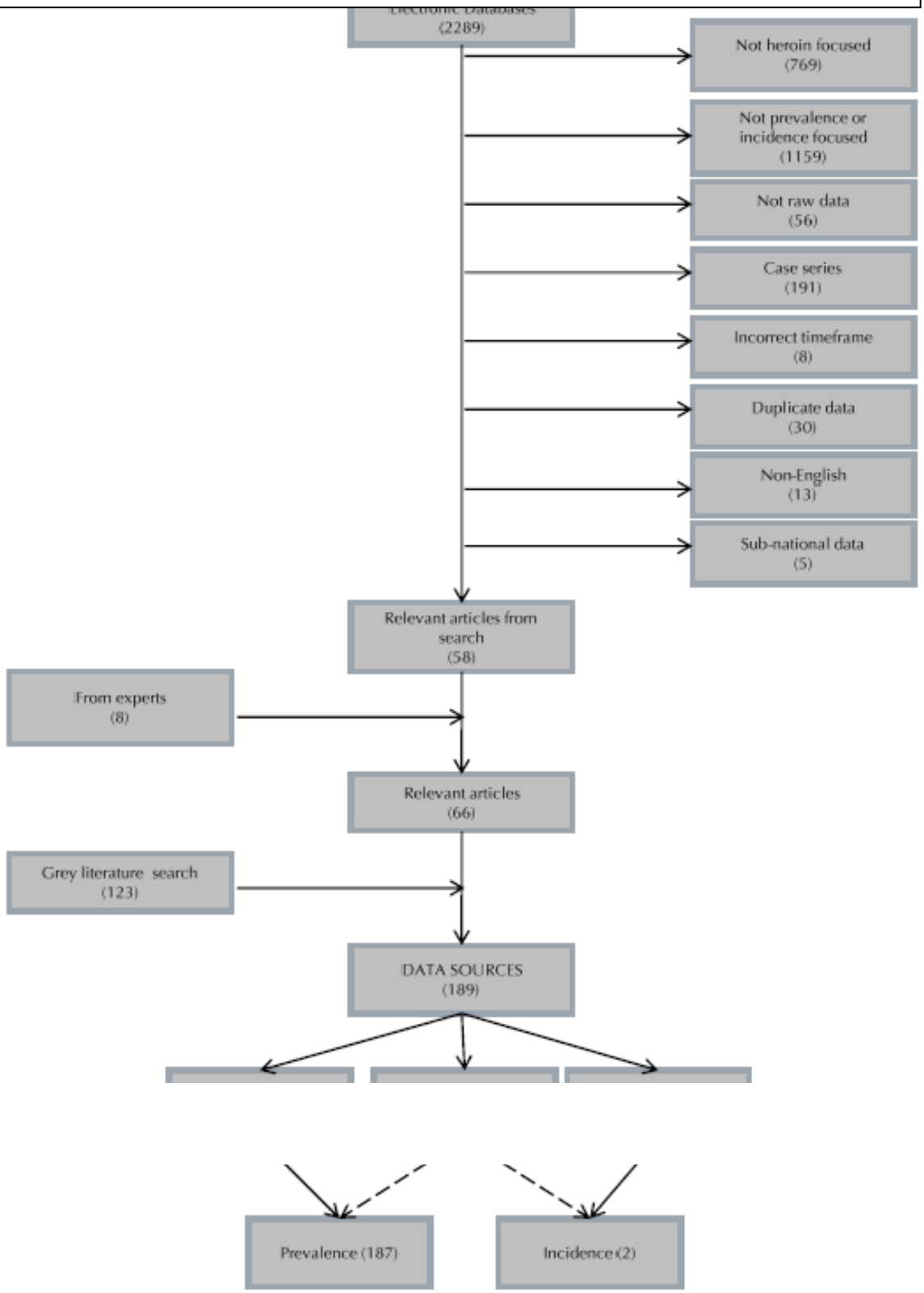
Thus, the prevalence of lifetime use was 16.5 times higher than past year dependence, and the prevalence of past year use was 1.5 times higher than past year dependence. However, it is likely that the prevalence of dependence reported in these surveys are underestimates themselves as most dependent heroin users are not captured in household surveys.

Law and colleagues (13) outline the reasons for why households surveys underestimate the number of injecting drug users (IDU): household surveys aim for a representative sample of the general population, and do not specifically target the areas in which there are concentrated IDU populations; households in which IDU live tend not to be the kind of 'normal' households that are targeted by these broad surveys; and if contacted, the stigmatised nature of heroin makes it less likely that people will admit to using these drugs. Using estimation techniques often applied to the estimation of HIV incidence, Law et al (13) estimated that there were 67,000 dependent heroin users in Australia at the end of 1997. The 1998 National Drug Strategy Household survey found that 113,000 people in Australia reported using heroin in the past year. However, this number cannot be compared with the estimate made by Law and colleagues, as it is not an estimate of the number of dependent heroin users. It could be assumed, based on previous research, that heroin users who use daily are likely to be dependent. The 1998 household survey found that 19,775 people reported using heroin daily and 11,865 reported using weekly or more. Even if these numbers were taken together, it is still about half of the estimate made by Law.

There is a need to look critically at estimates derived from surveys of drug use relying on self-reports. These estimates will only be accurate if a representative sample is obtained and people honestly disclose their drug use – these conditions are often not met. Marginalised groups who have higher levels of drug use, are typically excluded (e.g. those who are homeless, imprisoned or in treatment facilities). People may also feel uncomfortable disclosing illegal behaviours (in ways that probably vary across countries/territories and cultures), particularly in societies where participants fear reprisals for admitting to an illegal behaviour. This will particularly be the case when anonymity and confidentiality are not assured. It may also be affected by the type of interviewer, particularly if they are a law enforcement or government official, an approach used in some countries). Finally, drug use is often geographically concentrated, and random sample surveys may not always take this geographic heterogeneity into account. Technically it should not be difficult, but one needs some previous information (for example, that drug use in large cities is higher, so that data can be stratified by large cities and the rest of country). Magura and Kang (1996) conducted a meta-analytic review of the validity of self-reported drug use in high risk populations and found significant under-reporting (14).

Figure 1: Flowchart of search strategy for prevalence of heroin/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.



Data Sources and Specific Decision Rules

A number of different data sources were identified through the prevalence and incidence search (search terms were combined to complete the prevalence and incidence search; however, this section focuses on the prevalence search outcomes only). Below are decisions made based on the specific type of data.

Data sources

Peer Reviewed Literature

A number of peer reviewed articles were identified from the electronic database search and culled according to the exclusion criteria listed above. Articles in languages other than English were not included as data sources in English were available for the corresponding countries/territories.

Grey literature

Grey literature was searched to obtain prevalence data on heroin/opioid use and dependence. Decision rules used for the main sources of data are summarised below.

Surveys

In all cases, the primary source of data was used for all surveys for data extraction purposes. However, due to time restrictions when a report presented data from previous years this data was included. For data from previous years of a survey little or no methodology was reported.

The type of data extracted from reports was recorded in a Word document to ensure that duplicate data was not extracted from reports.

National Surveys

If data from a representative National study existed for a country/territory, data from a study with similar a methodology and target age group was not included. In the United States, for example, the Monitoring the Future continuing study has provided extensive national survey results on American youth from 1975-2006. These National surveys cover the GBD target years and therefore studies that provided data for a similar population were not extracted.

This decision was made to a) avoid unnecessary duplicate year extractions and b) address time restrictions.

European Monitoring Centre for Drugs and Drug Addiction

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) presents several collections of drug use data in Statistical Bulletin 2008. The General Population Surveys (GPS), Epidemiological studies amongst youth/Youth and the schools population (EYE) and Problematic drug use population (PDU) collections are reviewed by the GBD. Each of these provides various levels of detail on several drugs. Heroin/opioids are the focus of this document and so relevant information is presented below.

General Population Surveys (GPS)

GPS tables present information on the extent and pattern of heroin/opioid use in the general population.

Some methodological differences exist between countries (e.g. weighting and collection techniques); The EMCDDA advises caution in interpreting small inter-country differences. Of relevance to the GBD are the GPS tables for lifetime, past year and past month prevalence for each of the following age ranges: 15–64, 15–34 and 15–24 years.

More recent data still may be found in individual countries' annual reports, but may be less comparable with estimates from the Statistical Bulletin if subjected to different scrutiny/cleaning practices. Such data will be therefore be extracted only as required.

The GBD team has extracted all survey data available from the EMCDDA summary tables. For Statistical Bulletin 2008, the range of available estimates is from 1990 to 2007, but most countries provide estimates only for select years and few estimates are available from 1990-1995; the majority are for the 2003-2006 period.

For heroin/opioids, all relevant tables were downloaded and combined in Excel to create a master file with LTP, 12MP (PYP), LMP (PMP), methodological information and bibliographic references for the surveys only.

Prevalence of dependence

Information on dependence or patterns of use that may indicate dependence is available from the EMCDDA Problem Drug Use indicator (see below). Extensive methodological information on the 2008 GPS can be found at http://www.emcdda.europa.eu/stats08/gps/methods

Epidemiological studies amongst youth/Youth and the schools population (EYE)

EMCDDA summarises school students' drug use in their EYE (Studies of youth and the schools population) tables. Most of these data are reproduced from ESPAD and HBSC reports but may have been revised and therefore are not necessarily comparable with those in previous EMCDDA and other publications. GBD estimates will be drawn from those original sources where possible.

Additional information from national surveys is also provided, including those conducted by CAN (Swedish Council for Information on Alcohol and Other Drugs), the Scottish Government, and PNSD (Spain's *Plan National sobre Drogas*).

EYE tables report on prevalence of use of heroin, predominantly for 15-16 year old school students, and to a lesser extent students aged 17-18 years. Detailed methodological information for the 2008 EYE is available at: http://www.emcdda.europa.eu/stats08/eye/methods

Problematic drug use populations (PDU)

EMCDDA provides data on dependent use of heroin/opioids. Some of these data are not currently presented in a form amenable to extraction by the GBD and in this case, clarification was sought from the

EMCDDA. The following excerpt from the 2008 PDU methods page provides further information. For more detail on Problem Drug Use see http://www.emcdda.europa.eu/stats08/pdu/methods:

"'Problem drug use' is defined by the EMCDDA as 'injecting drug use or long duration/regular use of opioids, cocaine and/or amphetamines'. This definition specifically includes regular or long-term use of prescribed opioids such as methadone, but does not include their rare or irregular use, nor the use of ecstasy or cannabis. Existing estimates of problem drug use are often limited to opioid and polydrug use. As a reaction to a growing stimulants problem, as well as a growing number of cannabis-related treatment demands, the EMCDDA is currently examining the possibilities of breakdowns by main drug, as well as the best way of estimating the population of intensive and/or long-term, possibly dependent or problematic, users of cannabis."

Some of the problem drug use studies present data specifically for heroin/opioids; these estimates have been extracted. Many of the estimates are of 'problem drug use', which includes a combination of opioids, amphetamine and/or cocaine.

HBSC (Health Behaviour in School-Aged Children)

The Health Behaviour in School-Aged Children project (HBSC) is a cross-national research study undertaken in collaboration with the WHO Regional Office for Europe. Seven surveys have been conducted: 1983/84, 1985/86 and every four years since, making use of a common research protocol. The number of HBSC member countries has increased each survey year. Once enrolled, member states appear to have participated in each subsequent survey, with two exceptions: Northern Ireland, which last participated in 1997-98, and Belgium, which provided national data in 1989-90 but has since provided sub-national data.

The Health behaviour in School-aged Children project (HBSC) introduced mandatory cannabis questions for the first time in 2001/02; other drugs are included only in two optional extended questionnaires (Ext and Short) with questions based on the ESPAD questionnaire. EMCDDA tables EYE-2 and EYE-3 provide a limited selection of heroin/opioid lifetime prevalence estimates for 15-16 and 17-18 year olds in some countries.

Dependence is not assessed by the HBSC.

ESPAD (European School Survey Project on Alcohol and Other Drugs)

Cross-national survey conducted every fourth year from 1995. Results from the 2007 survey (of 35 countries) will be published December 2008; results from new member countries' 2008 data collection will be published in 2009. The GBD project has extracted all available data ESPAD data.

ESPAD does not provide dependence data. In the 2003 survey, estimates of lifetime prevalence of use are available for many countries' 15-16 year old school students (boys, girls and totals) (Hibell et al, 2004) and for 17-18 year old school students (boys, girls, and total) in several countries, some of which provide past year and/or past month estimates (Andersson et al, 2007).

Additional data not presented in summary reports

For the GBD, ESPAD data is extracted only from the international summary reports (e.g. Hibell et al, 2004) or from summary tables provided on the EMCDDA website. EMCDDA reports that ESPAD prevalence figures taken from published ESPAD reports may differ from those reported directly by Member States. Therefore, where data missing from the summary reports is found in national reports (or other publications), extraction will occur only after methodological and reporting differences have been confirmed, possibly after translation.

Data accuracy and data precision decision rules

Data precision rule

There is variability in the precision of estimates reported for different studies and by different reports. Many report prevalence data as integers, while others provide estimates more precisely to one or more decimal points. Estimates rounded to whole numbers may deviate as much as +/-0.5% from actual estimates, consequently the following rules are applied to the collection and extraction of estimates for the GBD project:

1. Data will be entered as it is presented by each report, to the maximum precision of three decimal points. (Greater precision is infrequently if at all observed).

2. Rounding will only occur where more than three decimal points are provided.

3. Where multiple figures varying only in precision are presented for the same estimate, the most precise estimate (only) will be used in subsequent analyses.

Documentation of data errors and inconsistencies

Small inconsistencies between data-points in different EMCDDA tables and between EMCDDA tables and printed reported are occasionally noted. Details of these are available from the GBD team on request.

References

1. 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.

2. 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).

3. 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.

4. 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.

5. 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.

6. SAHA, S., ET AL (2008) Modelling disease frequency measures in schizophrenia epidemiology, *Schizophrenia Research*, 104, 246-254.

7. 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.

8. UNITED NATIONS OFFICE ON DRUGS AND CRIME (2008) World Drug Report 2008 (Vienna, United Nations).

9. MATHERS, B. M., ET AL. (2008) Global epidemiology of injecting drug use and HIV among people who inject drugs: A systematic review, *The Lancet*, 372, 1733-1745.

10. MAAG, V. (2003) Estimated trends in the prevalence of heroin addiction in Switzerland: A multiple-indicator approach, *European Addiction Research*, 9, 176-181.

11. WARNER, L. A., KESSLER, R. C., HUGHES, M., ANTHONY, J. C. & NELSON, C. B. (1995) Prevalence and correlates of drug use and dependence in the United States: Results from the National Comorbidity Survey, *Archives of General Psychiatry*, 52, 219-229.

12. GRUCZA, R. A., ABBACCHI, A. M., PRZYBECK, T. R. & GFROERER, J. C. (2007) Discrepancies in estimates of prevalence and correlates of substance use and disorders between two national surveys, *Addiction*, 102, 623-629.

13. 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.

14. 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.

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 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**

Database	Search group	Search terms
		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 cocaine dependence/ or narcotic dependence/ or exp heroin dependence/ or exp morphine addiction/ or exp opiate addiction/**
PsychINFO^	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 Bianca.

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:

1. Lifetime Prevalence (LT) (ie: has the person ever tried the drug, even once)
2. Past year prevalence (PYP): has the person used the drug in the previous 12 months
3. 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.

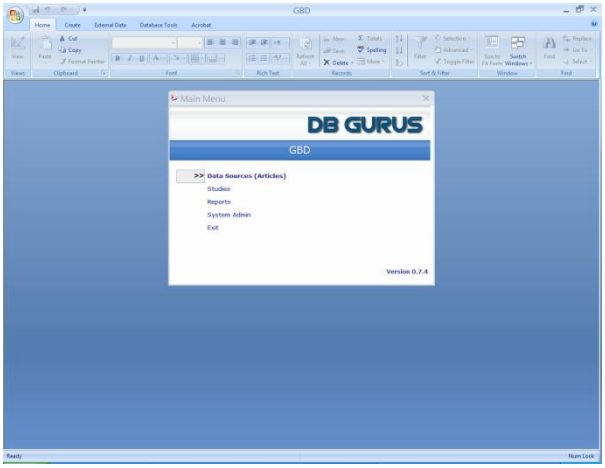
Please extract BOTH WEIGHTED and UNWEIGHTED.

Weighted estimates should have the Standardised box ticked, with a comment about how and why the statistics were weighted (if possible)

Appendix D: Access Database manual and data entry rules

DO NOT USE ROLLER ON MOUSE

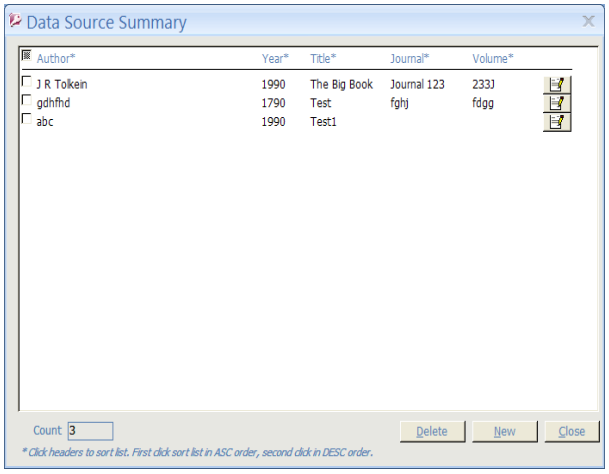
- Open the GBD database (front end) file, to the main menu.
- Clicking once is enough, double clicking is not necessary.



Data Source (Articles)

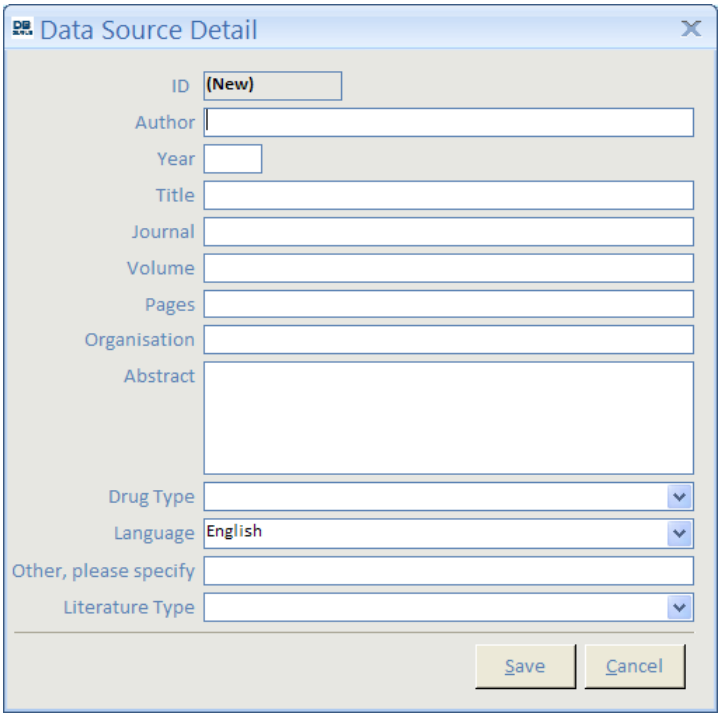
1. Click once on ***Data Sources (Articles)*** to view the ***Data Source Summary***.

2. Headers can be clicked once to sort lists in ascending order, a second click will sort in descending order.



Create a new article entry

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

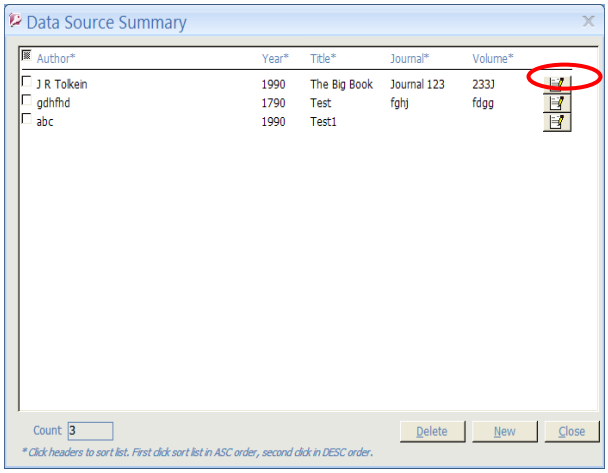


2. Enter data in ALL fields, then click **save** and **close** (abstract field can be left blank).

3. Click **close** in the ***Data Source Summary*** screen to return to the main menu.

Edit an existing article entry

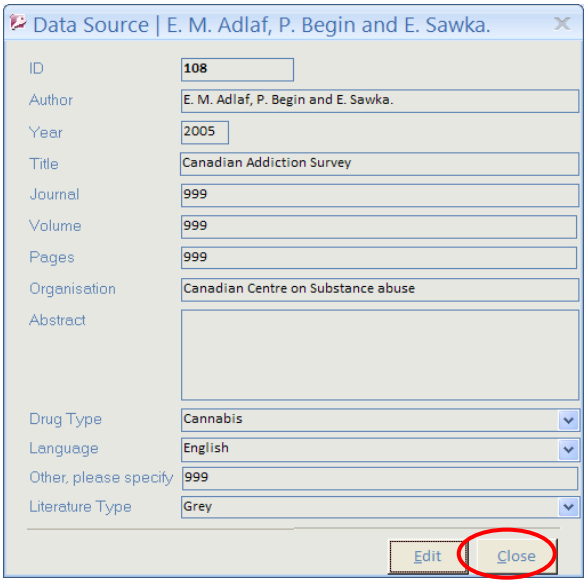
1. To edit an existing article entry click on the icon on the far right of the screen that is associated with the entry you wish to edit.



Then

2. Click **edit** on the bottom of the ***Data Source*** screen to edit existing information.

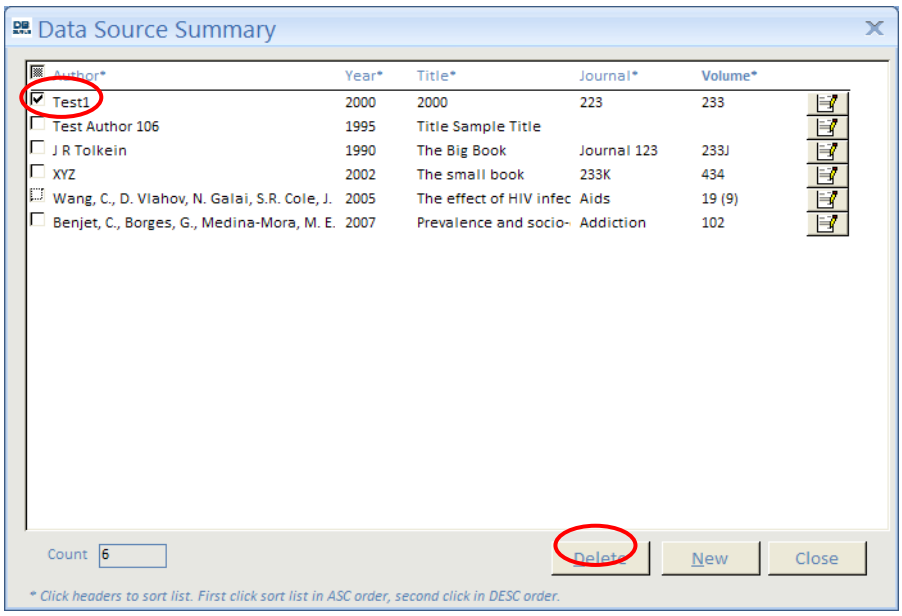
3. Click **save** and **close**.



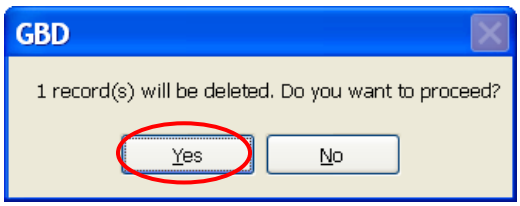
4. Click **close** to return to the main menu.

Deleting report/article information

1. 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.



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

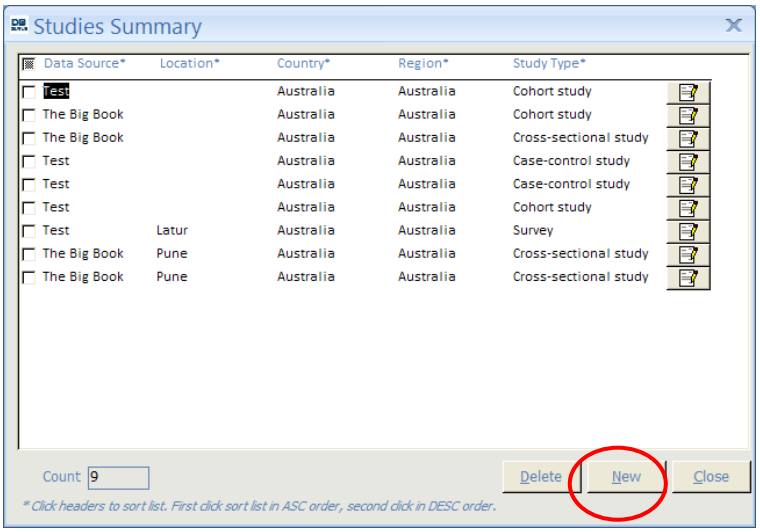


Studies

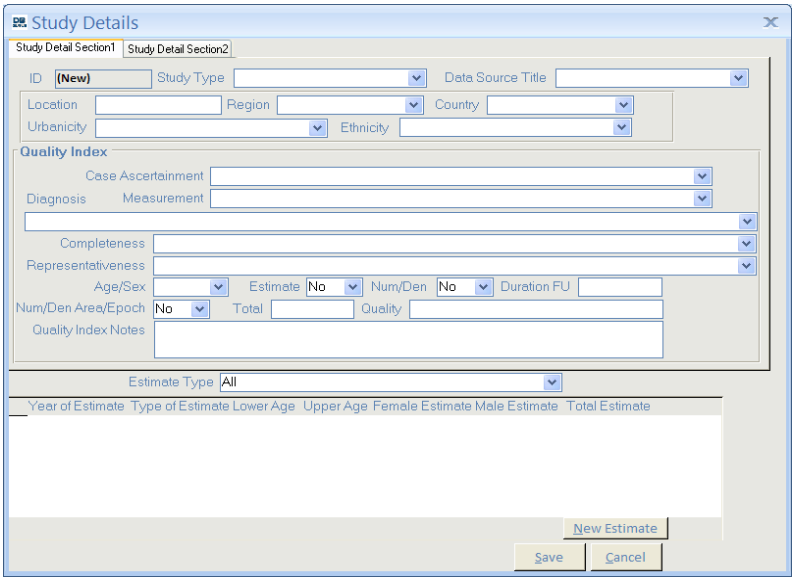
3. From the Main Menu click once on ***Studies*** to view the ***Studies Summary***.

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

1. 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

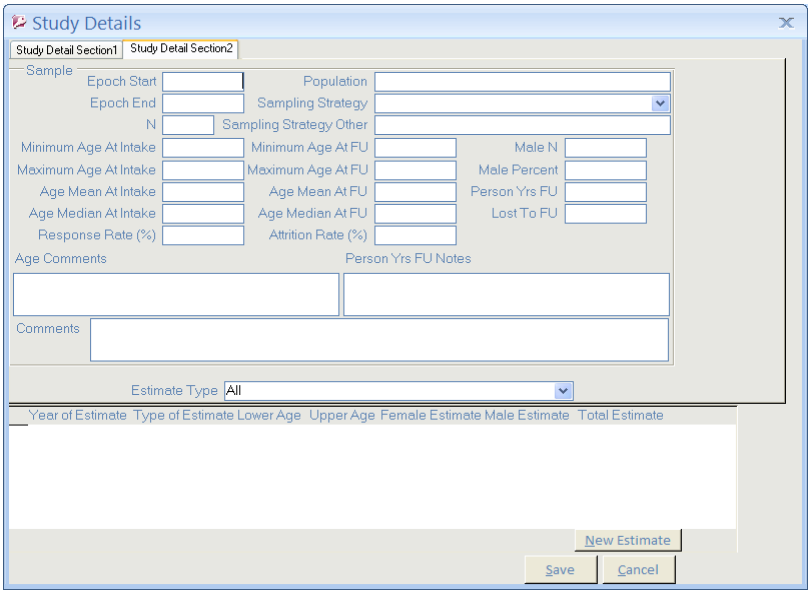


2. First select the authors of the particular article from the *Data Source Title* drop down box.

3. Enter data in ALL remaining fields on the ***Study Detail Section 1*** screen.

4. Select the ***Study Detail Section 2*** screen by clicking on the labelled tab at the top left of the screen.

Study Detail Section 2



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

6. Click **save.**

Reports/articles that present data on more than one country.

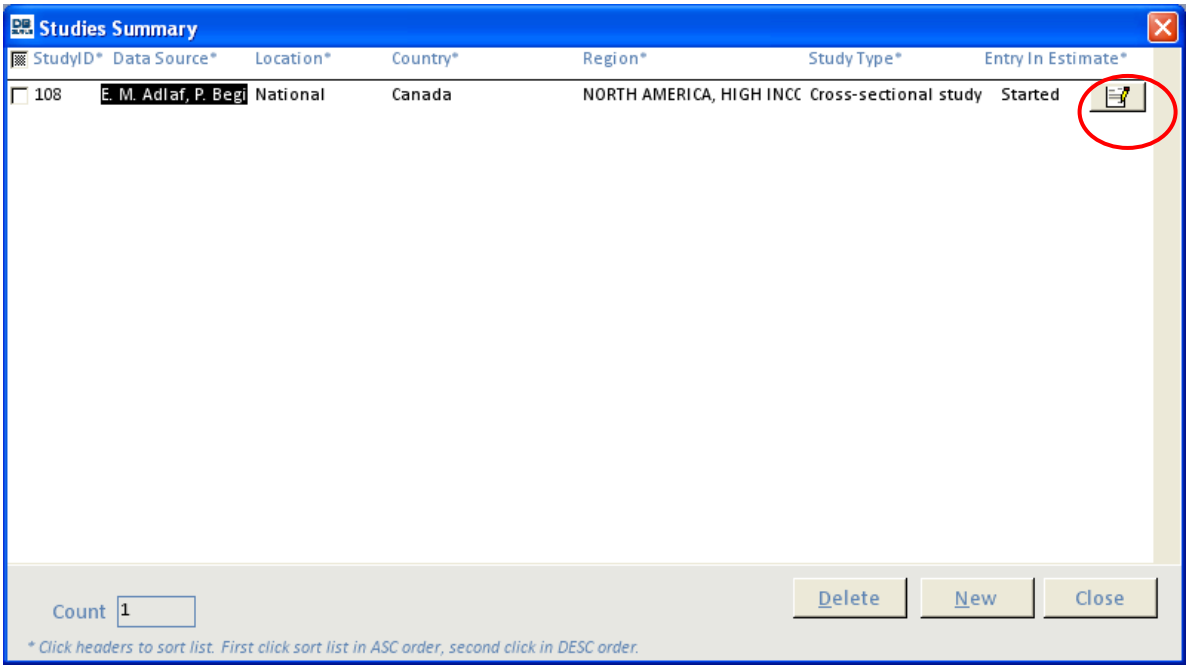
Click **new** at the bottom right of the ***Studies Summary*** screen. Select the appropriate author/date from the ***Study Detail Section 1*** screen and enter data for one of the countries reported on. Click **save** and **close**.

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

1. 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.

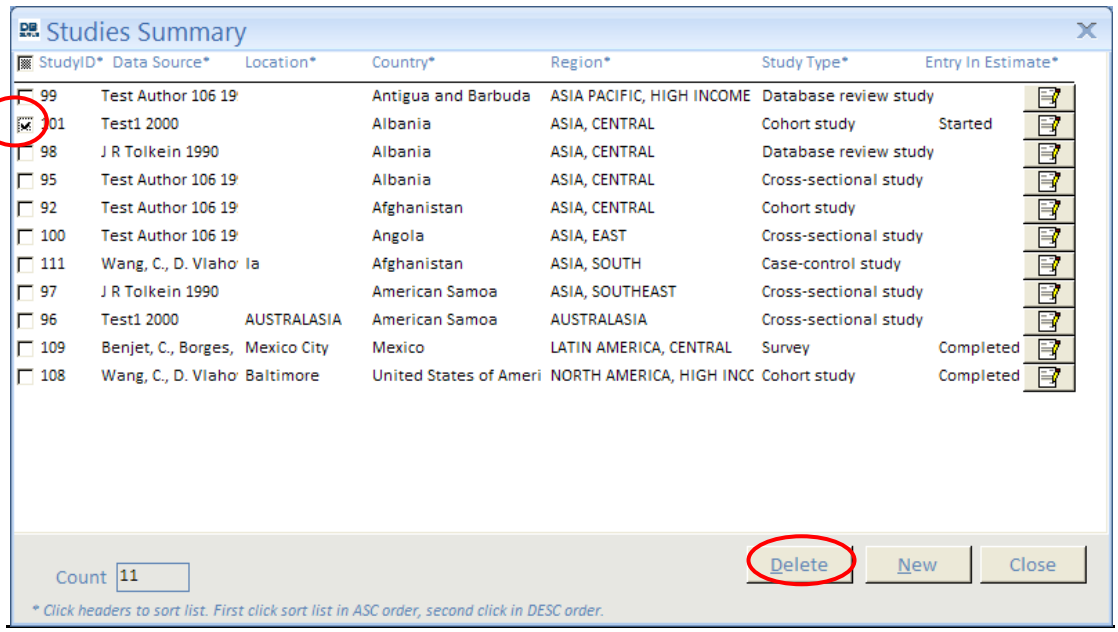


2. Click **edit** on the bottom of the ***Study Details*** screen to edit existing information (***Study Detail Section 1*** and ***Study Detail Section 2*** may both be edited, change between screens by clicking on the appropriately labelled tab at the top left of the screen).

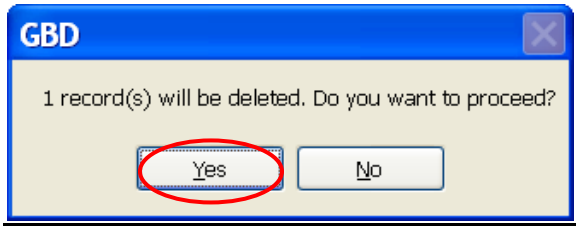
3. Click **save** and **close**.

Deleting study information

1. 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.



2. 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)

1. 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.

2. Click **edit**, at the bottom right of the ***Study Details*** screen.

3. 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.

4. Once data has been entered in ALL the fields click save and close.

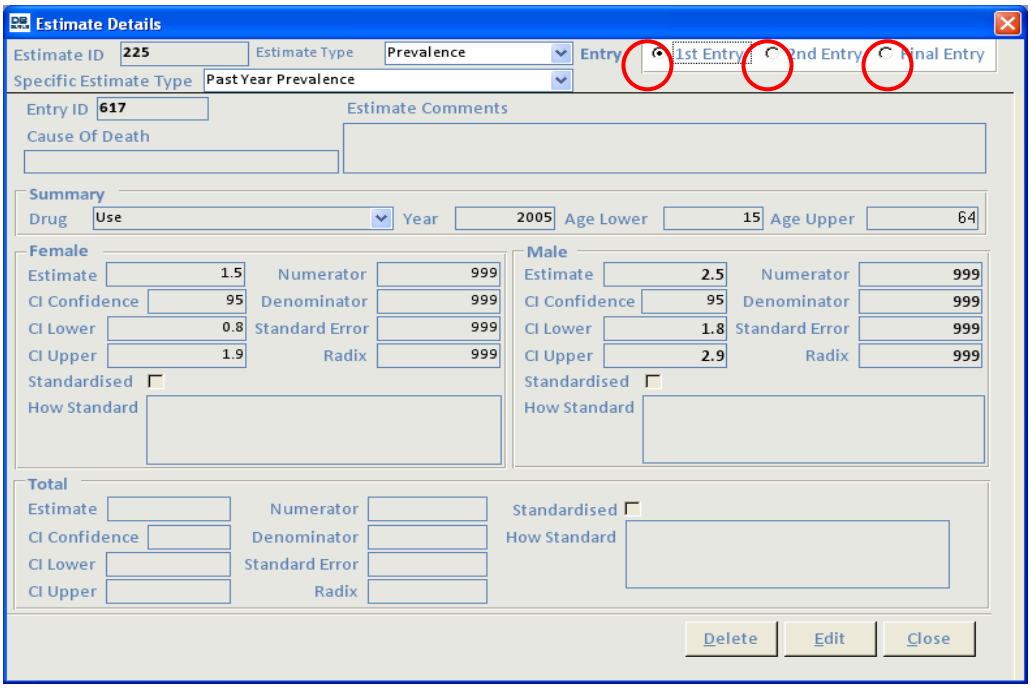
5. In the ***Study Details*** screen click **save** and **close** to return to the ***Studies Summary*** screen.

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

1. 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.
2. In the ***Study Details*** screen click **edit** at the bottom right of the screen.
3. 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.
4. 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**.



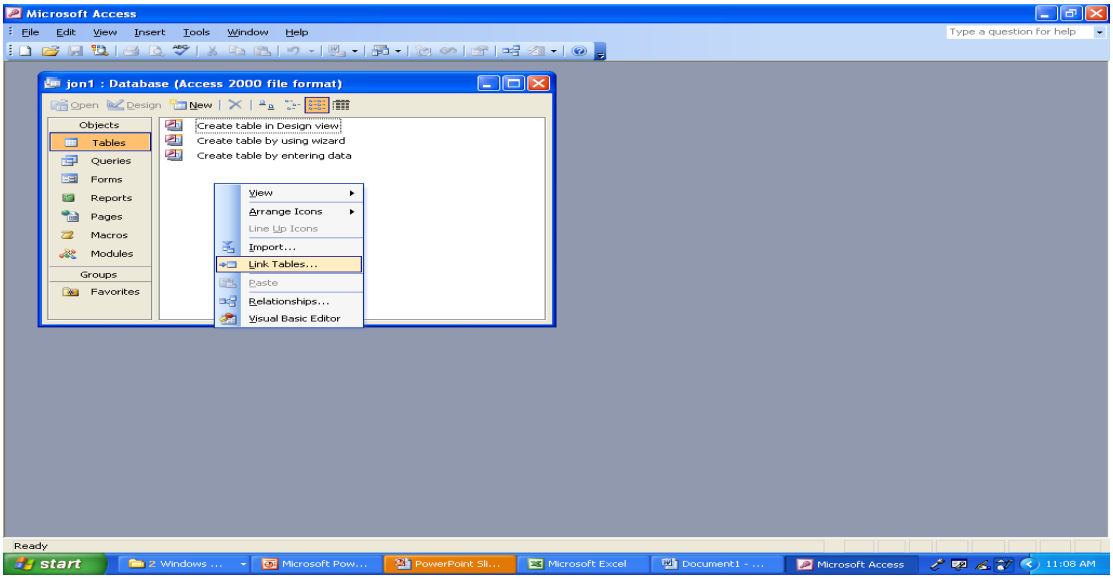
5. Entries that have been entered identically across 1st and 2nd entries will automatically appear in the final entry. Fields highlighted in pink do not match across 1st and 2nd entries and must be checked and correct responses entered manually.
6. Click **save** and **close**.

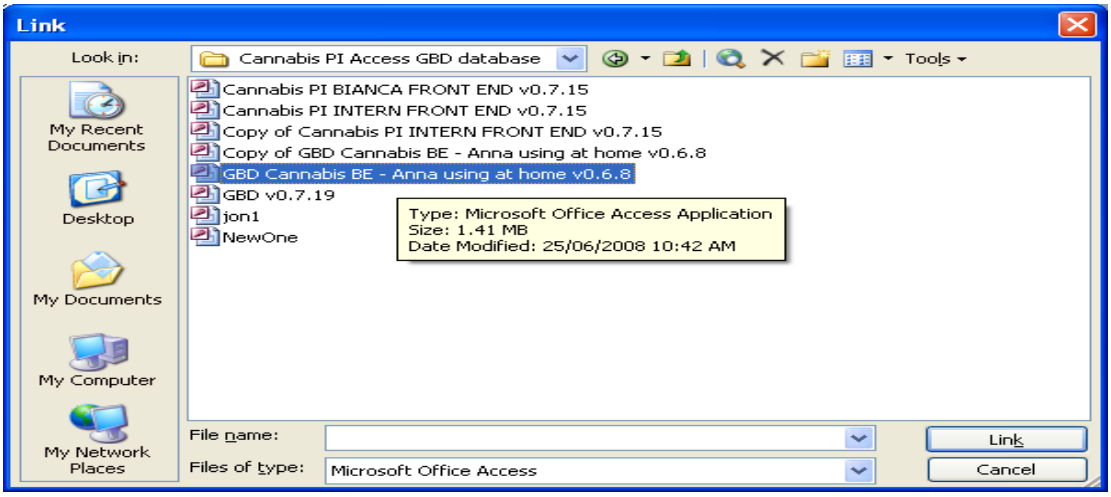
Queries

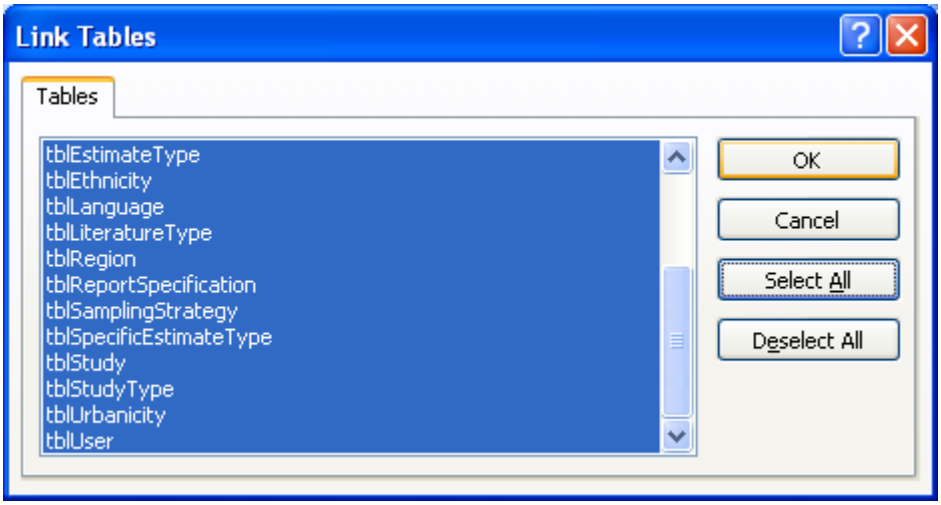
Linking tables from the Access database that holds the data to the new Access database that holds the queries:

- 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



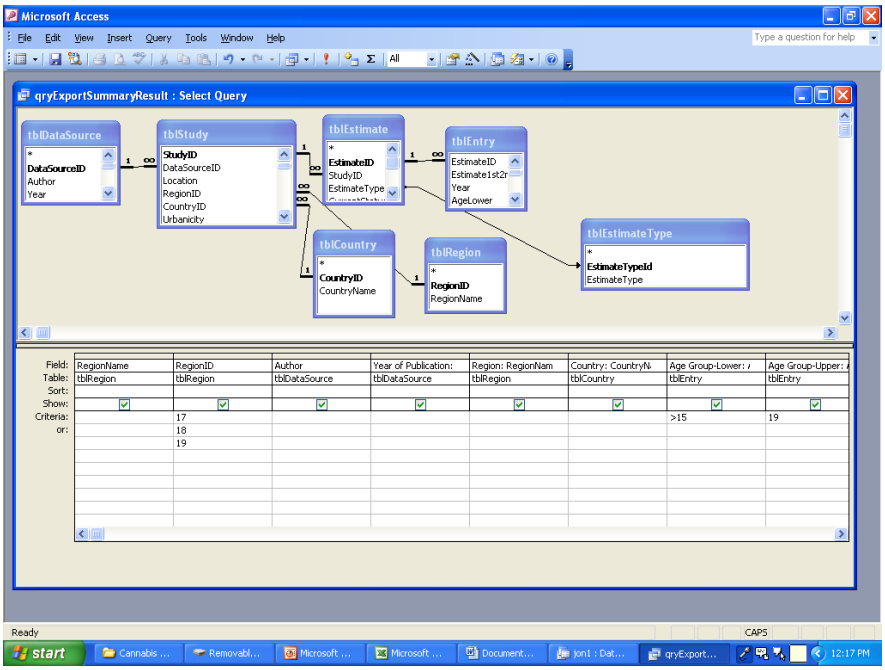




- Choose “Select all”
- Click “OK”

To make a query:

- choose Queries form 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

Variable	Database Rules
	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 heroin/opioid 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 heroin/opioid 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%)'
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'

Variable	Database Rules
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”.
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.

Variable	Database Rules
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.
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

Variable	Database Rules

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*
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

Variable	Database Rules
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

Variable	Database Rules
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.
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

Appendix E: Search strings for any evidence of use in specific countries

Databases/Search Engine	Search Group	Search terms
GoogleScholar	Heroin/opioids	Heroin, opioid, opium, opiate, morphine
	Drug use	"drug use" OR "drug abuse" OR "substance use" OR "substance abuse"
	Country	*"country name"*
WorldCat/ PubMed/ PsychINFO	Heroin/opioids	Heroin, opioid, opium, opiate, morphine
	Drug use	"drug use" OR "drug abuse" OR "substance use" OR "substance abuse"
	Country	*"country name"*

Appendix F: Global Burden of Disease country and region list

The 21 Global Burden of Disease (2005) Regions

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

Timor 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
The 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

SUB-SAHARAN AFRICA, WEST

~

Benin
Burkina Faso
Cameroon
Cape Verde
Chad
Cote d'Ivoire
Gambia
Ghana
Guinea
Guinea-Bissau
Liberia
Mali
Mauritania
Niger
Nigeria
Saint Helena
Sao Tome and Principe
Senegal
Sierra Leone
Togo