

HOSPITAL AND EMERGENCY SERVICES DATA

CONTRACT CODE: CT.08.EPI.042.1.0

FINAL REPORT

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Executive Summary

Recreational drug use is common in Europe, however there is no systematic collection of data on acute recreational drug toxicity. The EMCDDA held an expert meeting in November 2007 to explore 'the use of health emergency data to help detect, track and understand emerging drug trends'. The lead investigators were awarded a contract to undertake a feasibility study in two different member states to explore methods for collecting this data in two different units in busy nightlife areas.

The lead centre (Guy's and St Thomas' NHS Foundation Trust, London, UK) identified a partner centre (Hospital Son Dureta, Palma, Mallorca) to participate in this study. A data collection tool was designed to collect data prospectively on all cases presenting to the two centres with acute recreational drug toxicity in June and July 2009. This report details the collation and analysis of this data and the differences between the centres (types of recreational drugs used, place of drug use, home location of individuals presenting and patterns of acute toxicity seen).

A round table discussion was held with key stakeholders in the local community of both centres. This was a useful forum and could serve as a platform for developing strategies for dealing with issues associated with acute recreational drug toxicity.

We have shown it is feasible to collect and collate data to help detect and look at differences in acute recreational drug toxicity in different member states. Further studies building on this feasibility study methodology and extending both the number of centres to areas where the epidemiology of drug use is different and the duration of data collection would be of value to the EMCDDA. This would allow identification of seasonal and geographical differences in acute recreational drug toxicity and help to identify emerging trends in recreational drug use and acute toxicity across Europe.

Chapter 1. Background to the Project

Dr Paul Dargan and Dr David Wood at Guy's and St Thomas' NHS Foundation Trust, London, UK were awarded the Tender for the Hospital and Emergency Services Data (Contract Code: CT.08.EPI.042.1.0) in August 2008. This tender was awarded on the understanding that the lead centre for this project would be Guy's and St Thomas' NHS Foundation Trust and the partner centre would be the Hospital Universitari Son Dureta, Palma, Mallorca, Spain. The local project leads in the partner centre would be Dr Jordi Puiguriquer and Dr Chris Yates.

EMCDDA and other international bodies such as the UNODC collect and collate data from individual countries around the world on the production of recreational drugs, seizures of drugs, the epidemiology of drug use and use of drug treatment services for recreational drug addiction. However, with the exception of the Drug Abuse Warning Network (DAWN) in the US, there is limited data being collected and published internationally on the issue of acute recreational drug toxicity. In Europe, the monitoring of acute health problems related to recreational drug use is limited, with only Spain and the Netherlands routinely collecting and reporting some hospital emergency data to the EMCDDA.

Current international hospital and clinical coding systems (e.g. ICD-10) have significant limitations that make collection of such data on a national and international basis difficult. Acute recreational drug toxicity is a significant clinical issue with the potential for significant morbidity and mortality; furthermore with increasing use of novel and emerging recreational drugs it is important to be able to

detect, track and understand emerging trends in acute recreational drug toxicity. The aim of this project was to explore the feasibility of collecting information on acute recreational drug toxicity presenting to hospitals in two Member States to act as a platform for future studies to collect this on a more widespread basis.

Chapter 2. Technical Specifications for the Project

The technical specifications of the project is taken from Annex 1 of the Contract for the project.

2.1 Title of Contract

Feasibility study: Hospital and Emergency Services Data.

2.2.1 Purpose and context of the Contract

In November 2007, the EMCDDA held a small expert meeting to explore the use of health emergency data to help detect, track and understand emerging drug trends. This meeting followed on from earlier work in 1997, commissioned by the EMCDDA to review the scientific literature on drug related non-fatal hospital emergencies. This work identified the potential contribution of hospital emergency data to monitor and understand emerging trends (Domingo-Salvani, Vicente, Hartnoll, 1999).

Experts from Amsterdam, Barcelona, London and Madrid attended the meeting and discussed their experiences of collecting data on drug use and trends from hospital emergency departments or ambulance services. The objectives of their monitoring systems varied, ranging from: a stably funded long-term monitor of cases in Barcelona for epidemiological purposes; monitoring ambulance service activity in Amsterdam; meeting an identified need to reduce harm related to recreational drug use in a specific London area.

Consensus was reached on the fact that, in the framework of understanding and responding to emerging drug trends, there is no intention to create a comprehensive monitoring system / key indicator. This is outside the conceptual and financial scope of the project. However, the proposed feasibility study may provide information that would serve as an early stage for further or broader developments in the longer term.

2.2.2 Public Health Rationale

- There is a lack of information in EU Member States on acute health problems (their nature and extent) related to recreational drug use presented to hospital emergency services, except a few extreme cases that attract media attention or lead to death.
- There is a lack of information in EU Member States about the social or health characteristics (behavioural, psychological and physiological) that make individuals vulnerable to experiencing acute drug related problems that present as hospital emergencies.
- Need to inform stakeholders (clinicians, emergency services staff, harm reduction programmes staff and users) in EU Member States about interventions in clinical and preventive practice.

2.2.3 Institutional Rationale

- Need to develop monitoring methods and tools to disseminate evidence-based information about the use of emerging drugs in EU Member States and about the acute health risks associated with them.

- This study will promote a better understanding of strengths and limitations of a new information source by incorporating qualitative research methods to assess the feasibility and added value of future work in the field.

2.3 Subject of the Contract

1. To explore methods for collecting hospital emergency data that have sufficient detail about clinical characteristics and circumstances of use to improve understanding about risks associated with emerging recreational drug trends and for describing interventions.
2. To identify limitations in making comparisons over time and between hospitals and document the potential for collecting comparable data from a selected sample of hospitals in EU Member States on a regular basis.
3. To obtain a descriptive snapshot of acute drug related health problems [these may include alcohol when taken in combination with other psychoactive substances] that present at hospital emergency departments in two different member states within a specified time window, when higher than average drug related emergencies would be expected (for example in a weekend in a busy period).

The tasks to be covered during the project were:

1. Review key literature. However, it was agreed with Deborah Olszewski at EMCDDA that, although a literature review would be undertaken to facilitate the lead and partner centres in designing this study, it was not a requirement that this was included in the final report.

2. Design a prospective study of cases presenting with drug related health problems to a centralised hospital emergency department, within a given time window.
3. Identify two general / centralised hospital emergency department study sites in different Member States, which meet the following criteria:
 - It serves a busy night-life area where there are high levels of recreational drug taking (i.e. a significant number of drug-related cases present).
 - There is commitment on the part of hospital emergency staff to the study objectives and their potential compliance with the methods and tools.
 - Clearance from the hospital management in regard to data protection and ethical approval can be obtained.

The Clinical Toxicology Service at Guy's and St Thomas' NHS Foundation Trust, London, UK and Emergency Department at Hospital Universitari Son Dureta, Palma, Mallorca both fulfil all of these criteria.

4. Definition of a 'case' is to be explored in consultation with the participating hospital and the EMCDDA and identified using inclusion and exclusion criteria (substances, routes of administration, clinical signs and symptoms, etc).
5. Define the scope of information fields and variables for data collection

6. Where possible include qualitative information about how acute health problems are dealt with outside of the hospital setting (e.g. by ambulance paramedics, club staff) and how common they are.
7. Identify and/or design data collection method and tools (questionnaire and interviews, examinations, scales and observations, etc) and submit progress report to EMCDDA – within 4 months of the start of the contract.
8. Organise and supervise fieldwork and data collection.
9. Prepare and submit to the EMCDDA a draft final report that should contain:
 - an executive summary (1 page) suitable for early dissemination to a non-specialist audience;
 - a chapter addressing each of the three specific objectives;
 - an integration of comments from the EMCDDA and partners.
10. Final report to be submitted within 9 months of the start of the contract (EMCDDA requested that the final report be delivered by 1st November 2009).

The project was split into two phases:

- Phase 1:
 - planning of the project
 - construction of the case definition and the parameters to be collected
 - planning of the qualitative out of hospital study
 - production of an interim Phase 1 report

The Phase 1 Interim report was drafted by the lead centre, revised following comments from the partner centre and submitted in November 2008 to EMCDDA who approved the report and agreed that the project could move into Phase 2. Following approval of the Phase 1 interim report, it was agreed with the EMCDDA, as discussed below, that Phase 2 (data collection and analysis) would be undertaken prospectively. Furthermore, in the Phase 1 interim report we proposed collection over a longer period of time than the weekend that was originally proposed by the EMCDDA. To maximise the number of cases identified during Phase 2, it was agreed with the EMCDDA and the lead and partner centres that data collection would be undertaken over a two month period in June and July 2009.

- Phase 2:
 - data collection for both the hospital acute toxicity study and out of hospital qualitative study
 - data analysis
 - production of a final report: this report was to be drafted by the lead centre and revised at a meeting between the lead and partner centres prior to submission to the EMCDDA

Chapter 3. Case Definition and Data Parameters

The case definition and data parameters to be collected in Phase 2 were approved by the EMCDDA.

3.1 Case Definition

The following section describes the definition of a 'case' to be included in the feasibility study in Phase 2 of the study. The definition was drafted by the lead and partner centres as part of the Phase 1 interim report, and adapted and finalised following comments from the EMCDDA.

A 'case' was agreed to be defined as *“A patient who presents to the Emergency Department (ED) with symptoms and/or signs consistent with acute recreational drug toxicity and/or directly related to recreational drug use. Patients with a primary diagnosis of isolated ethanol intoxication will be excluded (although those who co-ingest ethanol and present with recreational drug toxicity will be included)”*.

The recreational drug(s) associated with the presentation was based on a combination of the patient's self-reported use, the opinion of the physician assessing the patient and the toxicologists reviewing data entry. Analytical confirmation of the drug(s) ingested is not undertaken routinely and therefore was not included in this study routinely; however where this information was available the results were included.

For the purpose of this study a recreational drug was defined as “a psychoactive compound that was taken for the purpose of recreational activities rather than for medical or work-related purposes”. These included:

- Established classified recreational drugs
 - e.g. cocaine, MDMA, heroin, amphetamine, methamphetamine, ketamine, GHB, cannabis
- Established non-classified recreational drugs (at the time of the drafting of the Phase I report)
 - e.g. GBL, 1,4-butanediol, piperazines
- Novel recreational drugs
 - e.g. bromodragon-FLY, D2PM, piperazines, cathinones
 - These may include drugs that are sold as “herbal highs”, “legal highs”, “PEP pills” etc; however the drugs will be recorded using the name of the preparation(s) included.
- Misuse of licensed pharmaceutical preparations
 - e.g. glaucine, methadone, sodium oxybate.

3.2 Inclusion and Exclusion Criteria

Specific inclusion and exclusion criteria to supplement the case definition described above were drafted and agreed as part of the Phase 1 interim report.

3.2.1 Inclusion Criteria

- Symptoms and signs consistent with acute recreational drug toxicity and/or directly related to recreational drug use.
- Patients aged 15 years and older.

3.2.2 Exclusion Criteria

- Lone ethanol ingestion / intoxication responsible for presentation.
- Symptoms and signs consistent with an alternate medical diagnosis and not related to acute recreational drug toxicity.
- No signs / symptoms of acute recreational drug toxicity.
- Presentation related to drug or ethanol withdrawal.
- Presentations with secondary complications of chronic drug use (e.g. infected injection sites, HIV/HBV/HCV, endocarditis) and no evidence of acute recreational drug toxicity.
- Deliberate self-poisoning with and/or misuse of lone benzodiazepines.

3.3 Data Parameters to be Collected

Both centres involved in the feasibility project have active databases collecting detailed demographic and clinical data on all recreational drug presentations, which were established prior to this study for their own research and clinical purposes. Although patient identifiable data is collected in both centres, the information which was collated as part of this study and provided to EMCDDA as part of the Phase 2 final report does not contain any detailed patient identifiable information. Basic demographic data on age and sex was collected as this is important in looking at the epidemiological trends in acute recreational drug toxicity.

For the purposes of this study it was agreed that the following data parameters would be collected during the data collection phase of the study. These data

parameters below were suggested by the lead and partner centres as being of primary importance in collating data on acute recreational drug presentations, and to potentially identify trends in clinically significant toxicity associated with recreational drug use. This is not an exhaustive list of potential clinical features of severe poisoning, but it was agreed that during the data collection study that both centres would consider other potentially significant features of toxicity that could be included in future extensions of this study.

3.3.1 Demographic data parameters

- Centre presented to
- Date of presentation
- Time of presentation
- Age – absolute variable
- Sex – M / F
- Home location – Local (London / Mallorca or Balearics), National (Other UK / Mainland Spain), International, Data not available

3.3.2 Exposure data parameters

- Method of transport to ED - ambulance / non ambulance
- Location of ingestion – free text
- Agent ingested – free text (we decided on this category to allow for novel / emerging recreational drugs)
- Preparation of agent – tablet / capsule / powder or crystalline / liquid / gas / other / data not available
- Amount of agent used – free text

- Route of exposure – oral / insufflated / inhaled / parenteral / rectal / other / data not available
- Time since last ingestion - <1hr, 1-4, 4-8, 8-12, 12-24, >24hr, data not available
- Results of toxicological screening, where undertaken

3.3.3 Clinical data parameters at presentation

- Level of consciousness – Glasgow Coma Scale (GCS) – absolute value
- Temperature – absolute value
- Heart rate – absolute value
- Blood pressure – absolute value
- Respiratory rate – absolute variable
- Agitation / Aggression – Y/N
- Hallucinations / altered perceptions – Y/N
- Seizures – Y/N
- Chest pain – Y/N
- Vomiting – Y/N

3.3.4 Outcome data parameters

- Discharge disposition from ED – medically discharged / self discharge or escaped / admit critical care / admit other / death / not known
- Length of stay in hospital – absolute value

3.4 Data Collection Tool

As mentioned above, both the lead and partner centres currently have active clinical toxicology databases which collect detailed demographic and clinical data on patients presenting with acute poisoning. This study drew from these databases the data outlined in Sections 3.1-3.3 above, to collate data on individuals who met the case definition criteria. This data was imported to the data collection tool by both centres. The data collection tool was a custom designed Excel spreadsheet (Appendix 1). The partner centre forwarded their completed data collection tool to the lead centre as agreed in the time-line below for data analysis.

3.5 Time Line for Data Collection

The tender from the EMCDDA suggested data collection over a single weekend. As outlined in our tender for this study we felt that this would be too short for adequate validity of the study. We therefore suggested collection over a longer period of one to two months; a two month collection period was approved by the EMCDDA.

At the meeting on 14th October 2008 the lead and partner centre reviewed the number of presentations to their Emergency Departments during 2007 that would potentially meet the case definition for this study. The lead centre has a high number of presentations per month, particularly during the summer and early autumn months. The partner centre has markedly increased number of presentations in July and August. In the tender time-line, data collection was scheduled to occur in February 2009. However, for both the lead and partner centre the background rate of

cases likely to meet the case definition during February is relatively low. Therefore the lead and partner centre agreed at the 14th October 2008 meeting that, in order to ensure data collection during a period during which there were a large number of acute recreational drug toxicity presentations, it would be more appropriate to either undertake retrospective data collection for July and August 2008 or seek approval from EMCDDA for extension of the feasibility study to allow prospective data collection in June and July 2009. Following review of the Phase I Interim Report, Dr Paul Griffiths (Head of Unit, Epidemiology, Crime & Markets at EMCDDA) approved extension of the project to allow prospective data collection in June and July 2009. The time-line (Section 3.8) was therefore adjusted and finalised at the meeting between the lead centre and partner centre in January 2009 to allow this prospective data collection and delivery of the final report by 1st November 2009 as requested by the EMCDDA.

3.6 Data Analysis

As discussed in Section 3.3, both centres imported relevant data to the data collection tool and the partner centre forwarded this to the lead centre as agreed in the time-line. The lead centre collated and combined the two datasets to enable further analysis and interpretation of the data. The data analysis was largely descriptive in nature although, where appropriate, data was presented as mean \pm standard deviation. Comparison was made between the datasets from the lead and partner centres using parametric and non-parametric statistical analyses as appropriate. We focused in particular, as agreed in the Phase I interim report, on the following data parameters that were collected.

3.6.1 Demographic parameters

- Day of week of presentation
 - most common day of presentation
- Time of day of presentation
 - peak time of presentation
 - proportion presenting outside standard working hours
- Age
 - mean \pm standard deviation
- Sex
 - proportion of individuals who are male / female
- Home location
 - proportion of presentations that met each of the pre-defined home location criteria

3.6.2 Exposure data parameters

- Method of transport to ED
 - proportion of patients brought by ambulance to the ED
- Agent ingested
 - description and frequency of the drugs involved
- Preparation of agent
 - description and frequency of the preparations involved
- Amount of agent used
 - description of the frequency of the amounts of agents used
- Route of exposure

- description and frequency of the routes of exposure involved
- Time since last ingestion
 - proportion of patients presenting within the defined time-lines

3.6.3 Clinical data parameters at presentation

- Level of consciousness
 - proportion of patients with significant “drowsiness”
- Temperature
 - mean \pm standard deviation
 - proportion of patients with significant “hyperpyrexia”
- Heart rate
 - mean \pm standard deviation
 - proportion of patients with significant “tachycardia” or “bradycardia”
- Blood pressure
 - mean \pm standard deviation
 - proportion of patients with significant “hypertension” or “hypotension”
- Respiratory rate – absolute variable
 - mean \pm standard deviation
- Agitation / Aggression
 - proportion of patients with agitation / aggression
- Hallucinations / altered perception
 - proportion of patients with hallucinations / altered perception
- Seizures
 - proportion of patients with seizures
- Chest pain

- proportion of patients with chest pain
- Vomiting
 - proportion of patients with vomiting

3.6.4 Outcome data parameters

- Discharge disposition from ED
 - proportion of patients in each of the pre-defined discharge disposition criteria
- Length of stay in hospital
 - mean \pm standard deviation

3.7 Out of Hospital Qualitative Data study

The EMCDDA stated in Annex III Reporting Obligations of the contract: “Where possible, include qualitative information about how acute health problems are dealt with outside of the hospital setting and how common they are”. Furthermore, in their response to the draft Phase I progress report, the EMCDDA requested that the “feasibility of identifying a stable panel of key informants/stakeholders to report on an annual or 6 monthly basis” should be included in this qualitative study.

The qualitative study was discussed during the meeting between the lead and partner centres on 14th October 2008. We discussed the key stakeholders in the community serving both centres that would be appropriate to approach as part of this qualitative study. The lead centre already had good contacts with key stakeholders that have been established as part of previous and ongoing studies. These include nightclub owners / promoters and the local police and ambulance services. Although

the partner centre does not have the same links currently it was felt appropriate that they would involve similar agencies in their locality.

The data to be collected, the number of stakeholders from each of the key areas and the feasibility of identifying a stable panel of key informants/stakeholders to report on an annual or 6 monthly basis was discussed at the visit of the partner centre to the lead centre on 12th January 2009. We agreed that the key groups in the local community of both centres from which this data should be collected should ideally include: police, ambulance staff and nightclub / bar staff. It was decided that a 1-2 hour "round table" discussion session involving these key groups would be the most appropriate way of undertaking this study and that these discussion sessions would be facilitated by one or both of the investigators in both centres (PD/DW, CY/JP). The same series of open ended statements / questions would be used at both centres to allow free discussion but to try and target the discussions to the relevant areas of interest of the EMCDDA. Additionally, those people attending will be questioned about their opinion of feasibility of identifying a stable panel of key informants/stakeholders to report on regular basis.

The statements that were used at the round table discussion sessions were:

- How common are acute health problems related to recreational drugs?
- What sort of acute health problems do you see?
- Which drugs do you think are causing these acute health problems?
- How do you manage people who develop acute health problems associated with recreational drug toxicity?

- What is your opinion on the opinion of feasibility and use of identifying a stable panel of individuals such as yourselves to discuss these issues on regular basis?

Notes from the round table discussion sessions would be taken by both centres using the statements as a template. The partner centre would then forward the notes from their meeting to the lead centre for qualitative data analysis of the notes from both the lead and partner centre meetings for inclusion in the draft final report.

3.8 Phase 2 Time Line

3.8.1 Agreement of this progress report by the EMCDDA.

The amendments and changes to the Phase 1 interim progress report were agreed by the EMCDDA and in particular, as discussed in 3.5, the change in the time period of data collection and the delivery of the finalised Phase 2 report.

3.8.2 Visit of the partner centre to the lead centre

The partner centre visited the lead centre on Monday 12th January 2009 to review the finalised Phase 1 interim report and to agree the final study protocol and the data to be collected for the out of hospital qualitative data study.

3.8.3 Time Line for the completion of the study

Month 7 – March 2009:

- Out of hospital qualitative data study to be undertaken.

Month 8 – April 2009:

- Analysis of out of hospital qualitative data study by the lead centre.

Month 11/12 – June/July 2009:

- Initiation and completion of data collection.
- Both centres to collect data on limitations of data collection.

Month 13 – August 2009:

- Partner centre to forward completed data collection tool to the lead centre.

Month 13/14 – August / September 2009:

- Data analysis by lead centre as outlined in Section 6.
- Drafting of finalised report by lead centre to be forwarded to the partner centre by the end of Month 14.

Month 15 – October 2009:

- Meeting between the lead centre and partner centre to discuss completion of final report on Friday 9th October 2009.

Month 16 – October 2009:

- Draft final report to be submitted to the EMCDDA by the lead centre by 1st November 2009.

Chapter 4. Cases Identified and Data Analysis

4.1 Cases identified and demographics

During the two month study period, there were 86 cases identified in the lead centre and 33 cases identified in the partner centre that met the inclusion criteria. Of the 86 cases identified at the lead centre, 76 (88.4%) were male, compared to 21 (63.6%) of the 33 cases at the partner centre ($p=0.003$). There was no difference in the mean \pm SD age (range) between the lead and partner centres [31.4 ± 8.0 (15 to 50) years old and 30.1 ± 8.5 (17 to 46) years old at the lead and partner respectively ($p=0.43$)].

The day of the week of presentation for both centres has been combined in Figure 1 to allow easier comparison between the two centres.

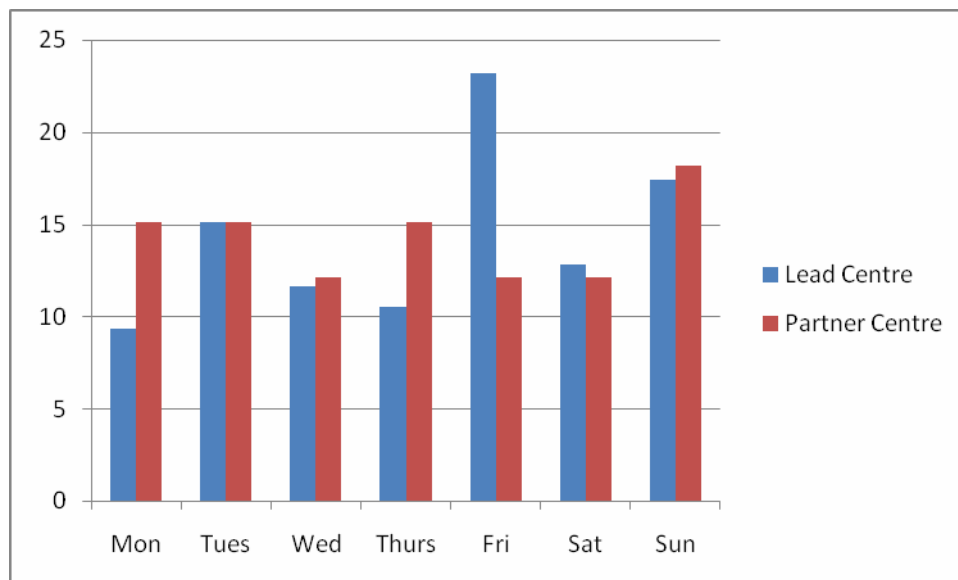


Figure 1. Percentage of presentations at each centre by day of the week.

The commonest day of the week for presentation was Friday at the lead centre and Sunday at the partner centre. The time of day of presentation to the ED is shown in Figure 2 for the lead and partner centres respectively.

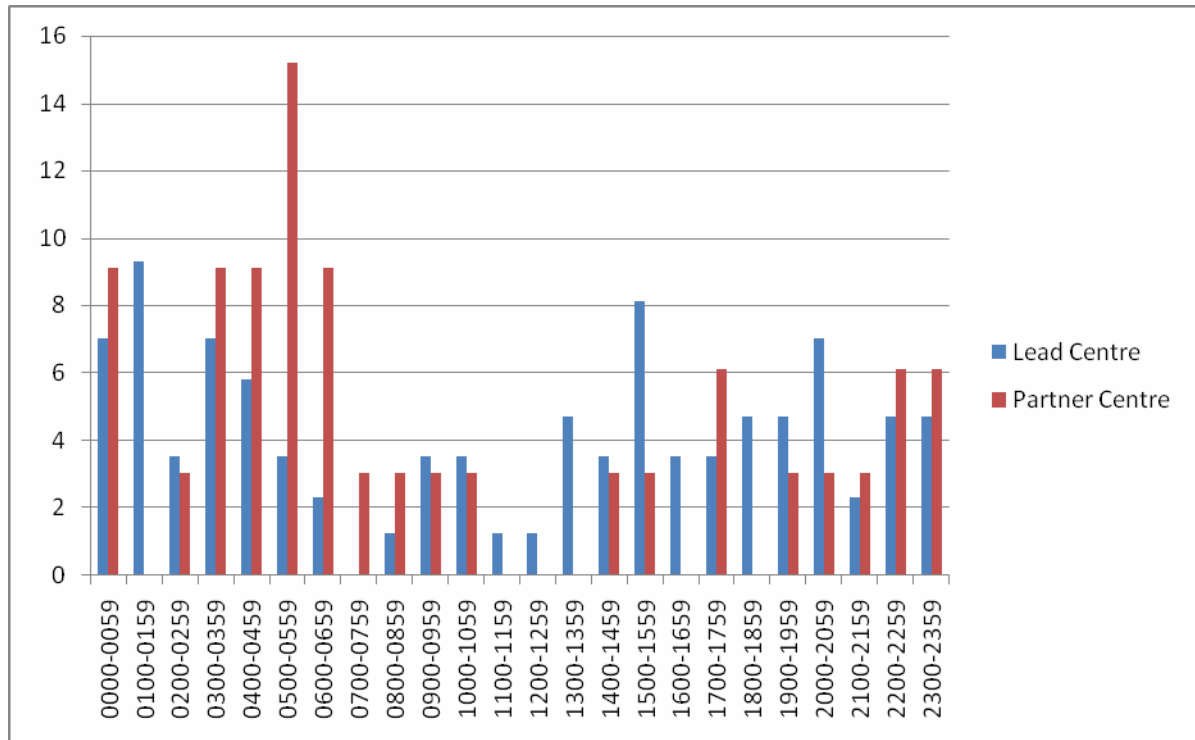


Figure 2. Percentage of presentations at each centre by time of day.

The peak time of presentation was between 01:00 to 01:59 at the lead centre and between 05:00 to 05:59 for the partner centre. There was no difference in the proportion of presentations outside working hours (defined as between 18:00 and 08:00) between the lead (67.4%) and partner centres (78.8%) ($p=0.32$).

As described in Section 3.3.1, the ‘home location’ of patients was defined as follows: home – London postcode for the lead centre and resident of Mallorca or other Balearic Island for partner centre; national – other UK postcode for lead centre and resident of mainland Spain for partner centre; and overseas resident was defined as international residence for both centres.

The home location was not known / not recorded for 24.4% of presentations at the lead centre (this is because this data is collected at the time of registration in the Emergency Department and many patients presented confused / drowsy), whereas the home location was available for all presentations at the partner centre. The home location for both the lead and partner centre is shown in Figure 3.

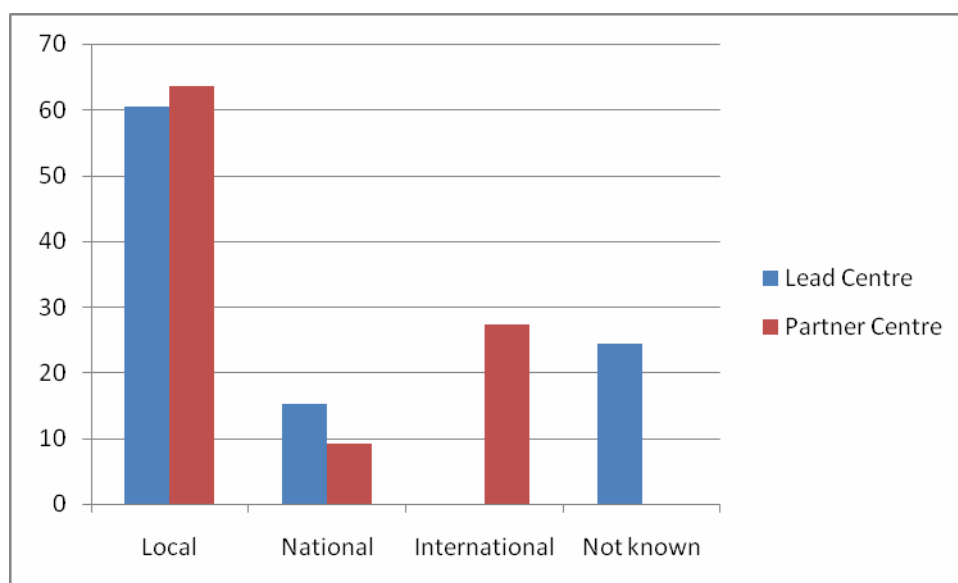


Figure 3. Percentage of presentations by ‘home location’ for both centres

Interestingly, whilst there were no international presentations during the study period at the lead centre, 27.3% of individuals presenting at the partner centre were defined as ‘international’ ($p < 0.0001$). Of the 9 ‘international’ presentations, 8 were from countries within the EU (UK – 5, Portugal – 2 and Romania – 1), with one from a non-EU country (Morocco).

Toxicological screening was undertaken in one patient in the lead centre, as part of the post-mortem examination in a patient who died, and there were no cases where screening was undertaken in non-fatal presentations. Urine toxicology screening was undertaken in 12 (36.4%) of presentations at the partner centre; of these 4 were negative for common recreational drugs (although these assays may not detect 'novel' recreational drugs and the detection time after use varies for different drugs). In the 8 cases with positive results, the results were consistent with the history of the drugs used in only 50% of cases. However, commonly used assays for recreational drugs typically screen for both parent drug, as well as major metabolites; therefore, the presence of a positive drug screen has to be interpreted in line with the clinical presenting features unless an assay that only screens for parent drug molecule is used. Furthermore, many novel / emerging recreational drugs are not be screened for in most in-hospital toxicology laboratories.

4.2 Exposure data parameters

The route of transfer to the Emergency Department was known in all cases identified in this study; 86.0% of presentations at the lead centre arrived at the ED by ambulance, compared to 60.6% at the partner centre ($p=0.002$). Data on the route of transfer to the ED in non-ambulance transfer was not collected as part of this study as previously agreed in the Phase 1 interim report.

The place of use of the recreational drug(s) is shown in Figure 4.

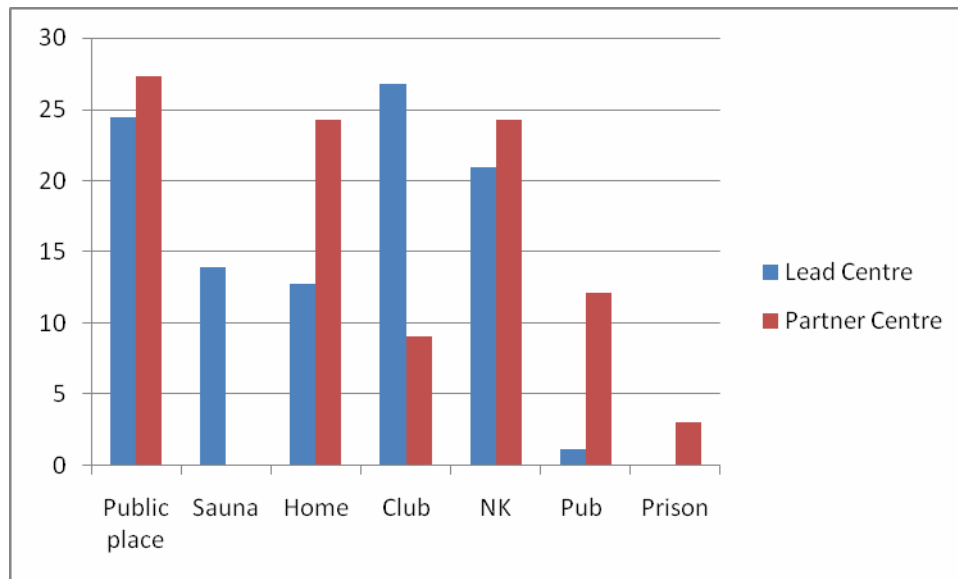


Figure 4. Percentage of recreational drug use in different locations by centre

There are several apparent differences in the place of recreational drug use between the two centres. Whilst there were similar proportions of use in public places in both centres ($p=0.75$), there was a greater proportion of presentations at the partner centre relating to use in ‘pubs’ ($p=0.007$) and trend to a greater proportion related to use in home environments ($p=0.13$) compared to the lead centre. Additionally, there were a significant number of presentations at the lead centre that resulted from recreational drug use in nightclub environments ($p=0.04$) or saunas ($p=0.02$). These differences may reflect the differences in the night-time economy in the countries where the study was undertaken, particularly given that in many Mediterranean countries many ‘pubs’ are in fact bars with a dance area, which in the UK would be classified as a ‘nightclub’. It would be interesting to determine whether there were differences in other centres in other countries, with different night-time economies, in future larger multi-centre studies.

The mean \pm SD (range) number of agents used was 1.9 ± 0.95 (1 to 6) and 1.82 ± 0.77 (1 to 4) at the lead and partner centre respectively ($p=0.68$). The number of agents ingested is shown in Figure 5 and the agents used and the frequency of ingestion of these agents is shown in Figure 6.

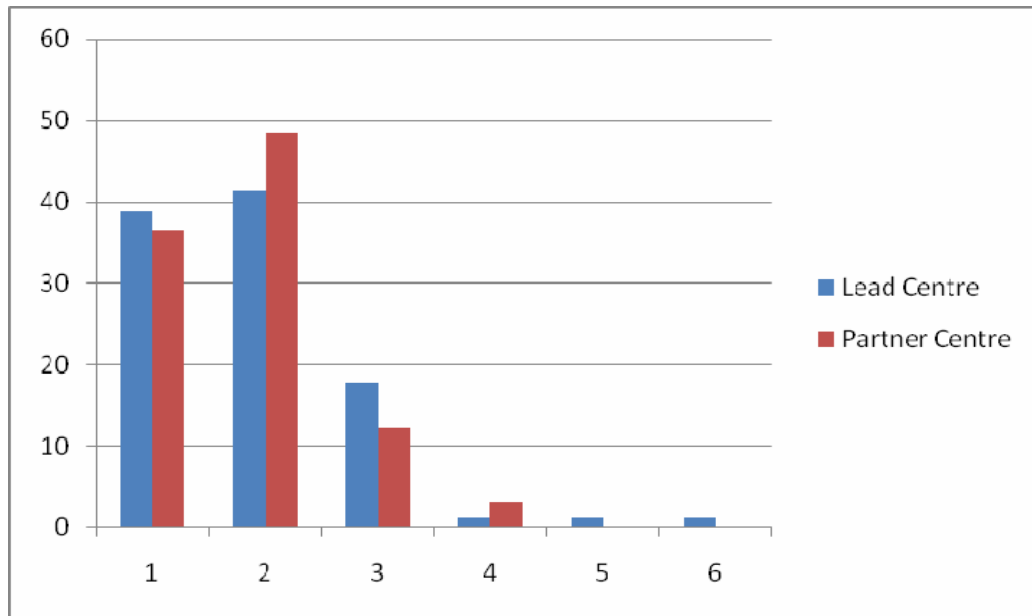


Figure 5. Percentage of cases with number of agents used by centre

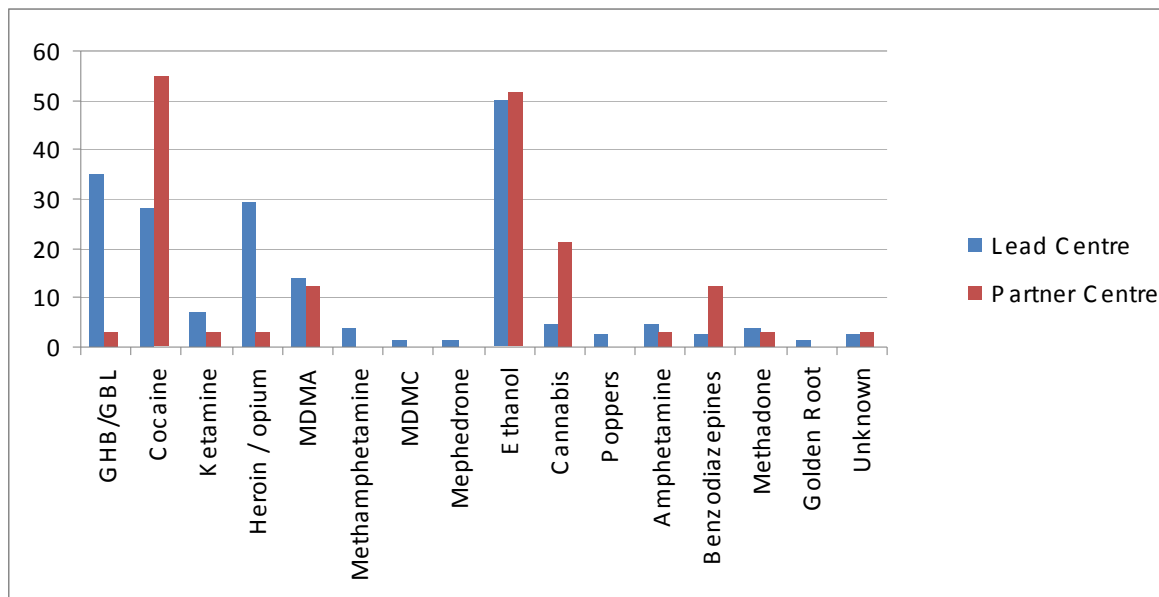


Figure 6. Percentage of cases reporting use of each recreational drug by centre

There was a range of agents that were used by patients presenting to the lead centre; the most common agents were GHB/GBL, cocaine, heroin, ethanol and MDMA. In contrast, there was less of a range of agents in patients presenting to the partner centre; the predominant agent was cocaine, followed by ethanol (as noted in the case definition, ethanol use was only collected as a co-ingestant and lone ethanol toxicity was not included in this study). There were three 'novel drugs' reported at the lead centre: one case involving use of both Mephedrone and MDMC and a further case of use of 'golden root', whereas there was no self-reported use of novel drugs at the partner centre.

The amount of drug(s) and/or agent(s) used was poorly recorded in the ED notes in both the lead and partner centres; some information on the amount used was recorded in 37.2% and 42.4% of presentations at the lead and partner centre respectively. However, this information was often not recorded for all the agents ingested by an individual, and therefore it was felt that it was not possible to be able to meaningfully interpret this data.

Similarly data on the route of exposure for all of the drugs used was often not available for analysis; where the data was available, this demonstrated that the predominant routes of use were oral, nasal insufflation and inhalation, with a lesser proportion of parental use (which was predominantly seen in those where the drug used was heroin; there were 2 cases of IV cocaine use at the partner centre). There were no cases of rectal use of drugs or use by other routes.

The time since last use and presentation to the ED is shown in Figure 7; data on the time since last use was not available in 36.0% and 36.3% of presentations at the lead and partner centre respectively.

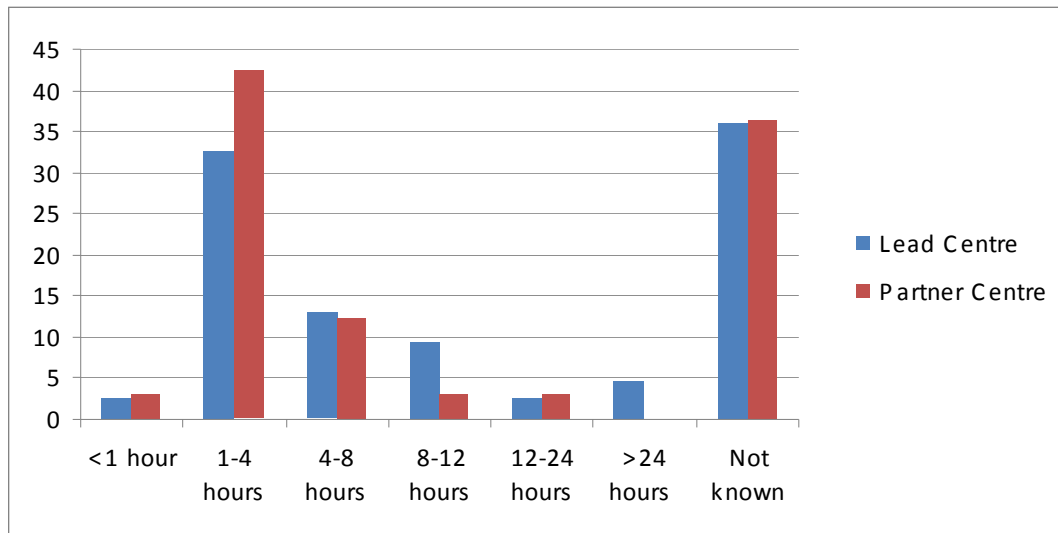


Figure 7. Percentage of cases presenting within each defined time period after recreational drug use by centre

Where this data was available for analysis, it demonstrated that the rate of presentations within an hour of recreational drug use at both centres was low (3.6% at lead centre -vs.- 4.8% at the partner centre, $p=0.82$). The majority of cases at both centres presented within 12 hours of recreational drug use (89.1% for lead centre and 95.2% for the partner centre).

4.3 Clinical data parameters at presentation

Clinical markers of significant harm related to the use of recreational drugs were defined by the lead centre as: i) reduced Glasgow Coma Score (GCS) of ≤ 8 ; ii) hyperpyrexia with a temperature on presentation of $> 38^{\circ}\text{C}$; iii) tachycardia with a

heart rate of 120 beats per minute; iv) hypotension (systolic blood pressure of <90mmHg) or hypertension (systolic blood pressure of >180mmHg) or v) respiratory depression with a respiratory rate of <10.

Conscious level (GCS) and significant coma

Glasgow coma score (GCS) was recorded in the Emergency Department (ED) notes for 95.3% and 100% of cases at the lead and partner centre respectively. There was the same proportion of patients who presented to the ED with a normal level of consciousness (GCS 15/15) at the lead centre (57%) and the partner centre (63.6%) (p=0.7); there was also the same proportion with significant central nervous system depression (coma) as defined by a GCS of ≤ 8 (lead centre 9.8% -vs.- partner centre 9.1%, p=0.9). It should be noted that although the Glasgow Coma Score (GCS) is routinely used by physicians in clinical practice, it has only been validated for use in head injury and trauma. Therefore, its use in determining the risk of significant harm in recreational drug toxicity should be used with caution, as for example, GHB/GBL toxicity is often associated with a GCS of 3/15 (significant coma and unresponsiveness), although the upper airway reflexes may remain intact.

Temperature and significant hyperpyrexia

Temperature was recorded in the Emergency Department (ED) notes for 96.5% and 54.5% of cases at the lead and partner centre respectively. There was no difference in the mean \pm SD (range) temperature was between the lead centre ($36.0 \pm 0.8^{\circ}\text{C}$ (34.0 to 38.0)) and the partner centre ($36.5 \pm 0.7^{\circ}\text{C}$ (35.5 to 38.5)) (p=0.44). There were no patients with significant hyperpyrexia ($> 38.0^{\circ}\text{C}$) at the lead centre and only 1 (3.0%) patient at the partner centre.

Heart rate and significant tachycardia.

Baseline heart rate was recorded in the Emergency Department (ED) notes for 96.5% and 93.9% of cases at the lead and partner centre respectively. The mean \pm SD (range) heart rate was significantly lower at the lead centre (84.6 ± 22.4 (42 to 143) beats per minute) compared to the partner centre (101 ± 20.4 (50 to 139) beats per minute) ($p=0.0005$). This difference in mean heart rate, may reflect the differences in the patterns of recreational drug use at the two centres, with greater use of drugs reported to cause bradycardia at the lead centre (GHB/GBL) compared to greater use of drugs known to cause tachycardia at the partner centre (cocaine). Despite these overall differences, there was no difference in the proportion of patients with significant tachycardia at both centres (lead centre 8.1% -vs.- 12.1%, $p=0.39$).

Blood pressure and significant hypotension/hypertension

Baseline systolic blood pressure was recorded in the Emergency Department (ED) notes for 96.5% and 93.9% of cases at the lead and partner centre respectively. There was no difference in the mean \pm SD (range) systolic blood pressure between the lead centre (135.5 ± 24.1 (73 to 199) mmHg) and the partner centre (134.6 ± 20.6 (85 to 177) mmHg) ($p=0.85$). 2.3% of presentations at the lead centre had significant hypertension (systolic blood pressure >180 mmHg), compared to no patients with significant hypertension at the partner centre. There was no difference in the proportion of patients with significant hypotension at the lead (3.5%) and partner (3.0%) centres ($p=0.92$).

Respiratory rate and significant respiratory depression

Respiratory rate was recorded in the Emergency Department (ED) notes for 94.2% and 24.2% of cases at the lead and partner centre respectively. The mean \pm SD (range) respiratory rate was significantly lower in the lead centre (16.2 ± 3.7 (10 to 32) breaths per minute) compared to the partner centre (20.1 ± 5.0 (16 to 32) breaths per minute) ($p=0.007$). Whilst it was agreed in the Phase 1 interim report that only respiratory rate would be collected by both the lead and partner centres in the Phase 2 data collection study, to determine significant respiratory depression in future extension of these studies, it may be advisable to also collect oxygen saturations (where available) and other markers of significant respiratory depression (e.g. need for mechanical ventilation).

Other Clinical Features

There was no significant difference in the proportion of patients presenting with hallucinations / altered perception (3.5% lead centre -vs.- 6.1% partner centre, $p=0.53$), seizures (2.3% lead centre -vs.- 3.5% partner centre, $p=0.83$) and vomiting (15.1% lead centre -vs.- 9.1% partner centre, $p=0.39$). However, there were significantly more patients with aggression/agitation (30.2% at lead centre -vs.- 63.6%, $p=0.0008$) and chest pain (2.3% at lead centre -vs.- 24.2% at the partner centre, $p=0.0001$) at the partner centre compared to the lead centre. This may reflect the greater proportion of patients at the partner centre presenting to the Emergency Department following the use of cocaine compared to the lead centre. However, the mention of "chest pain" in the Emergency Department notes does not necessarily indicate that the pain is related to potential underlying myocardial

ischaemia, which is of more clinical relevance than chest pain due to increased skeletal muscular activity.

4.4 Outcome data parameters

Discharge disposition was available for all individuals in both centres. Over 90% of patients in both the lead and partner centres were either medically discharged from the ED/admissions ward or self-discharged from hospital. Less than 5% of cases in both centres were admitted to a critical care facility for ongoing management following presentation to the ED. There was only one death in the study, which occurred in the lead centre, which was related to GHB/GBL toxicity with an out of hospital cardio-respiratory arrest (post-mortem analytical findings have been discussed in Section 4.1).

There was no difference in the mean length of admission to hospital, including the Emergency Department presentation, between the lead and partner centres; $p=0.49$. The mean \pm SD (range) length of admission to hospital was 6.9 ± 14.3 (0.2 to 109.3) hours in the lead centre and 9.0 ± 16.3 (0.8 to 96.0) hours in the partner centre.

Chapter 5. Difficulties Identified During Data Collection and Suggested Changes to the Data Collection Tool for Future Studies

Throughout data collection during Phase 2 of the project, both centres were tasked with identifying difficulties in data collection; in addition this section will discuss areas that we have identified where additional data could have been collected.

During data collection and the data analysis it was apparent that it was not practical to collect consistent data for the amount of drug used and the preparation of the drug. The reason for this is that it became apparent that this data was generally poorly recorded in the primary source of the data – the Emergency Department clinical notes. This is important in redesigning the data collection tool and ensuring that it is fit for purpose for any larger studies across multiple centres in the future.

As noted in Chapter 3, the data parameters were not an exhaustive list of potential data parameters relevant to acute recreational drug toxicity and we felt that it was likely that other data parameters would be identified during the feasibility study. The data fields that we feel need to be expanded and further clarified based on our experience in running this feasibility study are:

- i) Transport to hospital: currently only ambulance / non-ambulance are specified. We would suggest that this should be expanded and could include police / public transport / private transport / on foot.
- ii) Place of recreational drug use: we feel that this is an extremely important data parameter in comparing different centres across EU Member States. However,

in order for it to be representative of the actual place of use it is important that the terms such as “pub” and “nightclub” are well defined in future studies as these potentially have different meanings in different countries. For instance it became apparent during this study that what may be referred to as a “nightclub” in the UK was potentially classified as a “pub” in Spain.

- iii) Clinical features of toxicity: a number of patients presented to hospital following collapse and this variable was not included in the feasibility study.
- iv) Clinical features: it is important that chest pain is defined properly in any future study; in particular it is important to identify those patients with potentially significant chest pain e.g. ischaemic or pleuritic..
- v) Clinical features: we feel that instead (or in addition) to collecting respiratory rate it would be useful to collect data on oxygen saturations and/or other markers of significant respiratory depression (e.g. the need for mechanical ventilation). The reason for this is that respiratory rate is a poor measure of respiratory effort and in the context of agents such as heroin and GHB/GBL the combination of conscious level and oxygen saturations are a better marker of significant respiratory depression.
- vi) Discharge disposition: the current study collected only medical discharge / self-discharge / critical care admission / death. We feel that it would be useful to add non-critical care medical admission to this list as there were some individuals who were admitted to a non-critical care bed. In addition discharge to police custody should be collected as an additional discharge disposition variable.
- vii) Hospital admissions: we feel that in patients that require admission to hospital it would be useful to collect data on the reason for admission.

viii) Representations: in future studies we feel that it would be useful to look at the incidence of hospital representation with recreational drug toxicity.

We encountered no difficulty in obtaining the actual data for this study. This is because the data collected was obtained from the databases in the lead and partner centres. Both centres have active databases that have been established and validated over many years. It would not be possible to obtain this data from hospitals that do not have a database. Therefore in considering expansion of data collection to other centres and/or other EU Members States an essential consideration is that these centres need to have an established database or have interested clinician(s) who are interested in establishing a database at their centre.

Chapter 6. Results of the Out of Hospital Qualitative Study

The lead centre held their round table discussion session on the 13th March 2009. This was facilitated by the investigators at the lead centre (PD/DW) and attended by four staff from nightclubs in the locality of the lead centre hospital (3 nightclub promoters and 1 nightclub security man), three police officers (2 with responsibility for community liaison in the LGBT community and with the local nightclubs and one police liaison officer for the lead centre hospital Emergency Department) and a senior nurse at the lead centre hospital with a specific interest in recreational drug toxicity who is involved in recreational drug community and nightclub liaison work.

The partner centre held their round table discussion on the 29th April 2009. This was facilitated by the investigators at the partner centre (JP/CY) and attended by one representative from the Palma local police, one official from the Guardia Civil, two nightclub workers (one promoter and one public relations / bar worker) and one addiction therapy outreach worker. The Guardia Civil representative is responsible for the largest concentration of nightclubs in the locality of the partner hospital.

We have provided a summary of the discussion for each of the statements that were used to prompt discussion at the round-table sessions.

1. How common are acute health problems related to recreational drugs?

Lead centre: All of those attending the meeting reported that recreational drug toxicity is a common problem. However, they reported that there were different patterns in different areas of the local community (some areas where alcohol

problems were more common and some areas where recreational drug problems were more common) and also the use and problems associated with recreational drugs appeared to be different during different promotions perhaps in part related to the type of music played at the promotions.

Partner centre: It was reported that recreational drug toxicity is present but it was not perceived to be a significant issue. However, both the local police and Guardia Civil reported that recreational drug use was common in bars and clubs. It was felt that problems related to alcohol use were a more significant issue with concern expressed with respect to non-health issues such as public drinking, binge drinking and underage drinking. It was felt that “Mallorca has particularities due to the tourists present particularly in the summer months. Some are attracted to the islands due to a culture of drinking, partying and drug use”.

2. What sort of acute health problems do you see?

Lead Centre: The common patterns of toxicity seen by those attending the meeting included:

- Aggression – this was particularly an issue that security staff felt that they used to identify potential recreational drug toxicity;
- GHB/GBL toxicity was identified by staff attending the meeting by a “zombified reaction” of people in the club or collapses;
- Grinding of teeth was noted as a common means of identifying potential recreational drug toxicity;
- The nightclub staff stated that they had observed that ketamine users could often be identified as they “danced like a thunderbirds puppet”.

Partner Centre: As noted above, acute recreational drug toxicity was not felt to be a common problem that was seen in the bars/clubs or by the police. It was felt that one reason for this is that attending bars/clubs moved in groups and take care of each other and call an ambulance directly if toxicity arises. There was a perception that often there was someone in each group who wasn't drinking / taking drugs to be able to take a lead in taking care of the group.

3. Which drugs do you think are causing these acute health problems?

Lead centre: GHB/GBL, MDMA, cocaine, ketamine were perceived to be the drugs causing the problems; in particular many of the participants singled out GHB/GBL as being more likely to cause health effects.

Partner centre: As noted above drugs were not perceived to be a common cause of acute health problems. It was felt that binge drinking was a more significant issue both in terms of health and non-health problems. There was some discussion of the use of cocaine and 'designer drugs' such as MDMA in bars/clubs, although it was felt that drug dealing in clubs was decreasing.

4. How do you manage people who develop acute health problems associated with recreational drug toxicity?

Lead centre: Most of the large nightclubs in the area around the lead centre have "club medic" rooms which use the guidelines developed and published by the lead centre, along with many of those who attended this discussion forum, to determine when to call an ambulance. Those attending the meeting commented that these

guidelines made it easier to determine which individuals needed to be seen in hospital. Individuals who did not fulfil these criteria (e.g. those who had taken ketamine and had hallucinations) were managed in the nightclub medic room until they were safe and the staff felt that they could be discharged home with “friends who were not under the influence”. The police commented that if someone was found unwell on the street their first priority was the safety of the person and that they would immediately call for an ambulance before dealing with any legal issues relating to the recreational drugs.

Partner centre: As noted above, it was perceived by those attending the meeting that often those attending bars/clubs were in groups with someone in the group directly calling an ambulance if another member of their group became unwell. The bar/club owners stated that if someone became unwell they would call the police and an ambulance to take the individual to hospital.

5. What is your opinion on the opinion of feasibility and use of identifying a stable panel of individuals such as yourselves to discuss these issues on regular basis?

There was broad agreement amongst all of those attending the round table discussions at both the lead and the partner centre that it would be extremely useful to have a forum where people with an interest in recreational drug issues, from both the hospital and community, could get together to discuss issues pertinent to recreational drug use and toxicity. It was felt that this could serve as a useful platform to continue sharing experiences, concerns and developing strategies for dealing with problems associated with drug use and toxicity that could include public education and prevention initiatives.

Chapter 7. Conclusions and Next Steps

We feel that this feasibility study has been successful and has shown the value of specialist clinical toxicology units from different EU members states working together to collect unified data on acute recreational drug toxicity.

Although international bodies such as the EMCDDA and UNODC collate data on drug seizures and the prevalence of drug use the only data collected internationally on the harm associated with recreational drug use is on the use of drug treatment services and deaths. With the exception of the Drug Abuse Warning Network (DAWN) system in the US, there is limited data being systematically collected and published internationally. In Europe, monitoring acute health problems related to recreational drug use is limited, with only Spain and the Netherlands, routinely collecting and reporting some hospital emergency data to the EMCDDA. Furthermore, hospital coding systems are typically based around the ICD-10 coding system. This does not include the majority of recreational drugs and in most countries will only capture hospital admissions, and not patients who are discharged directly from the Emergency Department. Acute recreational drug toxicity is a significant clinical issue with the potential for significant morbidity and mortality; furthermore with increasing use of novel and emerging recreational drugs it is important to be able to detect, track and understand emerging trends in acute recreational drug toxicity.

This feasibility study has shown differences between the lead and the partner centre in a number of different areas; for example the recreational drugs used, the place of

use of these drugs, the means of transportation of individuals to hospital and the clinical pattern of toxicity. Establishing the epidemiology of acute recreational drug toxicity across different EU member states and the patterns of toxicity seen is important in determining the harm associated with recreational drug use. This information could then be used to ensure that legislative processes governing recreational drug classification are reflective of the patterns of drug use and their associated harms and also to aid clinical service planning across EU member states.

The qualitative out of hospital study that formed part of this feasibility study was useful in obtaining the views of key stakeholders in the local community of the lead and partner centres on the impact of recreational drug toxicity. Those attending thought that this would be a useful forum in the future and could serve as a useful platform to continue sharing experiences and concerns on recreational drug toxicity. There is the potential that this could be used and further developed to assist in developing local, regional, national and pan-European strategies for dealing with problems associated with recreational drug use and toxicity. These could include general and specific education for both the public and those managing recreational drug toxicity in the pre-hospital environment. There are published guidelines from the lead centre on assessing individuals with recreational drug toxicity in the pre-hospital environment that form part of National guidance in the UK. These could be adapted based on information gathered across EU member states using these discussion forums. Furthermore, the discussion forums could be used to plan prevention initiatives.

We have suggested a number of modifications to the data collection tool in Chapter 7 of this report. In addition, we feel that data collection over a longer period of time would be beneficial. The feasibility study only collected data over a two month period which was longer than the busy weekend originally suggested by the EMCDDA in the tender for this project. Whilst the revised two month time period was long enough to show that data collection is feasible in different centres in different EU Member States and to demonstrate the value of data collection, we feel that continuing data collection over a longer period of time would add significant value. This is important to look at seasonal variations in recreational drug use / toxicity; in particular in centres which serve a large tourist population such as the Balearics and other Mediterranean EU Member States. Furthermore, detection of trends in recreational drug toxicity will only be possible with continuous data collection rather than single period snapshots of data collection. Finally, whilst the use of 3 novel drugs in the lead centre was seen during the feasibility study, data collection over longer periods of time would be more beneficial to detect greater numbers of emerging novel drugs and to describe the clinical patterns of toxicity seen with these agents. Annual data collection would also enable identification and comparison of seasonal trends in acute recreational drug toxicity between different centres; this is particularly of value for centres which serve tourist resorts.

We also feel that data collection from centres in other EU member states would be beneficial. As described in the 2008 EMCDDA Annual Report, the epidemiology of recreational drug use and in particular the predominant stimulant drug used varies across the 27 EU Member States, candidate countries and Norway. This report describes a South West – North East divide. Cocaine is the predominant stimulant

drug used in the Southern and Western countries e.g. Spain, Italy and France. Amphetamines are the predominant stimulant drugs used in Northern and Eastern countries e.g. Scandinavia and Eastern Europe. In the transitional areas (e.g. Germany and Denmark) there is equal use of these stimulant drugs.

The lead and partner centres in this feasibility study are both in countries in which the predominant stimulant drug used is cocaine (a substantial number of presentation in this feasibility study were associated with cocaine toxicity in both centres). We feel that it would be valuable to include in future studies centre(s) in countries where cocaine and amphetamine use are equally present (e.g. Denmark) and centre(s) in countries in which amphetamine use prevails (e.g. Norway).

In summary, we have shown in this feasibility study that it was possible to collect data in two centres in different member states. Collation and analysis of this data proved to be of value in determining differences in acute recreational drug toxicity parameters between the two centres. Additional work, building on this feasibility study methodology and extending both the number of centres to areas where the epidemiology of drug use is different and the duration of data collection would, we feel, be of value to the EMCDDA. This would allow identification of seasonal and geographical differences in acute recreational drug toxicity and help to identify emerging trends in recreational drug use and associated acute toxicity across the European Union.

