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IMAS Institut Municipal d'Investigació Mèdica



FINAL REPORT

Review and Synthesis of Scientific Literature on Drug-related Non-fatal Emergencies

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0.- EXECUTIVE SUMMARY

INTRODUCTION

The European Monitoring Centre for Drugs and Drug Abuse (EMCDDA) work programme in epidemiology is willing to widen its scope on health consequences of drug use. Within the purpose of the present working program on early warning systems for identification of health problems linked to the use of new substances or new patterns of use EMCDDA was interested in exploring what work had been done in the European Union of the indirect indicator of drug use: Emergency Room (ER) drug-related non-fatal episodes.

The aim of this report was to provide a detailed review of epidemiological studies on drug-related emergencies implemented recently (10 years) in the European Union, and to synthesise information generated by all of them in order to provide some clues for an early warning system network. This was achieved with a systematic review of scientific and grey literature mainly from European countries.

METHOD

To locate scientific literature published by the European Union Member States the strategy involved: 1) a search through different bibliography databases and 2) contact with key persons in different Member States and with focal point REITOX contacts.

The main focus has been studies done in Europe, however relevant papers from other countries, mainly those related to DAWN in USA have also been selected. In the review, only papers and works in English, French, Italian or Spanish are included. Works in other languages are included if they have a summary in any of these languages.

When all papers and publications were compiled they were analysed and the information obtained synthesised in two main aspects: methods of data collection and different applications of analysed studies.

RESULTS

From nearly 300 references obtained through Medline, 76 were selected and a further 44 were added from other databases, including papers sent by key persons approached. The papers selected come from different backgrounds. They are either research works with patients seen at ER, clinical epidemiology studies or epidemiology studies from (sometimes large) databases to describe population with drug-related problems. In countries where there is systematic data collection from ER, information from this indicator is related to other indicators of drug use to achieve a more comprehensive picture.

The **METHODS** for collection of data depend on the objectives of the study. Most of the papers analysing data report ad hoc studies for which the correct method was decided in the study design. Some other papers report on information gathered through systematic data collection as an information system had been set in that area for whatever reason.

In a **retrospective** approach the collection of data is done reviewing clinical records some time after the actual emergency settled. A retrospective review needs to rely on the information that had been gathered in the clinical record. This is a limitation that needs to be remembered as usually clinical histories in ER are short and focused on what is interpreted as the casualty's main problem.

The information is gathered **prospectively** when it is being collected forwards, on patients presenting after a point in time when the study was planned. Information is collected when it is produced, along with the medical care provided, some times by interviewing the patient, while he/she is present in the ward. Criteria to be considered a case can be screened while the patient is present.

Information gathered through **systematic data collection** is mainly produced through a retrospective approach. It needs to review clinical records and identify those of patients who fulfil characteristics for selection. Subsequently data is collected from each of them. Some characteristics to take into account for systematic data collection are

time coverage (continuous or periodic) and geographical coverage (all hospitals/some of them/a representative sample).

The **APPLICATIONS** of papers analysed within this project include those listed below which are fully described in the main text:

- A. A source to characterise a possibly different sub-population of drug users.
- B. An indicator of drug use trends.
- C. To identify and monitor health consequences of drug use.
- D. A source with potential utility for detecting and monitoring new patterns on drug use.
- E. A source with potential utility for detecting abuse of new substances, especially new synthetic drugs.
- F. A capture source to estimate prevalence.
- G. To assess risks factors for some serious consequences of drug use (i.e., fatal overdose).
- H. To detect problems that DU may have.
- I. A source where to start prevention of further problems.
- J. To assess the burden of drug-related problems to ER load.
- K. To ascertain validity of information on drugs consumed and other data in clinical records.
- L. To monitor how prescribed drugs influence ER attendance for drug problems, and
- M. Other purposes.

What's on in Europe

From this literature review we observed that most of the papers are from ad hoc studies, but some of them report on studies that involve a wider project, either an information system on drugs (Spain), a local interest on ER drug problems (Amsterdam, Austria, Italy, Scotland), or a more health policy oriented project (Germany). In the main report a summary of what is available regarding drug-related emergencies in those countries as well as a summary of DAWN and the Pompidou Group pilot studies is given.

DISCUSSION

This search has shown that many studies of non-fatal drug-related emergencies have been done in different cities and regions in the EU. In general studies have provided information about drug-related problems that may not be seen from other data sources, have helped to draw a more complete picture of problem drug use impact (population affected, prevalence, health consequences, overload to ER, etc.), have described the evolution of the problem (time trends) and in several occasions have pointed out new problems. They have also shown a wide variety of health problems that drug users may have, driving them to seek help to ER. Also other studies have drawn attention to the integration of the health care system in the approach to drug users treatment.

In Europe most studies were ad hoc studies, in which researchers were directly involved and responsible for data collection. Except in Spain, they were finite in time, so very little information on ER data has been gathered for a long period, and thus is not available in an ongoing basis.

One of the methods used, retrospective data collection has to rely on information gathered in the clinical and administrative records, that some times may be incomplete or of doubtful validity as it has been pointed out in papers reviewed. This is specially important for case definition as the information needed to ascertain case meeting criteria may be difficult to find in clinical records completed for other purposes.

Prospective data collection can only be collected for ad hoc studies in a relative short period of time as it implies a 24 hours presence of interviewers at the ER to collect the information while the patient is visited, thus are very expensive.

Systematic data collection needs to have a precise definition of which cases are to be included, it will depend on the aim of the project, as well as some other characteristics related to geographical and temporal coverage.

Although description of ER sub-population of drug users may be an important source of knowledge of those drug users who have medical

problems, it is important to remember that it is also biased as not all drug users are equally susceptible to ask for help at an ER.

To have reliable information on trends it is very important that data within a specific indicator, in this case ER data, is being collected in a comparable way along time.

With a systematic data collection it can be possible to monitor whether new patterns in the drug abuse are taking place, if all information needed to ascertain the changing pattern is being collected (i.e., route of administration).

Monitoring new substances may be somehow easier if patients are willing to mention the drug consumed. Usually new substances will show up with intoxication related problems, thus ER data is very important.

If there is a partial coverage it would be necessary to know if any changes in referral patterns had taken place during the study period. Also overall policy with mobile services (i.e., ambulance units) may affect the number of patients that end up in an hospital ER.

It is important to take into account that trends of drug-related non-fatal emergencies may be influenced by increased prevalence of use, increased dosages, potency or frequency of use, also by the use of more dangerous routes of administration, or combination of several drugs and the ageing of drug users. Health services organisation may also influence the number of drug-related cases seen at ER.

Possibility of an European indicator.

An indicator of drug use based on ER data in the EU has to be based on a systematic data collection, it can not rely on ad hoc studies set up by researchers at their own initiative, as it would be difficult to obtain comparable data between countries. This would be a difficult task. The evidence of drug involvement in ER clinical records is generally light. Even in acute reactions it is not possible to have systematically pharmacological evidence of the type of drugs. Thus an European system should not demand for hard evidence of drug involvement. Physician's opinion after clinical evaluation and treatment, or patient's statement should be enough. It is also necessary to take into account that practices between and within countries may differ (completeness of ascertainment, coding of services and conditions, etc.).

A systematic data collection of non-fatal emergencies at an European level can give information for some purposes, but an ER indicator at European level that intends to fulfil all possible objectives for this type of information would be cumbersome and would require a very big budget. Alternative designs can be considered to fulfil particular objectives, as far as these objectives are clearly defined. These alternative designs can imply some form of sampling strategy, mainly: 1) representative, if possible random, sample or 2) targeted non representative sample.

Sampling strategies can consider several dimensions; geographical, hospital/facilities, time, type of problem, type of cases (gender, age...). To decide over the characteristics of the sampling strategy it will be necessary to have a relatively good previous knowledge of the possible prevalence, distribution and characteristics of the phenomena.

A strategy that aims at a representative (eventually random) sample of areas/hospitals/days will have the assumption that the information obtained will give an adequate image of the overall picture. The validity of the information will depend on the size and design of the sample. As in any sample, more prevalent phenomena and those with a more uniform distribution will be better represented, thus estimation of their prevalence will be more valid.

If the objective is to confirm the existence (or not) of certain unusual phenomena (for instance new trends, new substances, new -serious-health problems) and describe their basic characteristics a targeted non-representative sample strategy may be useful. Information gathered with such a sample would need to be analysed within its wider context, not to cause misunderstanding.

1.- INTRODUCTION

Among different Health Services that consumers of illicit drugs may contact when they have health related problems, Emergency Rooms (ER) would be those contacted when facing acute medical problems, directly related or not to their drug use.

The European Monitoring Centre for Drugs and Drug Abuse (EMCDDA) work programme in epidemiology is willing to widen its scope on health consequences of drug use. Within the purpose of the present working program on early warning systems for identification of health problems linked to the use of new substances or new patterns of use EMCDDA was interested in exploring what work has been done in the European Union of the indirect indicator of drug use: Emergency Room (ER) drug-related non-fatal episodes. To reach this purpose a review and synthesis of scientific literature was contracted.

Emergency room drug-related episodes are known to be the subject of different studies in several cities (London, Barcelona) and of some drug use information systems (USA, Spain). However some cities or regions within a country could have started initiatives to promote the study of health and social facilities other than treatment centres, among such facilities ER and ambulance services could be included. The purpose of such initiatives would be to know better the drug phenomenon locally and may not be available through scientific literature. To include such studies was in the aim of the present review.

The study of drug-related emergencies started in the US, in 1972 as an indicator within the Drug Abuse Warning Network (DAWN). The ER indicator collects information on patients seeking hospital emergency department treatment related to their use of an illegal drug or the non-medical use of a legal drug. The coverage of the system has changed over time and at present it is designed to obtain a US representative figure of drug-related emergencies in the coterminous United States. In a given episode (emergency) several drugs may be involved and they are described as "mentions". DAWN, besides drug-related emergencies,

collects data on drug-related deaths from a non-random sample of medical examiners. Several studies have been published with DAWN ER data, and some of them will be reviewed in the present study. It has been said that DAWN ER data may be useful in assessing health hazard associated with drug abuse and in monitoring drug abuse patterns and trends.

In the USA there is also information on ER data through the National Hospital Ambulatory Medical Care Survey (NHAMCS), which includes Emergency Departments, with a special form to collect information about patients visits (Nelson, 94).

In Europe the study of drug-related emergencies started, as far as we know, with a survey of all London hospitals during July 1975 (Ghodse, 1977). This survey studied all drug-related emergencies and found that more than a half of drug-dependent patients seen had not been notified to the Home Office (usual source for determining the magnitude of the problem). Several other studies were carried out in London ER during the 80's and found that ER data was a useful source for monitoring changing patterns of drug abuse (Ghodse, 1981, 86 and 87).

In Barcelona, monitoring of drug-related emergencies started later (1979) (Camí, 1984) and has been the source of several studies on drug dependence (Domingo, 1991). In Spain a national level information system on opiates and cocaine abuse started in 1987 (SEIT), it includes three indirect indicators: treatment demands, drug-related emergencies and drug-related deaths. Number of drug-related emergencies is an indicator that has suffered from lack of stability in the coverage since its early implementation. However it has been possible to describe characteristics of users seeking help at ER and to relate them to other indicators within the State Information System on Drug Abuse (SEIT). Also it was possible to show the high impact of heroin related problems in contrast with relative low cocaine related problems. Recently, after widening the scope of drugs, it stressed the importance of heroine and cocaine in relation to other drugs of abuse and an increase of crack use.

An initiative to monitor drug-related emergencies at a pan-European level was set up within the Pompidou Group. Two pilot studies were carried out to assess the feasibility to implement a common indicator in

different European cities. A description of this initiative is done within the present review.

The aim of this report was to provide a detailed review of epidemiological studies on drug-related emergencies implemented recently (10 years) in the European Union, and to synthesise information generated by all of them in order to provide some clues for an early warning system network. This was achieved with a systematic review of scientific and grey literature from European countries and a selection of papers related to DAWN.

2.- METHOD

It was necessary to look for all published materials from the EU Member States and others concerning epidemiological aspects of drug-related non-fatal emergencies (The search). With information gathered through the search a selection of works was needed to compile a database with all studies that could contribute to the analysis of drug-related emergencies as an epidemiological tool and as an element in an early warning system.

To search for drug-related non-fatal emergencies in the literature some facts need to be clear from the start. We were mainly interested in drugs abused for their psychic effects or dependence, so we needed to make some decisions in relation to: suicides, general intoxication, alcohol, and pharmaceutical drugs. We also decided that only those studies with the source of patients in a hospital ER or an ambulance service would be taken into account. Beside general hospitals, ER in psychiatric hospitals would also be considered.

2.1.- The search.

To locate scientific literature published by the European Union Member States the strategy involved: 1) a search through different bibliography databases and 2) contact with key persons in different Member States and with focal point REITOX contacts.

2.1.1.- Bibliography databases.

The search through different bibliography databases included years 1987 to 1998. Some additional years (1982-1986) were covered from one of them (Medline by CD-Rom)

The strategy to select articles from Medline is shown in Annex 1 and included the following **key words**:

- emergency room/service/ward o emergencies
- substance abuse/dependence, o narcotic dependence/heroin dependence

- epidemiology
- overdose
- withdrawal
- prevalence
- information systems,
- risk factor
- new substance
- synthetic drugs

For recent Medline outputs, the National Library of Medicine was explored. Other databases searched at the National Library were: HealthStar and AIDSLINE. The Cochrane Library was also approached to look for randomised controlled trials.

Also the “Instituto de Documentación e Información” (INDID) from Madrid was consulted from Internet, and some papers from the “Índice Médico Español” (IME) were obtained. The key word strategy employed was more relaxed, as that system didn’t allow complexities.

The Institute for the Study of Drug Dependence (ISDD) in London was contacted through the focal point REITOX member. The institute provided a search following the instruction of our interest: drug-related non-fatal emergencies.

TOXIBASE (Réseau National de Documentation sur les Pharmacodépendences) in Lyon was also approached, and we were able to consult their database through Internet.

2.1.2.- Contact with key persons.

Persons that had worked with drug-related emergencies from different countries of the European Union were approached with a letter to ask for scientific literature or internal reports that could be of interest for the present study. They are listed in Annex 2.

Focal points from REITOX were also approached as well as Michael Stauffacher responsible for the Pompidou Group in Strasbourg to ask for the report of the pilot studies on drug-related emergencies done in

several cities in Europe.

Finally Janet Greenblatt from the Substance Abuse and Mental Health Services Administration (SAMHSA) the person responsible for DAWN in the USA was also approached.

2.2.- Compile a database

To compile a database, papers of the above mentioned search were selected if:

They referred to non-pharmaceutical drugs or were pharmaceutical drugs known to be abused,
The study subjects had been selected because they consumed drugs or they presented with a drug-induced clinical problem,
The emergency presented at a general or psychiatric hospital or ambulance service,
Analysis of drug-related emergencies with other indicators of drugs of abuse was done,
Intoxicated suspected non-pharmaceutical drugs,
Description of complications in drug consumers seen at ER was done,
ER data was used for more comprehensive analysis,
New drugs were pointed out,
DAWN, including prescription drugs misuse,
Description of markers of severity was done,
Other studies included: treatment, prevention,...

They were not selected if:

- Primary selection of patients was: suicide, HIV infection, hepatitis, violence, or body packers, alcohol (only one study is included).
- Management of patients in the ER was the only topic.
- Specific treatment procedures were presented for complications of drug abuse.

Papers from other countries.-

The main focus has been studies done in Europe, however relevant papers from other countries, mainly those related to DAWN in USA have also been selected. Some papers from other countries (Australia, Mexico, etc) were reviewed but only one from Australia has been included in the selection.

In the review, only papers and works in English, French, Italian or Spanish are included. Works in other languages are included if they have a summary in any of these languages.

2.3.- Analysis

When all papers and publications were compiled they were analysed and the information obtained synthesised in two main aspects: methods of data collection and different applications of analysed studies. A summary of main studies in European countries, with special mention of Pompidou pilot study and a brief description of DAWN, the USA system is also provided.

3.- RESULTS

From nearly 300 references obtained through Medline, 76 were selected and a further 44 were added from other databases, including papers sent by key persons approached. Some of the references notified or sent by key persons had already been found from selected databases. The new references were mainly either grey literature or had been published in journals not listed on Medline. Also a few of them had escaped the strict strategy followed for the Medline search. They are summarised in table 1.

The papers selected come from different backgrounds. They are either research works with patients seen at ER, clinical epidemiology studies or epidemiology studies from (sometimes large) databases to describe population with drug-related problems. In countries where there is systematic data collection from ER, information from this indicator is related to other indicators of drug use to achieve a more comprehensive picture.

3.1.- Methods of data collection.

The methods for collection of data depend on the objectives of the study. Most of the papers analysing data report ad hoc studies for which the correct method was decided in the study design. Some other papers report on information gathered through systematic data collection as an information system had been set in that area for whatever reason.

Selected papers have applied either a retrospective approach, going back to the ER records, or a prospective / on going approach by interviewing the patient or collecting the clinical information when it was produced. Some papers include case series which, if not stated, it is difficult to know what type of approach was used. Some other studies, according to their objective, used more complex methods (i.e. case control, follow-up studies and randomised control trials), that could be included in the prospective/on going approach. Validity studies

combined retrospective collection of data with information gathered prospectively.

However, it is not always possible to know from published information which was the method followed. From some of the papers we only could review abstracts, where it is even less common to find this information.

3.1.1.- Retrospective approach

The collection of data is done reviewing clinical records some time after the actual emergency settled. Systematic data collection is mostly based in this type of approach. Ad hoc studies can also be implemented following such a retrospective approach, according to the aim of the study.

A retrospective review of ER records can be done in different ways depending the time since the emergency occurred and the person who extracts the information.

A retrospective review needs to rely on the information that had been gathered in the clinical record. This is a limitation that needs to be remembered as usually clinical histories in ER are short and focused on what is interpreted as the casualty's main problem. This may be a problem for case definition as with data already collected it is sometimes difficult to be precise with case meeting criteria. If time elapsed between the emergency and data collection is not large, some information can be traced back by inquiry to the persons who were in charge of the case. This can be relevant if the extracting protocol is large and detailed.

The advantage of this method of data collection is that it can be done in a convenient scheduled time, not needing a 24 hour presence at the institution.

The retrospective collection can be done by a person from the same institution, specially designed/trained to do so or by someone going for this purpose to the ER. If the person is from the same institution should have specified time to look for the data. This leads to another concept. It refers to whether the system is based on an active collection of the

data or gathering of information is being done by “passive” notification to a central or reference unit. “Passive” notifications would be those that physicians are supposed to do to a central office in accordance to some law or health related regulation. Passive notifications are less reliable, specially in ER because professionals usually have very hard job and to notify is an extra work (Ghodse, 1977).

3.1.2.- Prospective.

The information is meant to be gathered prospectively when it is being collected forwards, on patients presenting after a point in time when the study was planned. It doesn't mean that information generated by a patient included in the study is being sought after a period (follow-up). Information is collected when it is produced, along with the medical care provided. In some studies a complete protocol, different from the clinical data was collected, usually by interviewing the patient, while he/she was present in the ward. Criteria to be considered a case can be screened while the patient is present.

3.1.3.- Systematic data collection.

Information gathered through **systematic data collection** is mainly produced through a retrospective approach. It needs to review clinical records and identify those of patients who fulfil characteristics for selection. Subsequently data is collected from each of them. Information has to be looked for at the clinical records, reviewed systematically. It is important not to rely on passive notifications.

When a systematic data collection is implemented it may be difficult to assess whether the casualty problem is a consequence of drug use. This can be even worse if indirect consequences are to be monitored. That is one of the reasons why it has been said that overdoses would be the important drug-related problem to be monitored in a systematic data collection. It is easier to identify them and to be confident they are drug-related. This has been the case of the Pompidou Group pilot study which only includes acute adverse reactions to drugs, the most important one being overdose. Withdrawal cases would not be included within acute adverse reactions as their presence at ER can be very

sensitive to health care system provided, and sometime it is interpreted as drug seeking behaviour.

Problems with different data collection methods	
Retrospective	Prospective
<ul style="list-style-type: none"> - expensive - validity of clinical records - not reliable if passive notification 	<ul style="list-style-type: none"> - very expensive - need to standardise different persons criteria

Other characteristics to take into account for systematic data collection are time coverage (continuous or periodic) and geographical coverage (all hospitals/some of them/a representative sample).

The advantage of partial time coverage is that it diminishes costs. However it can have some disadvantages, specially in relation to some objectives: if an early warning system is based on partial time coverage it can loose the beginning of the change. A disadvantage related to all objectives is that several studies in this review have pointed out a circadian and circannual pattern in drug-related emergencies.

In relation to geographic coverage, it seems necessary that most important hospitals of a studied area are covered to account for different referral patterns over time. If it is a very wide area (i.e., country), a representative sample can be considered. This is the case of DAWN in the US; like this they are able to estimate a population rate of drug-related ER visits.

If a representative sample is difficult to be obtained it is important that a given selection of ER is maintained over time. To evaluate trends ad hoc studies can be implemented to assess changes in referral patterns over time.

It is important to take into account ambulance emergency units if they exist. They can be monitored or not, but changes in their patients' management can affect seriously the number of ER visits for overdose.

3.2.- Applications of non-fatal emergencies

Papers analysed within this project include studies done taking advantage of systematic data collection of ER visits in the United States and also in Spain. Also other papers rely on ad hoc studies with specific objectives. Their applications have been described below and are summarised in table 1.

- A. A source to **characterise a possibly different sub-population of drug users**. Some authors pointed out that ER may be a primary source of referral for drug users, specially the youngest (Dunlop, 85). Clients of emergency room services may be different from those asking for treatment or detected elsewhere. Many papers described ER clients characteristics, and for some of them this was the main objective, non including nor comparing data from other sources, though giving the opportunity to others to do so, if data was available (Pedrique, 87; Stone, 89; Ghali, 89; Makower, 92; San Marco, 93; Alvarez, 93; Sbeiti, 95). Some local studies where data from other health sources was available did compare it either in the results or within the discussion section (O'Connor, 86; Domingo, 91; Lahoz, 91; Lang, 93; Schulz-Schaeffer, 93a & b; Perez, 99b). One of the studies describes socio-economic geographical distribution of drug-related emergencies in a city (Domingo-S, 1993). Some other studies describe characteristics of illegal drug users within a wider study of all drugs intoxication seen at that ER (O'Connor, 86; Barraca, 91; Dorado, 92; Cabo Valle, 93). Studies describing drug users characteristics offered ER the possibility to know better the population served (Sbeiti, 95). Some other studies describe patients presenting with an overdose (Lahnsteiner, 97).
- B. An indicator of **drug use trends**. Quite a few studies presented results offering information on the evolution of the number of patients seen at different agencies, among which ER data was included. Most of them are from the USA, describing the situation at different cities (MMWR, 95). One paper from Dublin (Corrigan, 86) also compares data from different data sources over time, and one paper from Barcelona compared information gathered at one ER over 11 years with trends from mortality data available for the city (Domingo, 1991). Also few papers describe trends provided only by the ER data, some were specific for a drug (PCP)(Ahmad, 87), and others compared two or more cross-sectional data (Ghodse, 86; Lahoz, 91; Hutchinson, 95). DAWN reports provide trend data for

different drugs from the ER indicator (Colliver, 91) and there is one paper offering results for 1989-1990 (Kopstein, 92).

- C. **To identify and monitor health consequences of drug use.** Many of the studies that describe the population of drug users also describe the reason for attendance to the ER of patients included in the study (Stone, 89), but description of health problems was the main objective of several papers (Stone, 90; Quintans, 95). Some of them are ad hoc studies specially from the US and describe, with a large number of patients, health problems associated to specific drugs (mainly cocaine and crack)(Lowenstein, 87; Derlet, 89; Brody, 90; Rich, 91; Hollander, 94). Other studies with case series or case reports from Europe have also been included as they were describing problems that drug users presented when asking help at the ER (Pascual, 89; Rollan, 89; Vicens, 90; García, 92 a, b & c; Evans, 93; Hall 96; García, 96; Nuytten, 98). One paper from Barcelona (Spain), presents results of HIV infection prevalence among drug users who were visited in an ER (Perez, 99a). Some of them are also related to the description of problems that new substances or new patterns of use may induce. See points D and E. Among them the study by Abramson et al, about the association of smoking crack with perforated gastropyloric ulcer, with a case-case design is very interesting (Abramson, 91). In Europe many studies have been devoted to study heroin overdose. See point G.
- D. **A source with potential utility for detecting and monitoring new patterns on drug use.** Only four studies reporting new patterns of drug use have been identified, three of them were from the USA. The only one in Europe is the study from an in depth analysis of the ER indicator in some cities in Spain, that identified health problems related to crack abuse (Barrio, 1998). In cities where crack is being used the proportion of emergencies attributed to cocaine/crack was higher. In the US, one study reports the emergence of LSD among the young (Schwartz, 95). Another study (DeWeese, 1993) analyses data from different sources for a city, and finds that drug use patterns for that city differ from other areas in the US (increasing use of heroin). Lastly, analysis of ER DAWN data allowed to point out an increase in metamphetamine use in the period 1991-94 (MMWR, 1995).

- E. A source with potential utility for **detecting abuse of new substances, especially new synthetic drugs**. Eight publications containing case series reports of patients with health problems (mainly intoxications) related to the use of different substances have been identified. The new substances that have been reported are: dexametorphan (Nordt, 98) and gammahydroxibutiric acid (Li, 98) in the US, gammahydroxibutiric acid (Ryan, 97), MDMA/ecstasy (Singarajah, 92; Roberts, 94; Wake, 95), eve (Tehan, 93), and khat (McLaren, 87) in the UK. Other three publications can be considered under this application, they offered results after retrospective evaluations of patients seen at ER, where use of new substances was identified: heroin and cocaine in the early eighties in Barcelona (Camí, 84), amphetamines in Hawaii (Szuster, 90), and design drugs, hallucinogens and amphetamines in three Spanish cities (Rodriguez Arenas, 97).
- F. A **capture source to estimate prevalence**. Few prevalence studies have included, so far, data from ER. Only two studies in Barcelona and one in Navarra, all in Spain. One of the Barcelona studies analysed emergencies from different time periods as successive captures, as well as with other indicators (treatment, mortality) as different “captures” (Domingo-Salvany, 95). The other Barcelona study included emergencies as a capture source, together with treatment and preventive prison data (Domingo-Salvany, 98). The study from Navarra applied the case-finding method to ascertain prevalence, and psychiatric ER were one of the studied sources (Urtiaga, 93).
- G. To **assess risks factors for some serious consequences of drug use** (i.e., fatal overdose). We only identified one study, being done with patients at the ER, that tried to ascertain risk factors for a fatal overdose (Gutierrez-Cebollada, 94). Many other studies describe overdose emergencies (Bertol, 97), mainly opiate overdose (Kesler, 91; Seidler, 96b), and evaluate the role of early treatment, usually in an ambulance unit, to prevent fatal overdoses (Italy, Germany, Austria and Norway)(Verster, 97; Testa, 90; Schulz-Schaeffer, 93a; Zenker HJ, 93; Seidler, 96a; Skulber, 93). Also in Australia there was a similar study (Bammer, 95), and in Italy they have been discussing

further whether to learn opiate users how to use Naloxone® in an overdose emergency (Merlo, 95). The project in Germany includes looking for risk factors for fatal overdose (Schulz-Schaeffer, 95), but papers reviewed not include results about this subject. Larger reports in German could not be reviewed in detail (Arnold, 97).

- H. **To detect problems that DU may have.** Some papers focus on health problems that drug users may have more frequently than other persons (i.e., latent syphilis (Ernst, 93), asthma (Osborn, 97), burns in aerodigestive tract (Meleca, 97)), and also some behavioural problems that may interfere with treatment (i.e., leave against medical advise: Engstrom, 82; Zenker C, 93; Koppel, 96). Several papers either in the US and in Europe describe studies based on ER patients physiological changes in relation to the use of drugs (i.e., acid-base abnormalities, enzymatic changes)(Stevens, 94; Hoffman, 92; Welch, 91; Brody, 90b; Zele, 92; Counselman, 97).
- I. **Prevention further problems.** In Germany a project based on quantitative and qualitative data from patients with an overdose, developed a preventive strategy for opiate consumers (Zenker, C 93; Schulz-Schaeffer, 93a). Also in Italy several papers report on preventive work that can be done with patients seen in ambulance emergency units (Bertini, 92). In Vienna, following suggestions of studies with drug overdoses, a counselling unit has been created to help drug users after ER contacts (Seidler, 96a). Two randomised controlled trials were implemented (Batel, 95; Smereck, 92) to assess effectiveness of a letter to promote outpatient treatment for alcoholics, or counselling to reduce unsafe practices among IV users.
- J. **Burden of drug-related problems to ER load.** Some papers describe emergencies in patients with drug abuse and discuss the problem that these patients may entail to workers at ER (Dunlop, 85). Some other studies are more interested in the workload that drug users entail to the ER (Makower, 92). Also some papers study whether there is some time pattern in the arrival of drug users to ER (Morris, 87; Mari, 92; Schulz-Schaeffer, 93b; Manfredini, 94; Rossi, 97).
- K. **To ascertain validity of information** on drugs consumed and other data in clinical records. Some papers present results analysing

validity of drugs that patients report to have consumed versus clinical interpretation and toxicology performed (Brookoff, 93; Claasen, 97). Validity of data collected in clinical records has also been analysed and subnotification problems were related to administrative reasons (records missing from the files) and to less severe patterns of drug use (Domingo-Salvany, 94; Pérez, 96).

- L. **To monitor how prescribed drugs influence ER attendance for drug problems.** In the US, DAWN ER data has been used to ascertain whether physician prescribing practices or pharmaceutical composition of drugs influence drug-related emergencies (Porpora, 86; Baum, 87; Davis, 91).
- M. **Other purposes.** ER have been the place to capture drug users for other studies (i.e., mortality, randomised control trials)(Ortí, 96; Hollander, 95; Moscovitz, 93). Patients in ER have also been studied to assess prevalence of drug use in the general population (Nogué, 89; Belzunegui 90; Pérez, 95).

3.3.- What's on in Europe

From this literature review we observed that most of the papers are from ad hoc studies, but some of them report on studies that involve a wider project, either an information system on drugs (Spain), a local interest on ER drug problems (Amsterdam, Austria, Italy, Scotland), or a more health policy oriented project (Germany).

In this section we give a summary of what is available regarding drug-related emergencies in those countries as well as a summary of DAWN.

3.3.1.- Austria

In Vienna, there is a group of professionals lead by Dan Seidler, from the Allgemeines Krankenhaus Hospital, that has studied the problem of drug overdose in that city (Problematik der opiat-überdosierung in der Bundeshauptstadt Wien - epidemiologische und notfallmedizinische aspekte).

The project included the study of overdoses attended by ambulance emergency units, throughout the city (Seidler, 96b). Cases seen in different hospitals were also analysed (Seidler, 96a). This research covered four months in late 1993.

One of the aims of the research was to acquire knowledge to help to define areas of interest and to drive further research and prevention. In fact the study helped to establish a new service for opiate users: a mobile drug-counselling unit, which aims to have a therapeutic contact with persons after an acute opiate overdose.

At present an evaluation of the mobile drug-counselling unit is under way and further studies on intensive care medicine and mortality for non-fatal emergencies due to opioids have been undertaken. Also studies on problematic opioid use prevalence and poisoning due to illicit and legal substances are taking place.

3.3.2.- Germany

In Germany, the Federal Ministry of Health started a programme in 1994 to evaluate new methods in counselling drug addicts after an overdose. At present there are 11 projects in 10 Federal States, including two in the new Federal States.

The aim of the project was the prevention of further drug emergencies by counselling and taking care of drug emergency patients after an emergency had taken place. This aim was expanded and now evaluates the model programme as an addiction assistance service.

The target group of the programme in the first phase (1994-96) included only drug emergency patients. Later, it was opened to all hospital patients, and included also alcohol dependent patients.

All illegal drug users clients of the model programme are described by an unified documentation system, compatible with usual systems in Germany (EBIS, DG Sucht) and some questions from the Addiction Severity Index (ASI) are included. Thus, this is a project that involves, among others, illegal drug user patients seen at ER.

Several quantitative and qualitative studies before the start of the model programme were carried out between 1991 and 1992 in several cities (Bremen, Berlin, Hamburg, Dortmund) within the "Drug Mortality and Drug Emergencies Study". Some of the papers from those studies have been analysed within this review.

3.3.3.- Holland - Amsterdam

Since the early eighties information on illegal drug overdoses being attended by the Amsterdam Central Ambulance Service is collected by the Amsterdam Public Health Department. Information (name, gender, age, place of accident and living, kind of illegal drug, and Hospital First-Aid station where patient was transferred to) is gathered from records kept by the Central Ambulance Service, and checked sporadically with information gathered in the Hospital First-Aid Station where the patient was transferred. This system includes non-fatal as well as fatal emergencies. Results of this survey are collected in annual reports written in Dutch. The information has been used to give information and advice to spectators how to act in case of overdose, and to follow trends of illegal drug use patterns.

3.3.4.- Italy

Several cities in Italy have studied overdose emergencies, specially in relation to immediate treatment delivered by ambulance services.

A survey on prevalence and risk factors was recently carried out in Rome amongst 847 heroin users, both in and out of treatment, with a very similar study design that was used in Sydney and London. More than half

of them have experienced at least one non-fatal overdose with a mean number of 3.1 overdoses. In most events there is someone else present, who in general would try to do something himself instead of calling for professional intervention. The majority supports the idea to distribute Naloxone.

Naloxone is available over the counter without a medical prescription in Italy. Several cities have started to distribute Naloxone among active heroin users (Turin, Bologna and Rome). In Rome, this distribution of Naloxone will be monitored and evaluated.

Finally, a cross-over study is currently being conducted among people who are helped by the emergency units in Rome. Both urine and hair samples are taken for metabolite analysis and a short questionnaire. Questions are asked about the circumstances leading to their overdose (cases) and on the before last time they used drugs and did not go into overdose (as controls).

3.3.5.- Scotland

In Scotland there have been several studies on drug-related emergencies, both in Glasgow and Edinburgh.

At present in the University of Glasgow, Joanne Neale is conducting a study of non-fatal overdose. The research includes quantitative as well as qualitative aspects of drug overdose, and is being conducted in Glasgow and Dundee.

Qualitative aspects include looking for knowledge on risk behaviour and attitudes of drug injectors towards overdose, as well as overdose reduction strategies. A total of 240 injectors will be interviewed, 120 in several ER after a non-fatal drug overdose and other 120 will be gathered through drug agencies, pharmacies and other service providers in both cities.

A review of ER admission cards for a two year period should provide quantitative information on the number and characteristics of drug users presenting at ER with non-fatal overdoses. However, this is proving to be difficult as required information is often not recorded in ER records.

3.3.6.- Spain

The State Information System on Drug Abuse: SEIT, comprises three indirect indicators of opiate and cocaine abuse: treatment admissions, emergencies and mortality. The system has been in operation since 1987, though not all indicators have evolved along the same path. In 1996 the system opened up to all psychoactive substances, and introduced in the ER protocol some other changes (inclusion of route of administration, resolution, identification code, etc.).

The drug-related emergencies indicator has been covering emergency wards of hospitals located mainly in big cities, but hospital coverage was not maintained throughout the whole period. Also, after opening up the system to any psychoactive substance, time coverage was reduced to one week per month, although some Regions continued with a whole month collection. The index week is the same for all participating hospitals and is selected randomly in the central unit.

An individual protocol is fulfilled for every case that has been identified in an active systematic retrospective revision of all emergency clinical records in a given hospital. A patient is considered a case if 15 to 49 years old, and the emergency was directly related to the non medical use of drugs (opiates, cocaine and other psychoactive substances) looking for psychic effects or because of drug dependence.

Inclusion criteria

- 1.- Emergency visit by a physician in a hospital emergency ward.
- 2.- Non medical use of psychoactive substances
- 3.- Acute emergency produced immediately after psychoactive substance use with a direct relation between consumption and the emergency.
- 4.- Person is aged 15 to 49 years, both inclusive.

Exclusion criteria

- 1.- Emergency in a drug consumer but not related to the psychoactive substance use.
- 2.- Non hospital emergencies.
- 3.- The person died before arriving to the emergency room.

- 4.- Emergencies with an indirect relation to substance use.
- 5.- Emergencies with chronic pathologies related to psychoactive substance use.
- 6.- Emergencies due to adverse reaction to medical drugs or accidental exposure to substances.
- 7.- Suicide attempts, except with opiates or cocaine.
- 8.- Emergencies for trauma or external causes.
- 9.- Emergencies only related to alcohol.
- 10.- Emergencies related to tobacco.
- 11.- Emergencies in persons aged under 15 years or over 49 years.

Some problems in the data collection process have been raised with this protocol. When the collection of data was done over the whole year any episode where opiate or cocaine use were mentioned was collected. Results of the ER indicator within SEIT (Spain) have been offered in their annual report. Also some papers provide analysis of ER data with other indicators.

3.3.7.- A pan-european project

: Pompidou Group, Non-fatal emergencies indicator. Second pilot study.

In their objective to obtain comparable information on the use of illicit drugs in different countries, the Pompidou Group promoted the development of a non-fatal emergencies indicator, taking advantage of the experience of the Spanish indicator. There were several meetings to standardise an indicator to be used at European level. A fundamental characteristic for the proposed indicator to be used in a pilot study was to reach consensus between participating cities and experts. The indicator would only consider acute adverse reactions to illicit drugs.

Two pilot studies have taken place to assess feasibility. The first one in five cities and the second one in 13 cities (Amsterdam, Athens, Barcelona, Brussels, Budapest, Dublin, Lyon, Malta, 2 cities from the Czech Republic, Varna and Vienna) among which the previous five. From nine variables collected, two variables were difficult to obtain in the first pilot, they were excluded and substituted by two new ones that were somehow related. Data collection lasted for one month in most of the cities.

Although in most of the cities the study seemed feasible, some problems did appear. These problems include difficulties with inclusion criteria (suicide attempts), incompleteness of clinical records, and time to complete data collection. One of the variables (previous visits to treatment centres) was lacking in a high percentage of cases. There were also problems of acceptance by professionals: some of them didn't understand the need to collect this information if it would not directly lead to changes in health care.

This study concluded that it was feasible to obtain data for the non-fatal emergencies indicator in different cities on the basis of the Pompidou Group data collection form, but made some recommendations for future studies. Among them, research is needed for the elaboration of a representative sample taking into account time variations in the number and characteristics of emergencies and on how to relate emergency cases with treatment centre clients.

3.3.8.- DAWN

The Drug Abuse Warning Network (DAWN) is a large-scale, ongoing drug abuse data collection system, that comprises information from two indicators of drug abuse: emergency room (ER) visits and mortality. The system is under the Substance Abuse and Mental Health Administration (SAMHSA) since 1993, previously (1980-1992) it was conducted by NIDA (National Institute of Drug Abuse).

Since the early 1970's, DAWN has collected information on patients seeking hospital emergency department treatment related to their use of an illegal drug or the non-medical use of a legal drug. Data are collected by trained reporters (nurses or other hospital personnel) who review medical charts for indications -noted by hospital staff who treated the patients—that drug use was the reason for the emergency department visit. To be included in DAWN, the person presenting to the ER must be aged 6 years and older and meet all four of the following criteria:

- The patient was treated in the hospital's ER;
- The patient's presenting problem(s) was induced by or related to drug use, regardless of when the drug ingestion occurred;

- The case involved the non-medical use of a legal drug or any use of an illegal drug;
- The patient's reason for taking the substance(s) included one of the following: (1) dependence, (2) suicide attempt or gesture, or (3) psychic effects.

Alcohol is reported to DAWN only when used in combination with another drug.

Hospitals eligible for DAWN are non-Federal, short-stay general hospitals that have a 24-hour emergency department. Since 1988, the DAWN ER data have been collected from a representative sample of these hospitals located throughout the coterminous United States, including 21 over-sampled metropolitan areas. The data from this sample are used to generate estimates of the total number of ER drug episodes and drug mentions in all such hospitals.

Further description is in Annex 3.

4.- DISCUSSION

4.1.- General.

This search has shown that many studies have been done in different cities and regions in the EU. In general studies have helped to draw a more complete picture of problem drug use impact (population affected, prevalence, health consequences, overload to ER, etc.), have described the evolution of the problem (time trends) and in several occasions have pointed out new problems. They have also shown a wide variety of health problems that drug users may have, driving them to seek help to ER. Few studies provided data on illegal drug use within a wider drug intoxication problem.

In the USA large number of patients with intoxication allowed to describe different medical problems that patients may have when intoxicated with a specific illegal drug.

Other studies have drawn attention to the integration of health care system in the approach to drug users treatment. ER studies have also been the starting point to build up a secondary prevention strategy for drug users, mainly with the study of overdose episodes. In several cities of different countries (Austria, Germany, Italy, Norway, UK) heroin overdose patients have been studied to evaluate overall treatment approach or specifically the role of ambulance units.

Studies of non-fatal drug-related emergencies have provided information about drug-related problems that may not be seen from other data sources, giving a wider picture of drug-related problems. At the same time they have offered the possibility to compare the population of drug users contacting ER to that of other health services. Several papers main focus was to give an overview of drug-related problems within a city, region or country, and ER data gave a valuable input to analyse the problem (Corrigan, 86; Johnson, 87; Parker, 88; Sánchez, 91; Harrison, 92; Barrio, 93; Rouse, 96). One of them pointed out the difficulties of using the definition of problem-drug use in research (Parker, 88). In the US where data on different indicators has been collected for long time,

trend data allowed to analyse relation of drug related problems with purity and price of heroin (Hyatt, 95), and also to relate frequency of ER mentions of a specific drug with prescription practices along time.

In Europe most studies were ad hoc studies, in which researchers were directly involved and responsible for data collection. Except in Spain, they were finite in time, so very little information on ER data has been gathered for a long period, and thus is not available in an ongoing basis.

In Spain, SEIT ER indicator has suffered several changes, not only geographical and of drug coverage. The need to have stable data over a defined geographical area at a feasible cost lead the organisers to plan a new strategy of data collection in which only direct acute non-fatal emergencies were recorded during one week per month.

4.2.- Methods.

Retrospective data collection has to rely on information gathered in the clinical and administrative records, that some times may be incomplete or of doubtful validity as it has been pointed out in papers reviewed. This is specially important for case definition as the information needed to ascertain case meeting criteria may be difficult to find in clinical records completed for other purposes. Probably there are slight differences in the characteristics of this problem amongst regions or countries and should be taken into account when planning an international study.

Prospective data collection can only be collected for ad hoc studies in a relative short period of time as it implies a 24 hours presence of a person at the ER to collect the information while the patient is visited. Reliability of information gathered from patients may also be poor when collected prospectively, depending on patients' wishes and expectations.

Systematic data collection needs to have a precise definition of which cases are to be included. Definition will depend on the aim of the project. If trying to assess the overload that drug problems entail to ER, probably it would be necessary to monitor all episodes in which drug use would have any role; thus collection would include direct and indirect consequences of drug use. It will be necessary to draw a line in the point

where to stop considering a problem as drug related (i.e., AIDS' related diseases in an injecting drug user). For other purposes where the definition may be narrower (i.e., monitoring trends) it may be difficult to determine whether the problem is a direct or indirect consequence of drug use. To restrict data collection to acute direct consequences (i.e.: overdoses) provides a more precise and clean definition, more readily understandable. It is also easier to collect, specially if one is not to strict on the evidence of use. Another possibility is to include all those patients that have been described or diagnosed as drug users.

Somewhat in between lies DAWN definition of drug-related episodes where emergencies are recorded if the doctor or the patient relates his/her problem to drug use; if several drugs are mentioned, all of them are collected under the same episode, but are considered as different mentions.

4.3.- Applications

Although description of ER sub-population of drug users (A, J) may be an important source of knowledge of those drug users who have medical problems, it is important to remember that it is also biased as not all drug users are equally susceptible to ask for help at an ER. The probability of contact may depend on multiple factors (i.e., drug use patterns, health care services availability and policy), and the detection of a drug user by health personnel will also depend on some characteristics of the drug user related to stigmatisation (i.e., ivdu, social status).

To have reliable information on trends (B, L) it is very important that data within a specific indicator, in this case ER data, is being collected in a comparable way along time. It would also be important to take into account from what institutions data is searched and how representative those institutions are from the area studied. If there is a partial geographical coverage it would be necessary to know if any changes in referral patterns had taken place during the study period. Also overall policy with mobile services (i.e., ambulance units) may affect the number of patients that end up in an hospital ER. In DAWN's ER indicator an update of the ER wards participating is carried out every year to maintain the representativeness of ER data all over the US.

Several studies allowed to describe health consequences of specific drugs of abuse (C, H, J). In some instances case control studies have been necessary to ascertain whether a specific drug could influence the manifestation of a health problem (i.e., asthma, epilepsy). By the other hand it may be difficult sometimes to determine whether a specific problem is caused by the drug consumed.

With a systematic data collection it can be possible to monitor whether new patterns (D) in the drug abuse are taking place, if all information needed to ascertain the changing pattern is being collected (i.e., route of administration).

Monitoring new substances (E) may be somehow easier if patients are willing to mention the drug consumed. Usually new substances will show up with intoxication related problems, thus ER data is very important. Chronic complaints will probably appear in other health services premises.

For capture-recapture applications (F) ER data is very valuable as it is able to gather those patients not willing to start a detoxification program, however the case definition problem may be difficult to deal with if estimation of prevalence needs to be very specific and different patterns of use are taking place.

ER data may be suitable for other purposes, even though it is a biased population. In fact several other applications were found (G, K, M). They require ad hoc studies.

It is important to take into account that trends of drug-related non-fatal emergencies may be influenced by increased prevalence of use, increased dosages, potency or frequency of use, also by the use of more dangerous routes of administration, or combination of several drugs and the ageing of drug users (Kopstein, 92). Health services organisation may also influence the number of drug-related cases seen at ER (Domingo, 91).

4.4.- Possibility of an European indicator.

An indicator of drug use based on ER data in the EU has to be based on a systematic data collection, it can not rely on ad hoc studies set up by researchers at their own initiative, as it would be difficult to obtain comparable data between countries. This would be a difficult task. The evidence of drug involvement in ER clinical records is generally light. Even in acute reactions it is not possible to have systematically pharmacological evidence of the type of drugs. Thus an European system should not demand for hard evidence of drug involvement. Physician's opinion after clinical evaluation and treatment, or patient's statement should be enough. It is also necessary to take into account that practices between and within countries may differ (completeness of ascertainment, coding of services and conditions, etc.).

A systematic data collection of non-fatal emergencies at an European level can give information for some purposes, among which the following applications above mentioned:

- A. to characterise a possibly different subpopulation of drug users,
- B. drug use trends,
- C. to identify and monitor health consequences of drug use,
- D. to detect and monitor new patterns on drug use, and
- E. to detect abuse of new substances.

But an ER indicator at European level that intends to fulfil all possible objectives for this type of information will be cumbersome. It would need to have a broad coverage (geographical and in terms of hospitals/facilities), to collect data on a continuous and systematic form, to collect information on a wide range of problems, and to collect as much information as possible of each case. Really, establishing such type of European indicator would be difficult and expensive, and it would be necessary a firm political decision, as to be reliable such a system would require a very big budget.

Alternative designs can be considered to fulfil particular objectives, as far as these objectives are clearly defined. Also the limits of the information have to be presented explicitly and understood. These alternative designs can imply some form of sampling strategy, mainly: 1) representative, if possible random, sample or 2) targeted non representative sample.

Sampling strategies can consider several dimensions; geographical, hospital/facilities, time, type of problem, type of cases (gender, age...). For instance if the age range is restricted to 15-49 years olds in hospital ER, the number of records to review would decrease considerably and for some objectives this is very sensible as it would be unlikely that something like ecstasy appears initially in older people. To decide over the characteristics of the sampling strategy it will be necessary to have a relatively good previous knowledge of the possible prevalence, distribution and characteristics of the phenomena.

A strategy that aims at a representative (eventually random) sample of areas/hospitals/days will have the assumption that the information obtained will give an adequate image of the overall picture. The validity of the information will depend on the size and design of the sample. As in any sample, more prevalent phenomena and those with a more uniform distribution will be better represented, thus estimation of their prevalence will be more valid.

If we want to estimate precisely the number of (i.e.: opiate) overdoses, or the total number of emergency episodes related to drug use, it would be necessary to cover a wide range of hospitals, with a complete time coverage. It may be sensible to include only those episodes where the patient related the emergency to drug use. The inclusion of all episodes where the physician wrote the patient was a drug user may be subject to health care practices difficult to describe.

If we want to monitor trends (and not precise numbers) of a frequent phenomena a smaller sample with partial time coverage would be enough. If partial time is selected, by including complete weeks variability within a week is avoided. It will be also important to cover all the year through, trying to avoid circannual rhythms. For this purpose it may also be enough to cover acute non-fatal episodes directly related to drug use (i.e., overdose).

To monitor new patterns or new drugs is the more interesting task from an early warning system point of view. Both DAWN and SEIT allowed to detect new patterns of use and the emergence of new drugs. It is difficult to say whether a partial time coverage will be as likely to detect changes. In relation to new substances the inclusion of only drug

acute directly related episodes may be enough as new drug problems probably will show up in an acute way, more chronic effects will last some time to appear.

If the objective is to confirm the existence (or not) of certain unusual phenomena (for instance new trends, new substances, new -serious-health problems) and describe their basic characteristics a targeted non-representative sample strategy may be useful. A selection of certain hospital/facilities, of certain cities, and eventually during certain time frames (i.e.: weekends), and certain age ranges may be appropriate. Precise estimation of prevalence cannot be an objective with this methodology and some previous idea of the nature of the phenomenon of interest would be required.

This ER information strategy isolated would not be appropriate. It may detect a number of unusual phenomena, and cause unnecessary alarms if information is not validated with other methodologies. It may make sense in a broader strategy for detecting and tracking new substances, including other methods and sources of information (i.e.: qualitative studies among drug users, law enforcement indicators...).