

# Cocaine-Related Health Emergencies in Europe: A Review of Sources of Information, Trends and Implications for Service Development

Guillermo Mena<sup>a, b</sup> Isabelle Giraudon<sup>a</sup> Elena Álvarez<sup>c</sup> John M. Corkery<sup>d</sup>  
João Matias<sup>a</sup> Kari Grasaasen<sup>e</sup> Noelia Llorens<sup>c</sup> Paul Griffiths<sup>a</sup> Julian Vicente<sup>a</sup>

<sup>a</sup>European Monitoring Centre for Drugs and Drug Addiction, Lisbon, Portugal; <sup>b</sup>Preventive Medicine and Epidemiology Unit, Barcelona Centre for International Health Research (CRESIB), Hospital Clínic, Universitat de Barcelona, Barcelona, <sup>c</sup>Spanish Observatory on Drugs, Government Delegation for the National Plan on Drugs, Ministry of Health, Social Services and Equality, Madrid, Spain; <sup>d</sup>School of Pharmacy, University of Hertfordshire, Hatfield, UK; <sup>e</sup>National Board of Health, Copenhagen, Denmark

## Key Words

Illegal drug use · Cocaine-related health consequences · Health emergency services

## Abstract

**Background:** Cocaine-related health consequences are difficult to observe. Data on drug users in health-emergency settings may be a useful source of information on consequences that are not visible via other information sources.

**Methods:** Thirty European countries submit an annual national report on the drug situation to the EMCDDA. All reports for the period 2007–2010 were analyzed, with particular attention given to auditing cocaine-related mentions. Analysis was also performed in order to identify sources and case definitions, assess coverage, audit cases and, where possible, to identify long-term trends. **Results:** Considerable heterogeneity existed between countries in their approach to recording drug-related emergencies, with only Spain and the Netherlands having established formal indicators. The highest annual numbers of cocaine-related episodes were reported by the UK (3,502), Spain (2,845) and the Netherlands (1,211). A considerable (2- to 3-fold) increase in the numbers of cocaine-related episodes has been reported

since the end of the 1990s in these countries; these increases peaked in Spain and England around 2007/08. **Conclusions:** The analysis reported here suggests the need to develop more standardized approaches to monitoring drug-related emergencies. It points to the potential value of developing effective referral links between the emergency and specialized drug services working with cocaine users.

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## Introduction

Cocaine use and seizures of cocaine have increased during the last decade in Europe, with cocaine now being the most-used illegal drug after cannabis. More than 14.5 million Europeans, or 4.3% of adults aged 15–64 have reportedly used cocaine at least once in their lifetime [1]. However, patterns of cocaine use in Europe vary considerably with a high prevalence in a restricted group in mainly Western European countries. During 2010, the highest prevalence of cocaine use among young males (15–34 years) was reported by Spain, Ireland, Italy and the UK, as well as in Denmark (16–34 years) [2].

The most common adverse health consequences associated with cocaine are cardiovascular and cerebrovascular disorders and neurological impairments, which may be associated with both acute and chronic cocaine use [2–6]. Regular cocaine use, independently of the route of administration, is also associated with accidents and with the transmission of infectious diseases (through unprotected sex) [7]. Recent concerns have also been raised regarding the association between cocaine use and violent crimes in the night-time economy [8]. There is also an increased mortality risk for cocaine users admitted for treatment, compared to the general population [3, 5, 9].

The health consequences of cocaine may be underestimated due to the often unspecific or chronic nature of the pathologies arising from long-term use and the difficulty in establishing causal links between an illness and the use of cocaine. Despite some limitations [10, 11], hospital emergency departments and other health emergency settings may be an important source of information on drug-related health consequences [12]. Even when classic indicators of drug use exist, such as mortality, prevalence estimates or treatment demand, some aspects of drug consumption can easily be missed. This can be a particular problem for stimulant drugs like cocaine. Information obtained from drug-related health emergencies could provide insight on new drugs, new patterns of use and health problems or consequences that may not be identified by other indicators. Furthermore, a closer link between the emergency departments and addiction services could help in guiding problematic cocaine users towards appropriate treatment at an earlier stage in the addiction process [10].

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) is the designated hub for drug-related information in the European Union. The EMCDDA collates annually drug-related information from 30 national drug monitoring centers (Reitox Network), including data and reports on the national drug situation. A section of these reports focuses on health consequences related to illegal drug use which includes data on illegal-drug-related problems including acute health problems from hospital emergency services, hospital wards and/or other settings.

These sources of information are mapped here and the number of cases with cocaine-related health problems reported in emergency settings in European countries during the period from 2007 to 2010 is analyzed. Longer-term data are presented where available. The nature and extent of cocaine-related health problems and their implications for prevention and monitoring are discussed.

## Methods

The National Reports of the 27 European Union member states and Croatia, Norway and Turkey, sent between 2008 and 2011 and covering 2007–2010 [13] were reviewed. Analysis was conducted on the number of illegal-drug-related episodes reported and of cocaine-related episodes in hospital emergency services, hospital wards and other emergency settings. Information from ad hoc studies, nonrepeated studies and other sources that only covered a specific time period were excluded. Sources, case definitions, coverage and settings are described below.

The fraction of illegal-drug-related episodes accounted for by cocaine was computed and the share of cocaine available in the last year (2009 or 2010) was compared to the average proportion of the 2 previous years, using a  $\chi^2$  test. Trends in the number of cocaine-related cases during the 2007–2010 period were also reviewed with analysis restricted to those countries that reported more than 50 cases related to cocaine use. Sufficient data for analyzing the numbers of cocaine-related episodes since 1999 were available for only 4 countries: Spain, Denmark and the Netherlands where the data source used is the EMCDDA National Reports, and England, where this data is supplemented with information from the Health Episode Statistics of the NHS Information Centre for Health and Social Care [14]. Where available, information on the gender and age distribution of the reported cocaine-related cases was also analyzed.

## Results

### *Sources of Information on Illegal-Drug-Related and Cocaine-Related Health Emergency Episodes*

Seventeen out of 30 countries (57%) reported information on illegal-drug-related episodes (table 1). Five countries reported cases from more than one data collection system, totalling 24 different sources. Thirteen of the 17 countries collected data from hospitals: 7 of them from emergency departments and 3 reported cases from toxicology departments or clinics. Four reported discharges from general hospitals after admission for poisoning by illegal drugs and another 3 after discharge from psychiatric hospitals. Five used non-hospital-based alternative data collection systems on health emergencies.

Data collection systems, settings and case definitions vary (table 1). The Netherlands collects information from emergency departments, but with a very specific case definition: people treated following an accident, a violent incident or self-mutilation related to drug use. Four countries report hospital discharges: Lithuania (cases registered at inpatient medical institutions), the UK (cases with poisoning by drugs or cases with mental and behavioral disorders due to drugs), the Netherlands (admission due to abuse or dependence) and Ireland (only nonfatal overdoses). Admissions or hospitalizations in psychiatric

**Table 1.** Sources of information reported in 2011 to the EMCDDA on illegal-drug-related problems at hospital emergency services, hospital wards and other settings in 17 European countries

Country	Case definition	Setting and source
Belgium	A. Calls for information requests	National Poison Information Centre
	B. Inpatient admissions with substance-related disorder	Psychiatric hospitals
Bulgaria	A. Persons demanding emergency medical aid	Clinic of Toxicology of the 'Pirogov' MHATEM
	B. Nonfatal drug-related emergencies due to acute poisoning	Emergency departments at hospitals
Czech Republic	Nonfatal intoxication with drugs	Hospital 'sentinel' system
Cyprus	Drug-related cases	Emergency departments (4 hospitals) <sup>3</sup>
Denmark	A. Cases admitted as a result of poisoning with illicit drugs	Hospital emergency departments (~90% treated in somatic emergency wards and 10% in psychiatric wards)
	B. Admissions with a drug-related primary or secondary diagnosis (comorbidity)	Psychiatric hospitals
Estonia	Cases who received first-aid for overdoses	Emergency Service Ambulance Service (Tallinn) <sup>2</sup>
Hungary	Cases treated for intoxication of illicit drugs or organic solvents	Department of Toxicology (1 hospital) <sup>2</sup>
Ireland	Nonfatal overdoses discharge	Hospitals
Latvia	Drug overdose cases discharge	Department of Toxicology (1 hospital) <sup>2</sup>
Lithuania	Inpatient drug-related cases	Medical institutions
Malta	Nonfatal overdoses data	Police Drug Squad records
The Netherlands	A. Drug-related incidents (routine indicator in the text)	Police, ambulance transportation services, hospitals and 2 organizations on first-aid at dance parties (6 regions) <sup>3</sup>
	B. Drug-related requests for emergency assistance	Central Post for Ambulance Transports <sup>2</sup>
	C. Cases with accident, violent incident or self-mutilation with mention of drug use	Hospital emergency departments <sup>1</sup>
	D. Information requests from physicians, health authorities and others on acute intoxications	National Poisons Information Centre (NVIC)
	E. Admissions due to cocaine abuse or dependence (primary or secondary diagnosis)	Hospitals
Romania	Nonfatal emergencies due to intoxication from illicit drugs	Emergency departments at hospitals
Slovenia	A. Inpatient admissions	Emergency medical department University Medical Centre in Ljubljana <sup>2</sup>
	B. Hospitalizations due to mental and behavioral disorders related to the use of psychoactive substances	Hospitals
Spain	Illegal-drug-related mentions in emergency departments	Hospital emergency departments
Sweden	Inpatient admissions for drug-related diagnosis	Health-care settings
UK	A. Inpatient discharges recording drug poisoning	Hospitals
	B. Inpatient discharges with mental and behavioral drug-related disorders	Hospitals

<sup>1</sup> Data are derived from a representative selection of hospitals and extrapolated to yield national estimates. Coverage is national, except for: <sup>2</sup> local and <sup>3</sup> some regions.

**Table 2.** Number of cases and trends in illegal-drug-related and cocaine-related episodes from collection systems that reported more than 50 cocaine-related cases in the 2011 National Report to the EMCDDA

Country (last reported year)	Case definition, setting and source	Illegal-drug-related cases, n/trend <sup>1</sup>	Cocaine-related cases, n/trend <sup>1</sup>	% of cocaine over illegal drug cases/trend <sup>3</sup>
Denmark (2010)	Cases admitted as a result of poisoning with illicit drugs at hospital emergency departments	1,868/↑16.7%	155/↑16.8%	8.3%/↔
Hungary (2010)	Cases treated for intoxication of illicit drugs or organic solvents at the department of toxicology of 1 hospital	1,962/↑10.8%	67/↑12.7%	3.4%/↔
Ireland (2009)	Nonfatal overdoses discharge at hospitals	4,172/↓16.1%	92/↓37.0%	2.2%/↔
The Netherlands (2010)	A. Drug-related incidents reported by the police, ambulance transportation services, hospitals and 2 organizations on first-aid at dance parties	2,852/↑11.5%	188/↓47.9%	6.6%/↑
	B. Drug-related requests for emergency assistance at the Central Post for Ambulance Transports	1,306/↑18.6%	130/↓10.8%	10.0%/↑
	C. Cases with accident, violent incident or self-mutilation with mention of drug use at hospital emergency departments	4,270 <sup>2</sup>	1,211 <sup>2</sup>	28.4%
	D. Information requests from physicians, health authorities and others on acute intoxications to the National Poisons Information Centre	1,243/↑4.7%	243/↓1.4%	19.5%/↔
	E. Clinical admissions in general hospitals due to cocaine abuse or dependence (primary or secondary diagnosis)	2,399/↑24.1%	756/↑17.1%	31.5%/↓
Spain (2009)	Illegal-drug-related mentions with direct relation to cocaine in emergency departments at hospitals	5,567/↓28.0%	2,845/↓36.2%	51.1%/↓
UK (2010)	A. Inpatient discharges recording poisoning by drugs at hospitals	30,618/↑1.5%	1,986/↓25.1%	6.5%/↓
	B. Inpatient discharges with mental and behavioral drug-related disorders at hospitals	22,271/↑5.0%	3,502/↓21.2%	15.7%/↓

<sup>1</sup> Trends were analyzed comparing the last number of cases reported with the average number of cases in the 2 previous years. In the Netherlands (A) illegal-drug trends and cocaine trends (A and B) were calculated by comparing only with the number of cases in the previous year.

<sup>2</sup> Average numbers over the 2005–2009 period.

<sup>3</sup> Trends in the share of cocaine-related over all illegal-drug-related cases were analyzed using the  $\chi^2$  test ( $p < 0.05$ ).

hospitals are collected by Belgium, Denmark and Slovenia. Most systems have national coverage but some are based on one center, or a sentinel network based on a selection of representative hospitals. Others have a multi-center level covering areas of different sizes (local, regional or multiregional). Two countries, Spain and the Netherlands, have developed a routine indicator that monitors illegal-drug-related emergencies prospectively. Spain has implemented an indicator on nonfatal overdoses and drug-related emergencies at hospitals. In the Netherlands, the monitoring system for drug-related emergencies started in 2009 in four regions (system ‘A’ of the Netherlands in tables 1 and 2). Cases are reported by the police, ambulance services, hospitals and two first-aid organizations working at ‘dance parties’. Furthermore, the

Central Post for Ambulance Transports (system ‘B’) reports the number of drug-related requests due to intoxication by illegal drugs every year.

#### *Cocaine-Related Episodes*

Cocaine-related episodes were reported by 11 of the 30 countries (43%) or three quarters of the countries that reported data on illegal-drugs-related visits. Based on the most recent national reports, the largest annual number of cocaine-related cases (2,845) were collected in Spain (mentions directly related to cocaine in emergency departments) and in the UK, with 1,986 inpatient discharges recording poisoning by cocaine and 3,502 inpatient discharges with mental and behavioral drug-related disorders (table 2). One of the Dutch data collection systems

reported cases of accidents, violent incidents or self-mutilation related to cocaine use at emergency departments (n = 1,211). The 4 remaining Dutch information sources reported: 243 calls for information requests from physicians, health authorities and others with acute intoxication (from the National Poisons Information Centre), 756 hospital admissions due to abuse or dependence (primary or secondary diagnoses), 188 incidents collected by the police, ambulance transportation services, hospitals and 2 organizations providing first-aid at dance parties (a formal indicator) and 130 cocaine-related requests for emergency assistance (from the Central Post for Ambulance Transports). Denmark collected 155 cases admitted to emergency departments as a result of cocaine poisoning. Six other countries also reported cases: Ireland (n = 92), Hungary (n = 67), Belgium (n = 18), Romania (n = 13), Slovenia (n = 12), and Lithuania (n = 14).

#### *Trends in Illegal-Drug-Related Episodes*

Most, but not all, countries showed increasing trends in illegal-drug-related episodes, when comparing the last year reported against the average of 2 previous years. In the Netherlands, four sources with available information showed an increasing trend. Increasing trends were also reported by Hungary, Denmark and the UK, which reported a higher number of inpatient discharges recording drug-poisoning at hospitals and discharges associated with mental and behavioral drug-related disorders. Only Ireland and Spain reported a decrease in the number of episodes from hospitals for directly drug-related mentions and overdose, respectively.

#### *Trends in Cocaine-Related Episodes*

Data show a long-term increase in cocaine-related episodes in Spain, England, the Netherlands and Denmark (fig. 1). The last 3 reported years show a decrease for most collection systems. However, between 2008 and 2010, Hungary, Denmark and the data collection of hospital admissions in the Netherlands showed an increase in the number of cocaine-related cases (table 2).

#### *Case Characteristics*

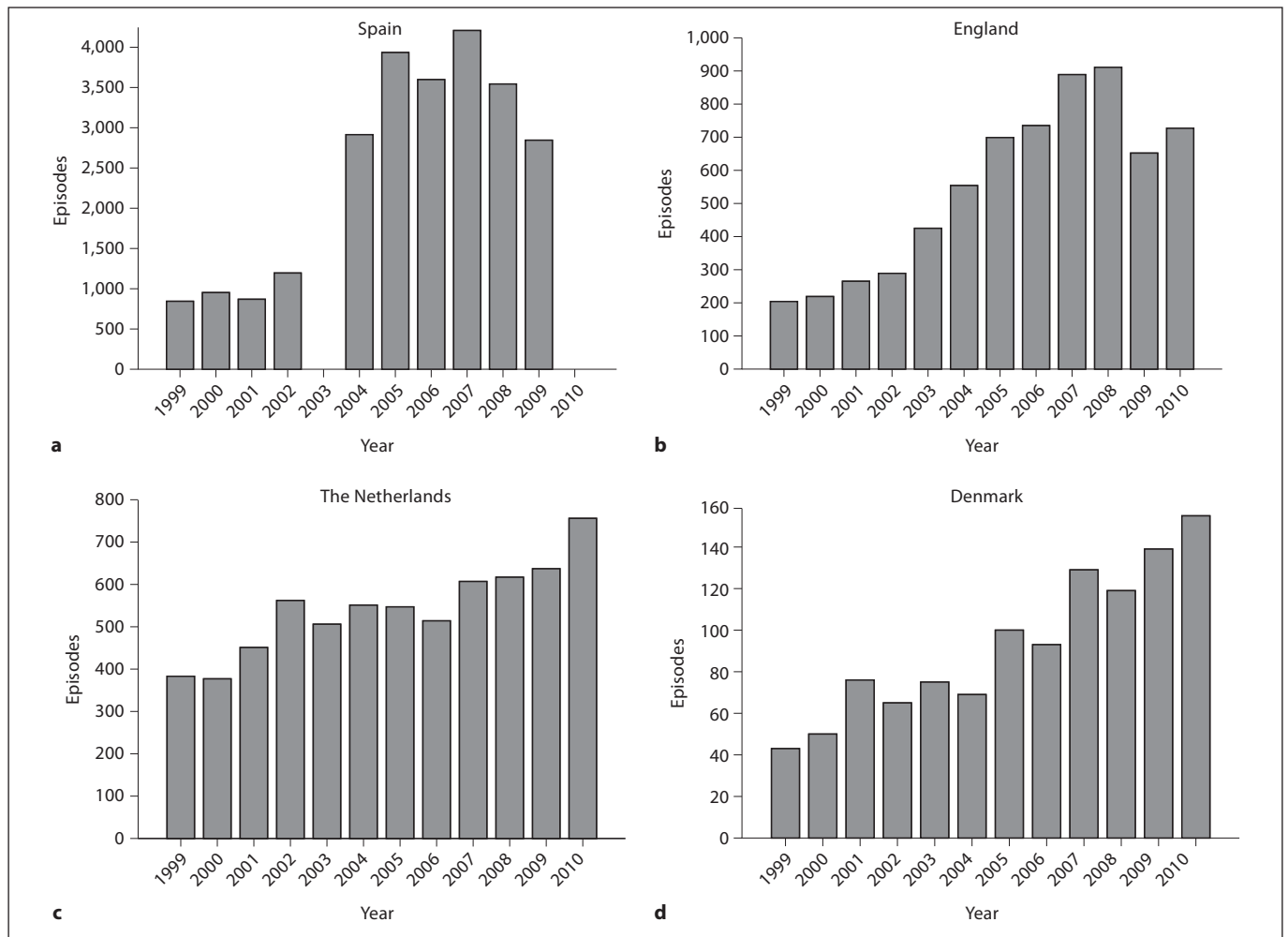
Information on age and sex was scarce. Overall, for both illegal-drug-related and cocaine-related episodes, most reported cases were males (gender ratio 3:1) with the exception of Ireland, where females accounted for 54% of all illegal-drug-related episodes in 2009 (2,269/4,202 cases). In Hungary, a 7% increase was observed in the number of female patients (614/1,692 cases in 2008 – gender ratio 2.8:1 compared to 851/1,962 cases

in 2010 – gender ratio 2.3:1). Amongst all drug-related recorded cases, the highest number of episodes was registered amongst young people (aged 15–29 years). In Denmark, 38% of intoxication with cocaine is among people over 30 years old. In Portugal, since 2005, the number of drug-related cases has been increasing, mainly in the over-30s age group. In Spain, the average age of reported cases has also been increasing in recent years, with an average age for cocaine-related cases of 33 years in 2009. In Ireland, the proportion of cases aged less than 25 years with illegal-drug-related problems fell in 2009. No information was reported on the severity or the clinical characteristics of the cases. Only the Netherlands reported that most intoxications associated with cocaine use were assessed as being of light (43%) or mild (44%) severity, in contrast with the high percentage of severe intoxications for opioids (33%) and GHB (31%).

#### **Discussion**

This review summarizes for the first time the data available on the number of cocaine-related episodes in health care settings of European countries. Most countries who are able to report information on illegal-drug emergencies reported some data related to cocaine-related health problems. Not surprisingly, most reports came from countries with a known high prevalence of drug use. Spain, the UK, the Netherlands, Denmark, Ireland and Hungary reported the largest numbers of episodes. All presented a decrease in the number of cases during the last 3 reported years (2007–2010), except Denmark and Hungary and one of the five Dutch systems. This occurred against a background of general increase, of 2- to 3-fold in cocaine-related emergency episodes in most countries since the end of the 1990s.

Part of the recent decline in cocaine-related admissions and emergencies, which is mirrored in data on cocaine-related deaths [1], may be related to a decline in cocaine purity and/or a shift to using alternative stimulants, including ‘legal highs’. The mean purity of powder cocaine seized by the police in England and Wales fell from 33% in 2007 to 24% in 2010; the purity of ‘Crack’ cocaine is reported to have fallen during the same period from 52 to 31% [15]. The use of powder cocaine amongst 16- to 59-year-olds in England and Wales fell from 3% in 2008/9 to 2% in 2010/11 [16]. It has been proposed that the fall in ecstasy and cocaine-related deaths in the UK since 2008 may be as a result of users switching to ‘legal highs’ with the suggestion that this may have had an unattend-



**Fig. 1.** Number of cocaine-related cases in hospital emergency departments and other settings in Spain, England, the Netherlands and Denmark for 1999–2010. **a** Spain: mentions of emergencies due to an acute reaction following the use of psychoactive substances with direct relation to cocaine, 1999–2009. Data for 2003 not available. Source: urgencias hospitalarias relacionadas con el consumo de drogas, Observatorio Español sobre Drogas, M.d.S.P.s.e.I., EMCDDA 2010 National Report from Spain. **b** England: cocaine-related health problems as primary diagnosis at hospital emergency settings, 1999–2010. Source: inpatient data. Primary diagnosis: 4 characters. The Health and Social Care Infor-

mation Centre, National Health Service, England. It includes individuals who are admitted from the Accident and Emergency Department. Patients who are discharged directly from the Accident and Emergency Department are not captured. **c** The Netherlands: clinical admissions in general hospitals due to cocaine abuse or dependence (primary or secondary diagnosis), 1999–2010. Source: National Drug Monitor. Trimbos Institute. Institute of Mental Health and Addiction, Utrecht, 2010. **d** Denmark: hospital contacts due to intoxications and poisonings caused by cocaine, 1999–2010. Source: The National Board of Health's National Patient Register, EMCDDA 2010 National Report from Denmark.

ed harm reduction effect [17]. Spain, however, reports a fall in the number of cocaine emergencies without any evidence of a switch to noncontrolled substances, suggesting that changes in the availability and purity of cocaine on the market, possibly together with other factors such as an increased perception of risks or the impact of preventive programs, could be sufficient to explain a reduction in emergency cases [18].

Information on prevalence is consistent with emergency data. Four out of 6 countries that reported the highest numbers of cocaine-related episodes in this review (the UK, Spain, Denmark and Ireland) have a prevalence of cocaine use in the young population above the European average [2].

The Drug Abuse Warning Network (DAWN) in the USA showed that among illegal drugs, cocaine was the

most frequent with a rate of 138 visits to hospital emergency departments per 100,000 population in 2009 (422,896 visits). Mentions of cocaine in emergency department visitors have decreased in the last 2 years, which is consistent with Europe. Comparing the 2009 rates to those of 2008, there was a 12% decrease, and versus 2007, this decrease was 24%.

Spain and the Netherlands (system 'A') have a systematic prospective and long-term data collection system more comparable with the DAWN in the USA [19]. Most of the other sources use retrospective data from clinical or administrative records. This information may be incomplete or of doubtful validity, as noted earlier [12]. Under-ascertainment of the cocaine-related cases is also likely [10, 20] and the numbers reported might therefore be an underestimate. Although the implementation of a coherent system for monitoring drug-related emergency consequences would have both practical and cost implications, our findings suggest that it would constitute an important indirect indicator of drug use. Analysis of trends in patterns of drug use, acute and chronic sequelae and detection of new drugs in circulation are some of the possible uses for such an indicator.

There are considerable limitations to the data currently available on European drug-related emergencies and analysis must be conducted with caution. Moreover, some countries currently do not collect or report data, including some with a known relatively high prevalence of use (Italy and Norway). The picture provided here is therefore incomplete and underestimates the extent of cocaine-related problems in Europe. Nonetheless, we believe we captured data from the countries that bear the largest burden of cocaine-related cases. Long-term information from the UK was limited to England [14] and to patients admitted from accident and emergency departments. Patients discharged directly were not captured; therefore, the hospital episode statistics data on inpatients are likely to be an underestimate of the prevalence of the acute toxicity related to cocaine [6]. Settings, case definitions and periods vary among reports, so the comparability of the numbers among countries is low. Nonetheless, it is possible to follow the trends within a country.

Considerable potential exists to intervene and to refer some patients to special services or to psychosocial support where appropriate. It has been noted that a closer link between the emergency departments and addiction services would help in guiding problematic cocaine users towards appropriate treatment at an earlier stage in the addiction process [10].

This review identified a considerable increase in the number of cocaine-related episodes since the end of the 1990s among those countries reporting the highest numbers of episodes. Numbers peaked around 2007/2008 in Spain and England. This information on trends is consistent with the trends in prevalence of use in the general population and with the reported numbers of cocaine-related deaths. The monitoring of morbidity associated with drug use based on hospitals, and in particular emergency departments, is informative, and many European countries are able to monitor particularly cocaine-related harm. This kind of data has considerable potential for reporting on the damage associated with patterns of drug use that are becoming more dominant and which are hard to detect from other information sources. This may become increasingly important as stimulant use and polydrug consumption patterns become more dominant on the European drug scene. Investment in this area could provide an indicator of drug-use trends, help to monitor the consequences of drug use within Europe and measure the drug-related burden in emergency departments. This review points to the already considerable existing burden on emergency services in Europe resulting from the use of cocaine as well as to the potential for early prevention, assessment and referral opportunities that are currently being overlooked.

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