



European Monitoring Centre  
for Drugs and Drug Addiction

TECHNICAL REPORT

# Emergency health consequences of cocaine use in Europe

A review of the monitoring of drug-related acute emergencies  
in 30 European countries

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National drug-related death (DRD) experts contributed to this publication by responding to a questionnaire, and the work of (other) members of the national focal points in the relevant sections of their countries' annual National reports was also used.

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[www.emcdda.europa.eu/activities/drd](http://www.emcdda.europa.eu/activities/drd)

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## Executive summary

### Background and rationale for focusing on cocaine-related emergencies

The use and seizures of cocaine have increased during the last decade, particularly in some countries, and cocaine is now the second most used illicit drug in Europe, after cannabis. However, levels of use differ widely between countries, and there is a noticeable diversity among cocaine users, both in patterns of use and sociodemographic characteristics, which complicate an assessment of the prevalence of the drug's use, its health and social consequences, and the necessary responses.

Cocaine-related health consequences are difficult to observe. This is partly due to the often unspecific or chronic nature of the pathologies typically arising from the long-term use of cocaine, and also to the difficulties in establishing causal links between illness and the use of the drug. Data on market indicators (e.g. seizures) and prevalence of use can help to approximate the extent of cocaine use and availability at a European level, but the traditional indicators of drug problems (e.g. treatment demand or drug-related deaths) may not identify many of the health consequences of use. Data from drug users attending hospital emergency departments (and other health emergency services) may be a useful source of information on the consequences of drug use that are not recorded elsewhere, and can also capture new or emerging drug-related problems.

In the United States, data on drug-related hospital emergencies from the Drug Abuse Warning Network (DAWN) system are widely used to help monitor problems related to drug use in general, including cocaine. In Europe, however, although some information on drug-related hospital emergencies is available from several countries, it has not been systematically collated.

### Objectives

This publication completes and expands on the paper in *European Addiction Research* by Mena et al. (2013) on cocaine-related health emergencies in Europe. Its objectives are:

- To present a summarised literature review of the most common health problems caused by cocaine use, focused on cardiovascular, cerebrovascular and neurological problems.
- To describe the sources of information on drug- and cocaine-related health emergencies in Europe and analyse relevant data from European countries' recent annual National reports to the EMCDDA.
- To discuss the limitations of the data collected on cocaine-related acute emergencies and the public health implications of the cocaine-related results.
- To discuss the broader issue of using data from emergency settings to help monitor problems related to drug use.

### Methods

A review of the literature on cocaine-related health consequences was conducted by the EMCDDA focused on the topics mentioned above. Information on hospitals' data collection on cocaine-related health emergencies was requested from drug-related death (DRD) experts in 30 countries (the 28 EU Member States, Turkey and Norway). Relevant information in each country's focal point annual report to the EMCDDA from 2007–11 (published in 2008–12) was used to expand on the DRD experts' responses. Where available, statistics reported by the national focal points to the EMCDDA on cocaine-related cases in hospital emergency departments or other settings from

1999–2011 were used to identify long-term trends. Data on drug-related visits to hospital emergency departments were obtained from 19 countries.

## **Results**

The literature review revealed a wide range of consequences of cocaine use, including mainly cardiovascular, cerebrovascular and neurological complications. It was found that cocaine–alcohol and cocaine–heroin combinations might present particularly severe health risks compared to the health risk of cocaine taken alone.

Data on cocaine-related emergencies were obtained from 17 of the 19 countries for which data on drug-related visits to hospital emergency departments were obtained (these data were not reported from Estonia and Malta), although they are sparse in some cases. In the most recent year for which data were available, the United Kingdom reported the highest number of cocaine-related emergency episodes (4 209 and 2 247 according to two sources, 2010–11 data), followed by Spain (2 386) in 2011, Italy (2 408) in 2008 and the Netherlands (an estimated 1 176 cases annually on average) from 2006–10. The cases are mainly male adults in their thirties, and many had used other drugs together with cocaine. Where information is available, most cases are related to acute intoxication. There has been a large (two- to three-fold) increase in the number of cocaine-related episodes reported from these countries since the end of the 1990s, although these increases peaked in Spain and England in 2007–08.

Data on drug-related road traffic accidents are reported in only some countries' National reports and are usually sparse. Where available, the data on the type of substances involved show that alcohol is by far the most common psychoactive substance involved, frequently followed by psychoactive medicines. Cocaine is rarely specifically mentioned, but may be included in a broader category such as 'stimulant drugs'.

## **Limitations**

There are limitations to the data currently available on illicit drug- and cocaine-related emergencies in Europe, and analysis must be conducted with caution. The countries' approaches to recording and reporting emergencies vary, however, with formal indicators established only in Spain and the Netherlands. In some countries the data provided from a specific source are not updated the following year in the National reports (in Belgium and in Italy, for instance). Some of the data from some countries are based on local or sentinel monitoring systems, which are valuable in providing information on trends (when based on stable data collection) but which do not provide a complete account of the numbers.

The picture provided here is therefore incomplete and underestimates the actual extent of cocaine-related problems, particularly because of the absence or limitation of data from some countries with a known relatively high prevalence of use. Nonetheless, we believe that we have captured data from most of the countries that bear the largest burden of cocaine-related emergency cases.

## **Conclusions**

This study reveals the substantial levels of morbidity related to cocaine use, translated into the large number of cocaine cases seen in various emergency settings in European countries. This health burden is often not captured by other traditional drug indicators. The report also points to the potential for early prevention, assessment and referral opportunities that may currently be overlooked, including the referral of some patients who may benefit from specific counselling or treatment.

In varying degrees, many European countries are able to monitor the morbidity associated with drug use (including the harms related to cocaine) using data from hospitals, particularly emergency departments, as well as from other emergency settings, but the absence of a coherent European-

wide monitoring system means the overall picture is difficult to determine. Although the implementation of such a system for monitoring drug-related emergencies has both practical and cost implications, our findings suggest that it would constitute an important indirect indicator of several aspects of drug use. Investment in this area could, for example, provide an indicator of drug use trends, help to monitor the consequences of drug use within Europe — in particular new psychoactive drugs, prescription drugs and polydrug use — and measure hospital emergency departments' drug-related workload.

# 1. Introduction

## **Cocaine: the second most commonly used illicit substance in Europe**

Across Europe, cocaine is the second most commonly used illicit substance among the general population (after cannabis). More than 14.5 million Europeans (4.2 % of 15- to 64-year-olds) are reported to have used cocaine at least once in their life, and 3.5 million are estimated to have done so in the last year (1.0 % on average: recent national surveys report last year prevalence estimates of between 0.1 % and 2.3 %). Cocaine use is particularly high among young adults (aged 15–34), with their last year prevalence reported to be 1.9 % on average and up to 3.6 % in Spain and 4.2 % in the United Kingdom (England and Wales) (EMCDDA, 2012a; 2013a; 2013b)

Some countries (including Spain, the Netherlands and the United Kingdom) have a long-established cocaine problem, while others (including France and Italy) have seen a rapid increase in use or seizures of the drug until recent years. In 2011, the largest quantities of cocaine seized were reported in Spain, France, the Netherlands and Belgium. Other countries, mainly in eastern and northern Europe (including Latvia, Lithuania and Finland), report very low figures for both cocaine use and seizures (EMCDDA, 2010, 2012a, 2013b).

## **A wide range of health consequences associated with cocaine use**

Cocaine dependence, a chronic, relapsing and multifactor disorder, is a significant public health problem with somatic, legal, social, cognitive and psychological complications. The most frequent acute health problems associated with cocaine include neurological impairments and cardiovascular and cerebrovascular effects (Egred and Davis, 2005). Regular use (by any route of administration) can also be associated with the risk of accidents and of the transmission of infectious diseases through unprotected sex (Brugal et al., 2009). Recently, concerns have also been raised regarding the association between cocaine use and violent crimes in the night-time economy (Measham and Moore, 2009). In addition, cocaine users have an increased mortality compared with the general population (Degenhardt et al., 2011; Pavarin et al., 2011; Sanchez et al., 1995). Cocaine was cited as the principal reason for entering treatment by about 14 % of all drug treatment clients in 2011, corresponding to about 60 000 cases according to treatment demand indicator (TDI) data (EMCDDA, 2012a, 2013b).

## **A health burden that is probably underestimated, and insufficiently captured by classical indicators**

Overall, there are indications of a significant health burden related to cocaine use in Europe, particularly in some countries, which is not yet fully identified or recognised. This is due partly to the often unspecific or chronic nature of the pathologies typically arising from the long-term use of cocaine, and also to the difficulties in establishing causal links between an illness and the use of the drug. In addition, urine screens of emergency department patients and referrals to addiction services are infrequent (de Millas et al., 2010). These issues, along with countries' differing data collection systems for both mortality and morbidity, suggest that the currently available information does not fully capture the whole picture of cocaine-related health consequences.

Traditional indicators of drug problems (e.g. treatment demand or drug-related deaths) may not identify many of the health consequences of use. Data from drug users attending hospital emergency departments (and other health emergency services) may be a useful source of information on the consequences of drug use that is not well recorded elsewhere.

This publication completes and updates the paper in *European Addiction Research* by Mena et al. (2012), which reviews the sources of information on cocaine-related health emergencies in Europe. It contains a more in-depth literature review on the cocaine health consequences that are analysed and gives a broader insight into drug-related emergencies in general. It also provides information

on more countries and further explores the limitations of the data currently available and the public health implications of cocaine-related harms. This publication therefore constitutes one of the bases for the EMCDDA to build on its strategy to explore the feasibility of enhancing the use of hospital emergency data as an information source on the health consequences of drug use and to reflect on the possible synergies with EU-funded projects in this area.

## 2. Methods

The following strategies were used to collect data for this publication:

- An initial **literature review** on the health consequences of cocaine use, conducted for the EMCDDA in 2007, was updated by conducting a search using the PubMed database <sup>(1)</sup>. This review focused only on cardiovascular, cerebrovascular and neurological problems and did not explore other domains, such as psychiatric problems related to cocaine.
- In 2009 the EMCDDA asked experts on the key epidemiological indicator drug-related deaths (DRD) <sup>(2)</sup> from 30 countries (the 28 EU Member States, Turkey and Norway) about their countries' **system of collecting data** on drug- and cocaine-related emergencies from various emergency settings, primarily hospital emergency departments but also emergencies reported through poison centres or through other emergency settings such as ambulance or first aid services at festivals and public events. This excluded cocaine-related non-acute harms. The experts were also asked for citations of any research studies on this issue.
- Data on the health consequences related to drug use are acquired annually by the EMCDDA from the 30 countries' national focal points and presented in their **National reports** <sup>(3)</sup> on the drug situation. Information on illicit drug-related emergencies in these reports for the period 2007–11 (published in 2008–12) was analysed, with particular attention given to data sources, cocaine-related emergencies, case definition, coverage and case characteristics. Where available, data on cocaine-related cases of road traffic accidents in hospital emergency departments from the 2011 National reports were included in the analysis.
- Where available, **statistics reported by the national focal points** to the EMCDDA on cocaine-related cases in hospital emergency departments or other settings from 1999–2011 were used to identify long-term trends.

What this report does not cover:

This report covers only cocaine-related acute incidents and emergency episodes. It does not cover the final outcome of these acute emergency episodes, such as full recovery, sequelae or death. Monitoring data on cocaine-related deaths in particular requires the use of other sources such as mortality registries (Corkery, 2012). It also requires the use of other study designs such as cohort studies among cocaine users or follow-up studies of the patients seen at emergency departments or in treatment (Degenhardt et al., 2011; Barrio et al., 2013). The present report does not aim to compare the burden of cocaine-related emergency to the burden associated with other drugs, such as heroin, amphetamines or misused medicine. In particular, alcohol-related emergencies, which are known to outnumber emergencies related to any other drug, are not covered.

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<sup>(1)</sup> The terms used in the search were: cocaine AND health AND consequences, cocaine AND acute AND consequences, cocaine AND chronic AND consequences, cocaine AND health AND problems, cocaine AND emergencies, cocaine AND casualties, cocaine AND vascular, cocaine AND complications, cocaine AND heroin, cocaine AND alcohol.

<sup>(2)</sup> The EMCDDA uses five key epidemiological indicators to achieve its goal of providing factual, objective, reliable and comparable information on drugs and drug addiction at the European level to inform the policy debate. More information is available from [www.emcdda.europa.eu/activities/key-indicators](http://www.emcdda.europa.eu/activities/key-indicators). National experts are nominated by the Reitox national focal points ([www.emcdda.europa.eu/publications/brochures/rtxfaq](http://www.emcdda.europa.eu/publications/brochures/rtxfaq)). The EMCDDA DRD network includes pathologists, toxicologists, public health practitioners and epidemiologists.

<sup>(3)</sup> National reports are available at [www.emcdda.europa.eu/publications/searchresults?action=list&type=PUBLICATIONS&SERIES\\_PUB=w203](http://www.emcdda.europa.eu/publications/searchresults?action=list&type=PUBLICATIONS&SERIES_PUB=w203).

### 3. The medical complications of cocaine use

This section presents the results of the literature review on the health consequences of cocaine use. It focuses on some common problems: cardiovascular disorders, cerebrovascular disorders and neurological impairments, the consequences of combining cocaine and alcohol and of combining cocaine and heroin.

Two broad groups of regular cocaine users can be distinguished. The first is made up of socially integrated users, who tend to use cocaine at weekends, at parties or on other special occasions, sometimes in large amounts. Many of these users report controlling their cocaine use by setting rules about, for example, the amount, frequency or context of use. The second group is composed of intensive cocaine and crack users belonging to more socially marginalised or disadvantaged groups. This group includes former or current opioid users who use (including by injection) cocaine powder and/or crack.

The risks associated with certain problematic modes of cocaine use are well known and mostly affect specific groups of users (former or current opioid users and marginalised populations). For example, injecting cocaine use is associated with the risk of blood-borne viruses infection (hepatitis C virus (HCV) and human immunodeficiency virus (HIV)) and an elevated risk of overdose, while use in combination with opioids appears to be linked to a higher risk of opioid overdose (EMCDDA, 2007).

Cocaine use has been associated with a variety of medical complications, which may involve all of the body's major organs or systems (Dinis-Oliveira et al., 2012). Such complications can be associated with acute and chronic use and may differ according to the route of administration. Polydrug use, involving mainly cocaine combined with heroin, alcohol and/or cannabis, is the predominant pattern of cocaine use in Europe. This, together with the various impurities and cutting agents often found in 'street' cocaine, may increase the adverse health effects (EMCDDA, 2007, 2011).

Acute and chronic cocaine use can cause:

- cardiovascular disorders (ischaemia, acute coronary syndrome, arrhythmias, etc.);
- cerebrovascular disorders and neurological impairment (cerebrovascular accident or stroke, and status epilepticus);
- psychiatric disorders (euphoria, dysphoria, agitation, anxiety, suicidal thoughts, paranoid psychosis and depression);
- respiratory disorders, either acute (pulmonary oedema, pulmonary infarction, haemoptysis) or chronic (e.g. pulmonary hypertension);
- genitourinary and obstetric disorders, either acute (acute renal failure, mediated by rhabdomyolysis or direct toxicity, testicular infarction, placental abruption, spontaneous abortion) or chronic (premature birth, growth retardation);
- gastrointestinal complications (mesenteric ischaemia or infarction);
- musculoskeletal and dermatological disorders.

Dependence is also one of the negative consequences of cocaine use. A study conducted in the US showed that about 5 % of cocaine users can become dependent in the first year of use, although not more than around 20 % of users developed dependence in the long term (Wagner and Anthony, 2002). Among those who become dependent, almost 40 % recover without treatment (Cunningham, 2000). There is also evidence that many cocaine users control their use of the drug by setting rules about, for example, the amount used and the frequency and context of use (Decorte, 2001). Daily cocaine consumption, unstable living conditions and low social support were variables highly associated with psychiatric morbidity in a study conducted in Spain among 705 current regular cocaine users aged 18–30. During the last 12 months, 22 % of this sample had depression and specific phobia (Tortajada et al., 2012).

The most common adverse health consequences of cocaine use are cardiovascular disorders, cerebrovascular disorders and neurological impairments, which may be associated with both acute and chronic cocaine use (Egred and Davis, 2005). A recent study in Spain among 720 regular cocaine users aged 18–20 who were not regular heroin users found that 27 % had experienced acute cocaine intoxication during the last year. Of these, 35 % presented symptoms of psychosis (hallucinations or delirium) and more than 50 % reported chest pain (Santos et al., 2012). Cocaine injection and crack cocaine use are associated with the highest health risks, including cardiovascular and mental health problems.

These medical consequences of cocaine use — cardiovascular disorders, cerebrovascular disorders and neurological impairments — are discussed in further detail below, followed by an examination of the effects of using a combination of cocaine and alcohol, and of cocaine and heroin.

### **3.1 Cardiovascular disorders**

Although most cases of cocaine-associated chest pain are non-ischaemic (not related to coronary artery disease), myocardial infarction (a heart attack) remains the most frequently reported cardiac complication of cocaine use. Regular, occasional, heavy and long-term cocaine use have all been implicated as a trigger of non-ischaemic acute myocardial infarction (Mouhaffel et al., 1995).

Atherosclerosis (accumulation of fatty materials along the walls of arteries which may eventually block the arteries) has also been linked to chronic cocaine use. Cocaine directly induces structural defects in the vascular endothelial cell barrier, which subsequently increases permeability to peroxidase and low-density lipoproteins (Brownlow and Pappachan, 2002). Coronary atherosclerosis increases the risk of myocardial infarction by as much as 24 times over baseline in the first hour after cocaine administration, and it could still be high for as long as a few days later (Mittleman et al., 1999).

A survey carried out in the US estimated that frequent cocaine users had a seven-fold higher risk of non-fatal myocardial infarction than non-users. Overall, it was estimated that a quarter of non-fatal myocardial infarctions in persons aged 18–45 were attributable to frequent cocaine use (Qureshi et al., 2001).

The most common cardiovascular disorders related to cocaine are ischaemia and acute coronary syndrome, which can occur with all the administration routes of cocaine. Other cardiac problems include arrhythmias, myocarditis and cardiomyopathy (Egred and Davis, 2005; Wood, 2010).

Although chest pain is the most common cardiovascular symptom in cocaine users, only a small proportion (6 %) is attributable to myocardial ischemia or myocardial infarction (Egred and Davis, 2005; Pozner et al., 2005). Cocaine users who present with acute chest pain may actually have acute myocarditis (inflammation of the heart muscle), rather than acute myocardial infarction. Myocarditis induced by cocaine may be either toxic myocarditis, which is dose-dependent, or hypersensitivity myocarditis, which is not related to dose. In the event that the chest pain is non-ischaemic, many cases may result from an extracardiac cause including barotraumas related to cocaine smoking or inhalation, such as pneumothorax (a collection of air in the space around the lungs) and pneumoperitoneum (a collection of air in the abdominal cavity) (Pozner et al., 2005).

Cardiac arrhythmia (irregular heartbeat) may be life-threatening and requires prompt treatment. A wide range of arrhythmias has been reported to be associated with cocaine use; these conditions are usually transient and resolve when cocaine is metabolised.

Endocarditis (inflammation of the internal lining of the heart chambers and heart valves) has been associated with intravenous injection of many illicit drugs, including cocaine (Chambers et al., 1987; Qureshi et al., 2001). However, cocaine use seems to be a greater independent risk factor for developing endocarditis than does the use of other drugs. Furthermore, intravenous injection of

cocaine may present an additional, independent risk for the development of endocarditis. It is presumed that the increases in heart rate and blood pressure that result from cocaine use may lead to valvular and vascular injury that predisposes to bacterial invasion, and the immunosuppressive effects of cocaine may also increase the risk of infection (Egred and Davis, 2005; Pozner et al., 2005).

Aortic dissection is a potentially life-threatening condition in which there is bleeding into and along the wall of the aorta, a major artery in the chest. Cocaine use can cause both acute and chronic dissection of the aorta (Brownlow and Pappachan, 2002) and lead to acute aortic dissection, probably resulting from the severe transient increase in systemic arterial pressure caused by the drug.

### **3.2 Cerebrovascular disorders and neurological impairments**

Acute and chronic cocaine use may cause either haemorrhagic or ischaemic stroke (cerebrovascular accident) — an acute neurological condition in which the blood supply to a part of the brain is interrupted.

Cocaine-related seizures (temporary abnormal electrophysiological phenomena of the brain, resulting in abnormal synchronisation of electrical neuronal activity) occur most often after chronic use, but may also occur after the initial use of cocaine via any route of administration. Most cocaine-related seizures occur within minutes of use, and almost always within 90 minutes (when there is peak concentration of cocaine in the blood) (Boghdadi and Henning, 1997). Cocaine-induced seizures are usually single, generalised (where most of the brain is affected), tonic-clonic ('grand mal') seizures. However, status epilepticus (a convulsive seizure that continues for a prolonged period — longer than five minutes — or when convulsive seizures occur one after the other with no recovery between) can also occur after cocaine use. Cocaine-induced seizures can occur in patients with or without a history of seizure disorder. The prevalence of cocaine-induced seizures is twice as high in subjects with a history of non-cocaine-related seizures than in those without a history of seizure disorder. Seizures caused by cocaine may be lethal, primarily because of associated cocaine-induced hyperthermia, systemic acidosis, cardiac dysrhythmias and cardiac arrest.

### **3.3 Cocaine and alcohol**

The combination of alcohol and cocaine is popular among some drug users, perhaps because of the more intense feelings of 'high' achieved, which is perceived as better than that from either substance alone. In addition, cocaine makes the effect of alcohol inebriation less intense and alcohol tempers the discomfort felt when 'coming down' from a cocaine high (Pennings et al., 2002). Some users take cocaine simultaneously with alcohol to enable them to drink for longer (EMCDDA, 2011; Gossop et al., 2006).

Prospective studies show that simultaneous consumption of cocaine and alcohol increases the heart rate with a greater than additive effect, as well as increasing systolic blood pressure and impairment of cognitive and motor functions (Pennings et al., 2002). Furthermore, compared with cocaine use alone, concomitant consumption of cocaine and alcohol increases blood levels of cocaine by up to 30 % (Farré et al., 1993; Perez-Reyes and Jeffcoat, 1992). However, retrospective studies suggest that combined use does not cause more cardiovascular problems than expected from the additive effects of each drug (Pennings et al., 2002).

Importantly, the concomitant use of alcohol and cocaine results in the formation of a new substance, cocaethylene (Herbst et al., 2011), a pharmacologically active metabolite synthesised in the liver (Brzezinski et al., 1994). There is some controversy over whether cocaethylene or alcohol-induced increases in cocaine levels are responsible for an increased heart rate, and presumed increased cardiotoxicity. Because of its pharmacological properties, such as slower clearance, longer elimination half-life and larger volume of distribution, cocaethylene persists longer in body fluids and tissues than the metabolites of cocaine taken without alcohol, and high

blood levels of cocaethylene are therefore found during users' post-mortems. This led researchers to conclude that it has higher toxic potency than cocaine (Lepere and Charbit, 2002). Cocaethylene produces cocaine-like cardiovascular and subjective effects, but discrimination of these from the direct synergistic effects of the cocaine–alcohol combination is difficult. Cocaethylene, however, appears to be less potent than an equivalent dose of cocaine (Hart et al., 2000; McCance et al., 1995; McCance-Katz et al., 1993).

### **3.4 Cocaine and heroin**

An increasing number of drug users in Europe report dual dependence on cocaine and heroin (EMCDDA, 2007). Opioid users who also use cocaine may take the drugs simultaneously or separately. Among drug users, the simultaneous injection of heroin and cocaine is often referred to as 'speedballing'. In this case, the cocaine is either injected in a mixture with heroin or is injected immediately before or after the heroin. Many heroin users report co-use of cocaine in a sequential manner, either to enhance euphoria or to reduce the withdrawal symptoms commonly experienced during a typical day or when attempting self-detoxification from opioid drugs. Compared to cocaine users who do not use heroin, those who combine cocaine and heroin are more likely to inject, and are likely to inject with a greater frequency because of cocaine's short half-life. Consequently, there is an increase in the health risks related to injecting, such as contracting HCV, HIV and other blood-borne infectious diseases (Leri et al., 2003).

The cardiovascular effects of cocaine are amplified when it is co-administered with opioids (EMCDDA, 2007). Studies on laboratory animals indicate that morphine (the substance to which heroin is converted/metabolised in the body) may enhance the toxic potential of cocaine and that cocaine, like morphine, induces respiratory depression, possibly contributing to the ultimate mechanism of death in narcotic overdose cases (Poletini et al., 2005; Tseng et al., 1991).

In this section we have discussed the general health consequences of cocaine use. Some of these, such as cardiovascular and psychiatric acute episodes, are likely to lead to a visit to an emergency department. The next section concentrates on drug-related health emergencies, with a focus on cocaine, and presents the data collection systems and their results from 20 European countries. It is important to note that the episodes reported from emergency settings are likely to represent the visible and most severe consequences of cocaine use: there may also be unrecognised and unreported cases.

#### **4. Drug-related health emergencies, with a focus on cocaine: data collection systems and results**

As detailed in Section 2, EMCDDA key epidemiological indicator drug-related death experts in 30 countries were asked about their country's system of collecting data on drug- and cocaine-related emergencies from hospital emergency departments and whether or not there were any research studies on this issue. Information on these was received from eight countries.

The 30 countries' annual National reports from the REITOX national focal points to the EMCDDA for the period 2007–11 (published in 2008–12) were scrutinised for relevant data on drug-related emergencies, with particular attention given to cocaine-related mentions, data sources, case definition, coverage, case characteristics and long-term trends. These data were found in reports from 20 countries, although in some cases they were very sparse and were not always collected across the whole country. For these 20 countries, data from the 2011 National reports (published in 2012) were scrutinised for relevant data on hospital visits due to driving while using the drug. Finally, where available, statistics reported by the national focal points to the EMCDDA on cocaine-related cases in hospital emergency departments or other settings from 1999 to 2011 were used to identify long-term trends.

The above strategies resulted in information for a total of 20 countries (19 on drug-related emergencies <sup>(4)</sup> and one on road traffic accidents only <sup>(5)</sup>) (see Table 1).

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<sup>(4)</sup> Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Ireland, Spain, France, Italy, Cyprus, Latvia, Lithuania, Hungary, Malta, Netherlands, Romania, Slovenia, the United Kingdom. In addition, the DRD experts in Finland and Austria responded to the questionnaire to report that there are no data available on drug-related emergency hospital visits.

<sup>(5)</sup> Norway.

**Table 1: Brief case definition, setting and sources of drug-related emergency episodes, by country, as reported in the National reports.**

Country	Case definition	Setting and source
<b>Belgium</b>	Requests for information from the general public and health professionals	National Poison Information Centre †
	Inpatient admissions with substance-related disorder (Minimal Psychiatric Data — MPD)	Psychiatric hospitals Belgium Federal Public Service
<b>Bulgaria</b>	Persons requiring emergency medical aid due to drug-related problem	Clinic of Toxicology of the ‘Nikolaj Ivanovich Pirogov’ multiprofile hospital for active treatment and emergency medicine (MHATEM)
	Non-fatal drug-related emergencies due to acute poisoning	Ministry of Health data. Hospital Centres for Emergency Medical Aid (CEMA) Δ
<b>Czech Republic*</b>	Cases of non-fatal intoxication with drugs	Sentinel-type system operated by the public health service †
	Cases hospitalised for more than 24 hours following intoxication with addictive substances (since 2011)	National Register of Hospitalisations (NRHOSP) managed by the Institute of Health Information and Statistics
<b>Denmark</b>	Cases admitted as a result of poisoning with illicit drugs	Hospital emergency departments†. LPR – Landspatientregistret, or National Patient Register
	Admissions with a drug-related primary or secondary diagnosis (co-morbidity)	Psychiatric hospitals †
<b>Germany</b>	Reported non-fatal overdose by drug users in cross-sectional interviews	MoSyD study of the Frankfurt scene
	Reported overdoses and life-threatening emergencies by drug users on the drug scene and from a substitution practice facility	Study in 10 cities by the Centre for Interdisciplinary Addiction Research of the University of Hamburg (ZIS) Δ
<b>Estonia</b>	Cases receiving first aid for overdoses	Emergency ambulance service (Tallinn) #
<b>Ireland</b>	Admissions related to non-fatal overdose (discharges)	Hospital† HIPE (Hospital In-Patient Enquiry), a computer-based health information system on coded discharge summaries
<b>Spain</b>	Episodes directly related to non-therapeutic use of psychoactive drugs	Hospital emergency departments Δ
<b>France</b>	Data from survey among drug users only	ENa-CAARUD (Centre d’accueil et d’accompagnement à la réduction des risques pour usagers de drogues)
<b>Italy**</b>	Hospital admissions with primary or secondary diagnoses related to psychoactive drug use	Italian Ministry of Health
	Analysis of the mortality of the patients admitted to hospital for drug-related causes	Italian Ministry of Health
<b>Cyprus</b>	Non-fatal drug-related cases	Hospital emergency departments Δ
<b>Latvia</b>	Drug overdose case discharges	Department of toxicology (one hospital — Riga Eastern Clinical University Hospital, 15 Toxicology Centre) #

<b>Lithuania</b>	Hospital inpatient drug-related cases	Medical institutions † State Patients Funds
<b>Hungary*</b>	Cases treated for intoxication by illicit drugs or organic solvents	Department of Toxicology (one hospital) # (Clinical Toxicology Department of Péterfy Sándor Street Hospital in the Municipality of Budapest)
<b>Malta</b>	Number of non-fatal overdoses	Police drug squad records †
<b>Netherlands</b>	Cases with accident, violent incident or self-mutilation related to drug use, from Letsel Informatie Systeem (LIS)	Hospital emergency departments ‡ †
	Drug-related incidents, from Monitor Drugs Incidenten (MDI) (sentinel system not attempting to estimate the actual number of cases)	Police, ambulance transportation services, hospitals and two organisations on first aid at dance parties (in eight regions) Δ
	Drug-related requests for emergency assistance	Central Post for Ambulance Transports #
	Information requests from physicians, health authorities and others on acute intoxications	National Poison Information Centre (NVIC) †
	Clinical admissions in general hospitals due to cocaine misuse or dependence (primary or secondary diagnosis), from the National Drug Monitor	Trimbos-instituut (the Netherlands Institute of Mental Health and Addiction). Dutch Hospital Registration, held by the Dutch Hospital Data Foundation. Hospitals †
<b>Romania</b>	Non-fatal emergencies due to intoxication by illicit drugs	Emergency departments at hospitals †
<b>Slovenia</b>	Inpatient admissions	Emergency Medical Department, University Medical Centre in Ljubljana #
	Hospitalisations due to mental and behavioural disorders related to the use of psychoactive substances	Hospitals †
<b>United Kingdom*</b>	Inpatient discharges recording poisoning by drugs (including secondary diagnosis)	Hospitals †
	Psychiatric inpatient discharges with a diagnosis of drug misuse	Hospitals †
	Hospital inpatient admissions from England, Scotland, Northern Ireland and Wales. The data for England uses primary diagnosis only but provides the longest trend data with records available from the end of the 1990s	Hospital activity (Hospital Episode Statistics — HES). Patient Episode Database Wales. ISD Scotland Inpatient and Day Case Activity. Northern Ireland Hospital Statistics Hospitals †
<b>Norway*</b>	Data on road traffic accidents only	Oslo University Hospital (Ullevål) and Norwegian Institute of Public Health

‡ Data are derived from a representative selection of hospitals and extrapolated to yield national estimates.

Coverage: # local; † national; Δ some regions only.

\* Countries that reported on road traffic accidents in 2011 National reports (published in 2012).

† Deaths and acute intoxications related to new psychoactive substances can also be reported from the national early-warning system — Department of Antidrug Policies, Presidency of the Council of Ministers.

- Fifteen of the most recent National reports (delivered in 2011 and published in 2012) reported on cocaine-related emergency cases. In Spain, data from emergency departments revealed 2 386 cases directly related to cocaine in 2011 (EMCDDA, 2013c).
- In the United Kingdom, 2 247 inpatient discharges recorded cocaine poisoning and 4 209 inpatient discharges recorded mental and behavioural cocaine-related disorders in 2010/2011.
- Italy reported 1 898 hospital admissions related to cocaine in 2009.
- Hospital emergency departments in the Netherlands reported an estimated 1 176 cases annually of accidents, violent incidents or self-mutilation related to cocaine use in 2011. In the same year there were also: 896 clinical admissions; 219 calls for information about acute intoxications involving cocaine to the National Poison Information Centre from physicians, health authorities and others; 188 cocaine-related incidents reported by the police, ambulance transportation services, hospitals and two first aid organisations at dance parties; and 179 cocaine-related requests for emergency assistance to the Central Post for Ambulance Transports.
- Danish emergency departments recorded 150 cases of cocaine poisoning in 2011.
- In Ireland there were 94 cases of discharge from hospitals after a non-fatal cocaine overdose in 2010.
- There were 147 cocaine-related emergency cases reported from Romania in 2011.
- In Hungary, 22 cases were treated for cocaine-related intoxication at the department of toxicology of one hospital in 2011.
- Five other countries also reported cocaine-related emergency cases in 2011: Belgium (16), Bulgaria (30), Lithuania (14), Slovenia (10), the Czech Republic (1).
- Four countries reported cases related to drug use but did not specify numbers related to cocaine: Cyprus, Malta, Latvia and Estonia.
- Norway reported only on drug-related road traffic accidents in 2009.
- Germany and France did not report any information on cocaine-related emergency cases from hospitals, although studies among problem drug users provided some insight into the frequency and number of cocaine-related overdose or incidents.

According to the most recent available information for each country (which in some cases is several years old), the highest number of cases were reported from the United Kingdom, Spain, Italy, Denmark and the Netherlands (Table 2).

**Table 2: Age, gender and last year trend of the reported cases of illicit drug- and cocaine-related episodes in the latest data available in the National reports.**

Country	Age: age bands or mean age (cases related to all drugs or to cocaine)	Gender (proportion of males)	Last year trend in number of cocaine-related cases
Belgium	No data	<i>No data</i>	<b>Stable</b> 16 in 2011 (18 in 2010)
Bulgaria	80 % aged 19–35 (all drugs, 2010)	74 % (all drugs, 2010)	<b>Increase</b> 30 in 2011 (12 in 2010)

Czech Republic	No data	<i>No data</i>	<b>Stable</b> 1 in 2011 (0 in 2010)
Denmark	30 % older than 30 years (cocaine, 2010) 55 % older than 30 years (all drugs, 2010) Most common age band for stimulants, including cocaine: 20–24 years	66 % (all drugs, 2011)	<b>Stable</b> 150 in 2011 (155 in 2010)
Germany	No data	<i>No data</i>	<i>No data</i>
Estonia	No data	<i>No data</i>	No specific data on cocaine
Ireland	66 % aged 25 or older (all drugs, 2010)		<b>Stable</b> 94 in 2010 (92 in 2009)
Spain	Mean age 33.3 years (cocaine, 2010) Younger than heroin users (36.2) and users of other opioids (37.8). Older than users of volatile substances (24.6), hallucinogens (27) and ecstasy (28.6) Mean age: 27.8 in 2008 (all drugs). Increased to 33 in 2010	80 % (cocaine, 2009). Decrease to 74.5 % (cocaine, 2010). Same decrease in the % of males observed for other drugs as well	<b>Decrease</b> 2 386 in 2011 (2 779 in 2010)
France	No data	<i>No data</i>	<i>No data</i>
Cyprus	No data	<i>No data</i>	<b>Stable</b> 4 in 2011 (4 in 2010)
Italy	Mean age 40 years for males and 46 for females (all drugs, 2009)	58 % (all drugs, 2009)	No trend data. 2 408 in 2008. 1 898 cocaine-related hospital admissions in 2009. Data not updated
Latvia	Mean age 25 years (all drugs, 2011)	80 % (all drugs, 2011)	No specific data on cocaine
Lithuania	Mean age 28.6 (all drugs, 2011)	77 % (all drugs, 2011)	<b>Increase</b> 19 in 2011 (14 in 2010)
Hungary	18 % aged 20–24; 19 % aged 25–29; 18 % aged 30–34 (all drugs, 2010)	85 % (all drugs, 2010)	<b>Decrease</b> 22 in 2011 (67 in 2010)
Malta	No data	<i>No data</i>	<i>No specific data on cocaine</i>
The NL (MDI)	43 % older than 25 (dance parties component of the MDI, 2011) 39 % aged 18–24 (all MDI, 2010) Median age 31 (all MDI, incidents related to cocaine-only use, 2010)	Two-thirds males (all MDI, 2010) 79 % (all MDI; incidents related to cocaine-only use, 2010)	<i>Changes in coverage. Cannot analyse trend.</i> In 2011, total of 3 652 emergencies of which: ambulance transportation services, 2 022; hospital emergency departments, 257; forensic doctors, 327; emergency posts at dance parties, 1 046.
The NL (Ambulance Amsterdam)	No data	<i>No data</i>	<b>Increase</b> 179 in 2011. (130 in 2010)
The NL (LIS)	47 % aged 20–29 years (all drugs, 2006–10 estimate)	74 % (all drugs, 2006–10 estimate)	<i>Changes in the % of those with known substances. Cannot analyse trends</i>
The NL (Poison Centres)	No data	<i>No data</i>	<b>Decrease</b> 219 in 2011 (243 in 2010)
The NL (National)	No data	<i>No data</i>	<b>Increase</b> 896 in 2011

Monitor)			(870 in 2010)
Romania	45 % aged 24 or older and 25 % aged 25–34. Mean age 25 (all drugs, 2011)	73 % (all drugs, 2011)	147 cocaine-related emergencies in 2011
Slovenia (admission)	Mean age 33 (cocaine, 2011) Mean age 29 (all drugs, 2011)	67 % (all drugs, 2011) All 10 cases males	<b>10 cases in 2011</b>
Slovenia (psychiatry)	No data	<i>No data</i>	<b>Stable</b> 4 in 2011 (6 in 2008)
UK (inpatient discharges poisoning)	No data	<i>No data</i>	<b>Increase</b> 2 247 in 2010–11 (1986 in 2009–10) Still at a lower level than in 2007–08 and in 2008–09
UK (drug misuse diagnostic)	No data	<i>No data</i>	<b>Increase</b> 4 209 in 2010–11 (3 502 in 2009–10)
UK — England (inpatient admission, primary diagnosis)	No data	<i>No data</i>	<b>Decrease</b> 662 in 2011–12 (727 in 2010–11)
Norway	No data	<i>No data</i>	<i>No data</i>

#### 4.1 Data collection sources and results, country-by-country

The information that was collected from each country is presented in Annex 1, the case characteristics are summarised, and long-term trends in cocaine-related emergency cases are extracted from the data.

#### 4.2 Cocaine-related emergency case characteristics

This section summarises the available information on the age and gender, clinical characteristics and outcomes of cocaine-related emergency cases.

The information on the age and gender of cases of drug- and cocaine-related emergencies reported in the National reports varied across countries: the level of detail provided and the age bands used were not standard (see Table 2). In some cases, the age breakdown for all drug-related episodes was presented and the drugs responsible were not specified. In such instances, the age and gender of all drug-related cases can be used as a proxy, although some reports, such as those from Spain and Denmark, suggest that cocaine-related episodes might be seen in users younger than users of other drugs, particularly heroin users.

Where specific information is available on drug-related episodes, only Spain and one indicator of the Netherlands report age and gender specifically on cocaine-related incidents. The information available for the other countries relate to all drugs, with no breakdown by substance. Males typically account for three-quarters or more of the reported cases. However, the proportion of males is relatively smaller in Denmark, Italy and Slovenia; and in Spain and Hungary the proportion of males has decreased compared to previous years. Changes in the gender ratio are not reported from other countries, making comparison between countries impossible (see Table 2).

Overall, for both drug- and cocaine-related episodes, most cases were male and in their twenties or thirties. Data from emergency departments in Spain show an increasing mean age of the patients. Italy and Hungary report that females are slightly older than males. For example:

- The mean age in Italy of the reported drug-related cases was 40 years for males and 46 years for females in 2009.
- 76.5 % of the reported drug-related emergency department cases in Spain in 2010 were males, and the mean age of all patients was 32.6 years (33.0 for males and 31.6 for females). The average age of the emergency cases where the physician stated a direct relationship with cocaine was 33 years.
- 74.5 % of the reported cocaine-related emergency department cases in Spain in 2010 were males, a decrease compared to 80 % in 2009.
- In the Netherlands from 2006–10, estimates from Letsel Informatie Systeem (LIS) on the number of people treated annually at a hospital emergency department following an episode related to drug use reveal that 47 % of a total of 4 270 were aged 20–29 and 74 % were male. Over this period, poisoning was the most frequent cause of the emergency (74 %).

Information on the clinical characteristics of the cases is often limited and is not standardised, although most drug-related and cocaine-related emergencies reported in the National reports seem to be coded as poisoning or overdose. For example, in the Netherlands from 2006–10, around 4 270 people were treated annually at a hospital emergency department following a drug-related accident, violent incident or self-mutilation. Of these cases, poisoning was the most frequent cause of the emergency (75 %).

Only some countries report data on the number of psychiatric episodes among drug users seen at hospitals, and hospitalisations in psychiatric wards due to drug-related problems: Belgium, Denmark, Slovenia and the United Kingdom.

Where information is available, polydrug use seems to be frequent in drug-related emergency cases. In Belgium around half of the cocaine-related admissions were due to cocaine alone and the other half was due to cocaine taken with other drugs. Data from the poison centres also show that some polydrug-related cases involve cocaine. In Denmark polydrug was the largest group of drug-related psychiatric admissions, and in Romania it is the second most frequent cause of acute intoxication with drugs after 'ethno-botanicals'. In Germany polydrug use was the main reason reported by the drug users as having caused their overdose, but no specific information was reported on cocaine.

The severity of cocaine-related cases was reported only from the Netherlands, where a monitor of drug-related emergencies (MDI) reported that intoxications with cocaine in 2010 were most often categorised as 'light' (43 %) or 'mild' (44 %). Only 13 % of the cocaine intoxications were categorised as 'severe', in contrast to higher proportions for opioids (33 %) and GHB (31 %). Just over one-third (36 %) of the 188 'severe' cocaine-related cases resulted in hospitalisation, compared with 58 % of the cases related to opiates and 46 % of those related to GHB. The severity of the episode is, however, approximated in some of the national reports by the proportion of cases that are hospitalised following the emergency episode. This is not reported systematically, though, and may depend on the referral systems and structure of the care system rather than only on the severity of the case.

Reporting the outcome of a cocaine-related emergency episode was very rare, particularly for death. Data from Italy, however, show that around one in 20 (6 %) of the hospital admissions related to cocaine ended in death compared with about a third (32 %) of admissions related to opiates. Where available, data show that most cases related to cocaine are discharged after the emergency episode. For example, the most frequent outcome of emergency cases in 2009 in Italy was discharge to home, for around eight in ten cases, followed by self-discharge for around one in ten. The other cases were transferred to another facility and less than 1 % of the cases with emergency episodes died. In Spain in 2009 the outcomes of the 3 413 cases of cocaine-related

emergencies were mainly discharge (81.2 %), self-discharge (8.7 %), hospital admission (7.5 %) and transfer to another hospital (2.5 %).

### 4.3 Trends in cocaine-related episodes

The data from many countries do not allow for long-term trend analysis, although this was possible for four countries among those that report the highest number of emergency cases in Europe — Denmark, England (because long-term data for the United Kingdom as a whole were not available), Spain and the Netherlands. These data are shown in Figures 1–4, in Annex 1.

There was an increase in the number of cocaine-related emergency episodes from the late 1990s until 2007–2008. In Spain and the United Kingdom, these increases appear to have peaked around 2007–08 and have subsequently dropped. These two countries have a large proportion of the overall European reported number of cocaine-related emergency cases and thus impact heavily on the overall European total. The overall trend is consistent with changing prevalence of use among the young population; with rates of cocaine-related deaths; and with the number of people entering treatment with cocaine as the primary drug (EMCDDA, 2013b; 2013c).

The picture varies between countries, however, and is complex (see Figures 1–4 in Annex 1 and Table 2 for most recent trends in all countries). The trends also vary within countries, such as the Netherlands, where, between 2010 and 2011, some indicators showed an increase and others a decrease in the number of cocaine-related emergencies.

According to the most recent data, the decreasing trend is not reported by all data collection systems in all countries. Six systems report an increase, four a decrease and six a stable level (Table 2). For many other systems the trends are not available, or the coverage of the surveillance system has changed, which impedes comparisons.

In many countries the numbers reported are small and trend analysis should be conducted cautiously (Table 2).

This overview of the most recent trends for all countries, using data from 2011, is completed in Table 3, which summarises the trends observed in 2009 or 2010 (depending on the available data) compared with the previous two years. Trends in the six countries <sup>(6)</sup> where the data collection systems reported more than 50 cases of cocaine-related emergencies annually were examined in details (other countries were excluded, as trend comparison is difficult with smaller numbers). Table 3 presents cocaine-related episodes as a proportion of all drug-related episodes and documents changes over time, both for all drugs and for cocaine.

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<sup>(6)</sup> Denmark, Ireland, Spain, Hungary, the Netherlands, the United Kingdom.

**Table 3: Number of cases and trends in illicit drug- and cocaine-related episodes from collection systems that reported more than fifty cocaine-related cases in the 2010 (published in 2011) National reports to the EMCDDA (modified from Mena et al., 2013<sup>&</sup>)**

<sup>&</sup> Original source : Mena, G. et al. (2013), *European Addiction Research*, 19, pp. 74–81. Permission granted by S. Karger

Country (year)	Case definition, setting and source	Illicit drug-related cases N / Trend*	Cocaine-related cases N / Trend*	% of cocaine over illicit drug cases / Trend <sup>#</sup>
<b>Denmark (2010)</b>	Cases admitted as a result of poisoning with illicit drugs at hospital emergency departments	1 868 /↑16.7 %	155 /↑16.8 %	8.3 % /↔
<b>Hungary (2010)</b>	Cases treated for intoxication of illicit drugs or organic solvents at the department of toxicology of one hospital	1 962 /↑10.8 %	67 /↑12.7%	3.4 % /↔
<b>Ireland (2009)</b>	Non-fatal overdoses discharge at hospitals	4 172 /↓16.1 %	92 /↓37.0 %	2.2 % /↔
<b>Netherlands (2010)</b>	A. Drug-related incidents reported by the police, ambulance transportation services, hospitals and two organisations providing first aid at dance parties from Monitor Drugs Incidenten (MDI)	2 852 /↑11.5 %	188 /↓47.9 %	6.6 % /↓
	B. Drug-related requests for emergency assistance at the Central Post for Ambulance Transports, Amsterdam	1 306 /↑18.6 %	130 /↓10.8 %	10.0 % /↓
	C. Cases with accident, violent incident or self-mutilation related to drug use at hospital emergency departments from Letsel Informatie Systeem (LIS)	4 270**	1 211**	28.4 %
	D. Information requests from physicians, health authorities and others on acute intoxications to the National Poison 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)	2 800*** /↑24.1 %	756*** /↑27 %%	31.5 % /↓
<b>Spain (2009)</b>	Illicit drug-related cases with a direct relationship to cocaine in emergency departments at hospitals	5 567 /↓28.0 %	2 845 /↓36.2 %	51.1 % /↓
<b>United Kingdom (2010)</b>	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 behavioural drug-related disorders at hospitals	22 271 /↑5.0 %	3 502 /↓21.2 %	15.7 % /↓

AG, Basel, Medical and Scientific Publishers.

\* Trends were analysed by comparing the latest number of reported cases with the average number of cases in the two previous years. In the Netherlands (A), illicit drug trends and cocaine trends (A and B) were calculated by a comparison only with the number of cases in the previous year.

\*\* Average number over the 2005–09 period, national estimates based on sample data.

\*\*\* Secondary diagnosis only of abuse or dependence: there were 114 cases with a primary diagnosis.

<sup>#</sup> Trends in the proportion of cocaine-related cases over all illicit drug-related cases were analysed using the Chi-square test (p<0.05).

The proportion all drug-related episodes that features cocaine varied in the six countries and 11 systems analysed, reflecting the differences in the types of cases captured, and in the prevalence of use of cocaine and other drugs. For example, cocaine represented a tenth or less of all drug-related cases in six systems. It represented more than a quarter of the cases in two systems in the Netherlands and more than half of the cases in Spain.

The changes over time seen in 2010 compared to the previous two years were confirmed in Spain in 2011. The numbers stabilised in Denmark and Ireland, and the trend reversed in Hungary where the numbers decreased in 2011, as well as in the United-Kingdom where the numbers increased in 2011. In the Netherlands the picture was mixed and incomplete as two indicators did not allow trend comparison. The previous increasing trend in hospitalisation was confirmed in 2011; however, the trend in calls to poison centres reversed, with an increase in 2011. The trend in the numbers reported by the ambulance services in Amsterdam also reversed, with an increase in 2011.

## 5. Discussion

### 5.1 Data sources on hospital emergencies in Europe

In Europe there is no overall systematic data collection on hospital emergencies, which makes it difficult to obtain a general picture.

The reported information on drug- and cocaine-related hospital emergencies in Europe is limited to a few countries and, until this publication, has not been systematically collated. One of the main findings of this report is that the majority of the European countries report some information on drug-related emergencies, based on a wide range of different settings and sources. Information on illicit drug-related emergencies was retrieved for 20 of the 30 countries that report data annually to the EMCDDA. Most of these (excluding Denmark, Germany and Estonia) include some data on cocaine-related health problems. A total of 33 data sources were cited, as nine countries (Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Italy, the Netherlands, Slovenia and the United Kingdom) have more than one data collection system.

Another important finding of this study is the variety and heterogeneity of the sources used (primarily hospital emergency services, but also including poison centres, first aid services for drug users, police drug squad reports), and therefore of the types of cases reported (see Tables 1 and 2 and Annex 1 for further details by country). Many countries report data from more than one source (Table 1).

In most countries, data are collected from hospitals:

- from emergency departments in seven countries (Bulgaria, Denmark, Spain, Cyprus, the Netherlands, Romania and Slovenia);

- from toxicology departments or clinics in three countries (Bulgaria, Latvia and Hungary);

- from discharge records following hospitalisation because of poisoning by illicit drugs in four countries (the Czech Republic, Ireland, Lithuania and the United Kingdom); and

- from psychiatric hospitals or diagnostics in four countries (Belgium, Denmark, Slovenia, the United Kingdom).

Data collection systems on emergencies that are not based on hospital statistics are reported by five countries:

- cases in which services provided first aid for drug users were reported from Estonia and the Netherlands;

- calls for information about cocaine to the National Poison Information Centre from physicians, health authorities and others on acute intoxications were reported from Belgium and the Netherlands;

- cases from the police drug squad records were reported from Malta;

- data on drug-related road traffic accidents were reported from Norway, but there were no data from emergency settings.

Data not directly related to emergencies were reported from France and Germany:

findings from surveys among drug users accessing low-threshold services (CAARUD) from France;

the results of the MoSyD study on drug trends from Germany.

The situation in Europe contrasts with that in the United States of America, where a structured system of data collection (DAWN) has valuable uses. In the US national estimates of drug-related visits to hospital emergency departments are obtained from the Drug Abuse Warning Network (DAWN) <sup>(7)</sup>, a public health surveillance system managed by the Substance Abuse and Mental Health Services Administration (SAMHSA), US Department of Health and Human Services (HHS). DAWN data are based on a national sample of general, non-federal hospitals operating 24-hour emergency departments. Information is collected for all types of drugs, including illicit drugs, inhalants, alcohol, prescription and over-the-counter (OTC) medication, and dietary supplements. Structured information is reported weekly.

DAWN data are widely used to help monitor problems related to drug use in general, including cocaine (see Annex 2 for further detail). Data on individuals who experience drug-related medical emergencies severe enough to require treatment in an emergency department provide important information on the types of drugs involved in problem substance use and the characteristics of those who suffer the negative consequences of use.

## 5.2 Cocaine related hospital emergencies in Europe

We found, unsurprisingly, that the highest numbers of cocaine-related emergency episodes were reported from countries with a known high prevalence of cocaine use among young adults: Denmark, Ireland, Spain, the Netherlands and the United Kingdom. These countries have a prevalence of cocaine use in the population aged 15–34 that is above the European average (EMCDDA, 2013a).

Where information was available, most cases were males and young adults, consistent with data from general population surveys (EMCDDA, 2013b, 2013d). Some of the cocaine-related emergency cases occur against a background of polydrug use. This is mirrored by the findings of some studies of cocaine-related cases in emergency settings as well as by cocaine-related deaths, which often involve other drugs (EMCDDA, 2013c; Pavarin et al., 2011; Santos et al., 2012; Corkery, 2012).

There was a two- to three-fold increase in cocaine-related emergency episodes in several countries from the late 1990s until 2007–08. This peak in Europe is consistent with the data from the US DAWN system, where the number of cocaine-related visits to emergency departments peaked in 2007. There was a rebound in numbers in the USA in 2010, but the number of visits is still below the number recorded in 2007. Similar to Europe, most cocaine-related cases are young and males (see Annex 2 for further details on the DAWN design and recent results).

The most recent European data show a more complex picture and trends vary between countries. A decrease in the number of hospital emergency cases during the last reported years was seen in the data from Ireland, Spain, the United Kingdom (England in particular) and Hungary (after the peak reached in 2010). Based on the most recent data, an increase was reported from Denmark (until a stabilisation in 2011), from the United Kingdom as a whole, and from two of the five Dutch systems that monitor these emergencies (Ambulance Amsterdam and National Monitor). In

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<sup>(7)</sup> [dawninfo.samhsa.gov](http://dawninfo.samhsa.gov)

Bulgaria and Lithuania an increase in 2011 compared to 2010 was also reported, but small numbers require caution when analysing trends.

Part of the recent decline in cocaine-related hospital admissions and emergencies in some countries is mirrored in data on cocaine-related deaths (Bird, 2010; EMCDDA, 2011). The decline in cocaine-related hospital admissions may be related to a decline in cocaine purity and/or in cocaine use as observed in recent population surveys. It has been hypothesised that in some countries there could have been a shift to using alternative stimulants, including 'legal highs' which seem to have less toxicity than cocaine. Last year use of powder cocaine amongst 16- to 59-year-olds in England and Wales fell from 3 % in 2008–09 to 2 % in 2010–11 (Smith and Flatley, 2011). The mean purity of powder cocaine seized by the police in England and Wales fell from 33 % in 2007 to 24 % in 2010 and the purity of crack cocaine fell from 52 % to 31 % (United Kingdom National Focal Point, 2012). In Spain it was suggested that changes in the availability and purity of cocaine, possibly combined with other factors such as increased risk perception or successful prevention programmes, could explain a reduction in cocaine-related emergency cases, but there is not an apparent switch to other stimulants (Observatorio Español sobre Drogas, 2009).

### **5.3 Limitations of this exploratory report and of the data available through the national reports**

There are several limitations to the data on drug-related emergencies in Europe that are currently available and collated in this report, and analysis must be conducted with caution. Some countries do not currently report data on this issue, including some with a known relatively high prevalence of cocaine use compared with the EU average, notably France, which, after the United Kingdom, Spain, Ireland, Denmark, the Netherlands, Belgium and Cyprus has the eighth highest prevalence of last year cocaine use among 15- to 34-year-olds (EMCDDA, 2013a, 2013b).

The quality of the data reported through some of the National reports is sometimes low, although it has to be remembered that there has not been an active use of this information or guidelines on how to report it. Some national reports provide very limited information of cocaine-related harm, with no reference to hospital emergency data (e.g. Germany and France). This kind of information should be available, to a certain extent, either at the national or local level, in published papers or in reports. This study found in particular: that definitions of the cases considered, the settings and the coverage were unclear; that the data sources referred to varied over time; that some data collection systems have local or regional coverage only; and that the amount of information available was insufficient, or not sufficiently standardised to allow comparisons and the identification of trends.

Some national focal points including those in Latvia and Hungary, do not yet have access to data on drug-related emergencies at the national level and provide data from just one source (respectively one hospital in Riga and one in Budapest), while others use a sentinel-type system (e.g. the Czech Republic and the Netherlands). The picture provided here is therefore incomplete and underestimates the extent of the cocaine-related health problems in Europe.

### **5.4 Challenges of monitoring and analysing acute intoxications through retrospective data from clinical or administrative records**

The Spanish monitoring system and the Dutch Monitor Drugs Incidenten systems have systematic, prospective and long-term data collection systems similar to DAWN in the USA. The sources of most of the other countries discussed here are retrospective data from clinical or administrative records, however, and this information may sometimes be incomplete or of doubtful validity (Domingo-Salvany and Hartnoll, 1999). Some of the reasons for that are detailed below.

### **Underestimation: some hospital systems capture only hospitalised patients**

For example, long-term information from the United Kingdom (England), and also from other countries, is limited to cases from emergency departments that are admitted to hospitals as inpatients. As drug users discharged directly from accident and emergency departments are not captured by the database, the data for England are likely to underestimate the prevalence of acute toxicity related to cocaine (Wood and Dargan, 2010). As an illustration, a study in a London clinical toxicology unit showed that approximately 50 % of those who present to the emergency department with drug-related toxicity are admitted to hospital (Wood and Dargan, 2010).

### **ICD codes: a limited capacity to capture presentations with acute recreational drug toxicity in the hospital**

Cases may be coded by the symptoms (e.g. chest pain, convulsions, stroke, etc.) rather than as being due to cocaine and this is another reason for significant under-representation. There are some limitations inherent in the use of ICD-10 for categorising hospital emergency episodes, admissions and discharges related to drugs. The ICD-10 codes have specific limitations for cases related to new psychoactive substances, for which no codes exist. As an illustration, a study in the United Kingdom (Shah et al., 2011) found that hospital admissions due to 'recreational drugs' without specific ICD10 codes are assigned to a wide variety of primary codes, and/or the use of 'recreational drugs' may not be coded. The authors of this study concluded that further work is needed to look at methods of capturing presentations to hospital with acute recreational drug toxicity, either by updating the ICD codes or by using a more time-responsive data capture system in sentinel hospitals in the UK to monitor trends in acute recreational drug toxicity.

### **Possibly less recognition of cocaine-related cases compared to cases related to other drugs**

Under-reporting of cocaine-related emergency cases is also likely to be due to the often unspecific or chronic nature of the pathologies typically arising from the long-term use of cocaine, and also to the difficulties in establishing causal links between an illness and the use of the drug (de Millas et al., 2010; EMCDDA, 2007). For example, in terms of the possible cardiovascular consequences of cocaine use, studies have shown that although doctors are aware that cocaine is a risk factor for acute coronary syndrome, they are less likely to ask about cocaine use than about classical cardiovascular risk factors such as smoking, diabetes and hyper-cholesterolaemia (Wood et al., 2007). Therefore, for instance, it is likely that doctors do not ask patients presenting with cardiac arrhythmias about recent cocaine use. This may partly explain the limited published data in this area (Wood and Dargan, 2010).

Different definitions are used when collating the number of cocaine-related emergency episodes, and these are often determined by the amount and detail of the information that is recorded and accessible. In particular, some countries extract cases retrospectively from hospital databases that record only one main diagnosis or 'cause' of the incident, as reported from Slovenia; the information that cocaine was present and might have played a role can thus be lost. This is the case, for example, if a patient has used cannabis, amphetamines, cocaine and alcohol and has an accident while under their influence, and in some cocaine-related cardiovascular episodes, as described above — the incident may or may not be recorded as a cocaine-related emergency.

### **Analytical confirmation of the presence and quantification of the drug in emergency settings is rare**

Many cases of acute intoxication do not undergo a toxicological screening, and a diagnosis is therefore based only on a clinician's examination and interview with the patient. This means that most reports of toxicity associated with the drugs are presumptive and that there is no analytical confirmation of the specific drug. This is a limitation in particular in the monitoring of harm related to new psychoactive drugs. This is either due to the lack of analytical testing of biological samples (often this analysis takes too much time to complete to be of use in clinical management); a patient

refuses to provide a sample for testing; or there are issues of cost, availability and methodology. Analytical confirmation of the presence and quantification of a new drug and or its metabolites in the biological fluids should be an essential component of the monitoring systems.

### **Few papers have been published in most countries**

In the questionnaire for the drug-related death experts, we asked if they knew of any research studies using data from emergency services in terms of the harms related to drug use, but very few were cited. Several countries have published data on this type of monitoring, however, particularly Spain, Italy and the United Kingdom. This deserves more attention, as relevant findings should have more visibility in European countries in order to inform prevention interventions.

### **5.5 Drug-related emergencies after road traffic accidents: scarce and heterogeneous reports**

Some National reports include information about emergency hospital visits after road traffic accidents due to the influence of drugs and/or alcohol. We reviewed the data on these accidents in the 2011 National reports (published in 2012) for all countries that had reported drug-related emergency episodes in their National reports since 2008. Only four countries reported data on drug-related traffic accidents (the Czech Republic, Hungary, Italy and the United Kingdom) in 2011 — and Norway in 2009. However, the reports had many limitations. The reporting method was not standardised and data came from a variety of epidemiological approaches (e.g. prevalence of drug among severely injured or dead drivers, and roadside surveys). Some reports provided the number of accidents where illicit drug use was involved, but did not specify whether they were followed by an emergency hospital admission, and Italy and the United Kingdom did not specify which drug was involved. Therefore, no comparison should be made between countries, and any analysis should be cautious: the statistics from the National reports should not be used to estimate emergency episodes that follow road traffic accidents. Further information can be found in the EMCDDA report on drugs and driving (EMCDDA, 2012b) and a summary of this (including methods and the results on cocaine) is presented in Annex 3.

### **5.6 Possible way forward and suggestions**

Despite the limitations discussed above, we believe that we have captured data from the countries that have the greatest number of cocaine-related hospital emergency cases, and that we have gone some way to identifying the burden of harm related to cocaine, the characteristics of the patients and the trends within each of these countries.

Many European countries are able to monitor (at least to some extent) the morbidity associated with drug use (including the harms related to cocaine) using data from hospitals, particularly emergency departments. 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 constitutes an important indirect indicator of drug use.

Some suggestions can be made to try to improve the usefulness of this data. There is a need for explicit case definition(s) of drug-related emergency episodes that are considered and reported. The reports from the monitoring systems need to specify in particular the settings, and the inclusion and exclusion criteria for the cases. This would allow the countries to reproduce easily the monitoring systems that have proved to be efficient and feasible in other countries and would constitute a step towards the harmonisation of the data produced by existing systems in Europe. It would ultimately improve the comparability between countries. This standardisation would also facilitate the continuity of the monitoring systems, which is currently not the case in all countries, as reports from some monitoring systems have been discontinued, impeding the analysis of trends.

## 6. Conclusions and public health implications

This study has revealed a substantial increase in the number of cocaine-related episodes in several countries from the late 1990s until 2007–08. This trend is consistent with the trends in prevalence of use of cocaine in the general population and with the reported number of cocaine-related deaths. This report documents the considerable morbidity related to cocaine use, translated into a large number of cases — several thousand every year — seen in various emergency settings in Europe. The cases are mainly young male adults who have used other drugs together with cocaine.

This report reveals the considerable burden on emergency services in some countries in Europe that results from cocaine use. It points to the potential for early prevention, assessment and referral opportunities that may currently be overlooked. There is appreciable scope to intervene and to refer some patients from emergency departments to drug treatment services or psychosocial support: it has been argued that a closer link between emergency departments and addiction services would help to guide problematic cocaine users towards appropriate treatment at an earlier stage than currently (de Millas et al., 2010).

Data on drug-related emergencies also have reasonable potential to report on the harms associated with patterns of drug use that are becoming more dominant and which are difficult to detect from other information sources. In particular, the data from emergency services may become increasingly important as stimulant use and polydrug consumption patterns become more common on the European drug scene.

Other possible uses of this indicator include the detection of new psychoactive drugs in circulation and the implications of their use in emergency episodes. This might be feasible and relevant in areas where the prevalence of their use is relatively high (such as nightlife settings). The objectives of such studies focused on recreational drugs, and in particular on new drugs, vary from early warning systems to the monitoring of trends. Their feasibility depends on what data are recorded and available on the patients, and on the emergency episode. It also depends on comprehensive toxicological testing (which may require working with laboratories that are willing and able to carry out drug screening beyond the routine screening that is carried out in hospitals) (Dargan and Wood, 2009).

More information on episodes related to recreational drugs seen in hospital emergency settings should be made available from the European Commission funded Euro-DEN project, which began in 2013 and runs for two years. Euro-DEN involves 11 countries (the Czech Republic, Denmark, Estonia, France, Germany, Ireland, Poland, Spain (Barcelona and Mallorca), the UK, Norway and Switzerland) and will be collecting data from hospital emergency departments in these countries on presentation to hospital with acute 'recreational drug' toxicity. It aims to identify potential differences in the drugs responsible for toxicity across Europe, trends in presentations over time and trends in presentations related to new psychoactive substances (European Commission, 2012). Other European Union funded projects may follow the new call for proposal launched in 2013 (European Commission, 2013). Under the priority of prevention, projects were called to develop approaches towards the systematic collection of data on emergency room admission relating to drugs, with a particular focus on identifying trends in use and adverse consequences relating to stimulant and poly drug use.

Results of enhanced surveillance of emergency settings could also contribute to further monitoring the increasing harms associated with the non-medical use of prescription drugs, particularly prescription opioids and benzodiazepines. Recent data also points to the need to monitor closely any increase in deaths caused by opioid analgesics as it may signal an emerging problem in Europe similar to the issue that is now well established in the US (Giraudon et al., 2013). Monitoring the non-fatal intoxications and emergencies related to prescription drugs would contribute to detecting and assessing this increasing European public health concern. Investment

in this area could provide an indicator of drug use trends, help monitor the consequences of drug use within Europe and measure hospital emergency departments' drug-related workload.

Among the emergency settings identified in this report, poison information centres could be further used as source of information on drug use (including NPS) and its health consequences. Use of this source was reported only from Belgium and the Netherlands, but there may be similar centres in many other countries.

## References

- APA (American Psychiatric Association) (2000), *Diagnostic and statistical manual of mental disorders (DSM-IV-TR)*, fourth edition, APA, Washington DC.
- Barrio, G., Molist, G., de la Fuente, L., Fernández, F., Guitart, A., Bravo, M.J. and Brugal, M.T. (2013), 'Itinere Working Group. Mortality in a cohort of young primary cocaine users: controlling the effect of the riskiest drug-use behaviors', *Addictive Behaviors*, 38(3).
- Bird, S. (2010), 'Banned drug may have saved lives, not cost them' ([www.straightstatistics.org/article/banned-drug-may-have-saved-lives-not-cost-them](http://www.straightstatistics.org/article/banned-drug-may-have-saved-lives-not-cost-them)).
- Boghdadi, M. S. and Henning, R. J. (1997), 'Cocaine: pathophysiology and clinical toxicology', *Heart and Lung: The Journal of Critical Care*, 26(6), pp. 466–483.
- Brownlow, H. A. and Pappachan, J. (2002), 'Pathophysiology of cocaine abuse', *European Journal of Anaesthesiology*, 19(6), pp. 395–414.
- Brugal, M. T., Pulido, J., Toro, C., et al. (2009), 'Injecting, sexual risk behaviors and HIV infection in young cocaine and heroin users in Spain', *European Addiction Research*, 15(3), pp. 171–178.
- Brzezinski, M. R., Abraham, T. L., Stone, C. L., Dean, R. A. and Bosron, W. F. (1994), 'Purification and characterization of a human liver cocaine carboxylesterase that catalyzes the production of benzoylecgonine and the formation of cocaethylene from alcohol and cocaine', *Biochemical Pharmacology*, 48(9), pp. 1747–1755.
- Chalumeau, M. (2010), *Les CAARUD en 2008: Analyse nationale des rapports d'activité ASA-CAARUD* [CAARUD in 2008: national analysis of the ASA-CARRUD activity reports], Saint-Denis La Plaine Cedex ([www.ofdt.fr/ofdtdev/live/publi/rapports/rap10/epxmcq7.html](http://www.ofdt.fr/ofdtdev/live/publi/rapports/rap10/epxmcq7.html)).
- Chambers, H. F., Morris, D. L., Tauber, M. G. and Modin, G. (1987), 'Cocaine use and the risk for endocarditis in intravenous drug users', *Annals of Internal Medicine*, 106(6), pp. 833–836.
- Corkery, J.M. (2012), 'Analysis of the data sources, numbers and characteristics of cocaine-related DRD cases reported in special mortality registries, or eventually in general mortality registries (GMR) when necessary', European Monitoring Centre for Drugs and Drug Addiction, Lisbon and University of Hertfordshire, Hatfield. ([www.emcdda.europa.eu/attachements.cfm/att\\_191876\\_EN\\_Cocaine\\_deaths\\_DRD\\_final-1.pdf](http://www.emcdda.europa.eu/attachements.cfm/att_191876_EN_Cocaine_deaths_DRD_final-1.pdf)).
- Cunningham, J. A. (2000), 'Remissions from drug dependence: is treatment a prerequisite?', *Drug and Alcohol Dependence*, 59(3), pp. 211–213.
- Dargan, P. I. and Wood, D. M. (2009), *Hospital and emergency services data: final report*, EMCDDA Contract Code CT.08.EPI.042.1.0, European Database on New Drugs
- DAWN (Drug Abuse Warning Network) (2012), 'Highlights of the 2010 Drug Abuse Warning Network (DAWN) findings on drug-related emergency department visits' ([www.samhsa.gov/data/2k12/DAWN096/SR096EDHighlights2010.htm](http://www.samhsa.gov/data/2k12/DAWN096/SR096EDHighlights2010.htm)).
- de Millas, W., Haasen, C., Reimer, J., Eiroa-Orosa, F. J. and Schaefer, I. (2010), 'Emergencies related to cocaine use: a European multicentre study of expert interviews', *European Journal of Emergency Medicine*, 17(1), pp. 33–36.
- Decorte, T. (2001), 'Quality control by cocaine users: underdeveloped harm reduction strategies', *European Addiction Research*, 7(4), pp. 161–175.

Degenhardt, L., Singleton, J., Calabria, B., et al. (2011), 'Mortality among cocaine users: a systematic review of cohort studies', *Drug and Alcohol Dependence*, 113(2–3), pp. 88–95.

Dinis-Oliveira, R. J., Carvalho, F., Duarte, J. A., et al. (2012), 'Clinical and forensic signs related to cocaine abuse', *Current Drug Abuse Review*, 5(1), pp. 64–83.

Domingo-Salvany, A. and Hartnoll, R. L. (1999), 'Review and synthesis of scientific literature on drug-related non-fatal emergencies', EMCDDA Project CT.97.EP.13, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.  
([www.emcdda.europa.eu/attachements.cfm/att\\_1840\\_EN\\_scilit\\_emergencies.pdf](http://www.emcdda.europa.eu/attachements.cfm/att_1840_EN_scilit_emergencies.pdf)).

Egred, M. and Davis, G. K. (2005), 'Cocaine and the heart', *Postgraduate Medical Journal*, 81(959), pp. 568–571.

EMCDDA (European Monitoring Centre for Drugs and Drug Addiction) (2007), *Cocaine and crack cocaine: a growing public health issue*, Selected issue, Office for Official Publications of the European Communities, Luxembourg ([www.emcdda.europa.eu/html.cfm/index44746EN.html](http://www.emcdda.europa.eu/html.cfm/index44746EN.html)).

EMCDDA (2010), *Annual report 2010 on the state of the drugs problem in Europe*, Publications Office of the European Union, Luxembourg  
([www.emcdda.europa.eu/publications/annual-report/2010](http://www.emcdda.europa.eu/publications/annual-report/2010)).

EMCDDA (2011), *Annual report 2011 on the state of the drugs problem in Europe*, Publications Office of the European Union, Luxembourg  
([www.emcdda.europa.eu/publications/annual-report/2011](http://www.emcdda.europa.eu/publications/annual-report/2011))

EMCDDA (2012a), *Annual report 2012 on the state of the drugs problem in Europe*, Publications Office of the European Union, Luxembourg  
([www.emcdda.europa.eu/publications/annual-report/2012](http://www.emcdda.europa.eu/publications/annual-report/2012)).

EMCDDA (2012b), *Driving under the influence of drugs, alcohol and medicines in Europe: findings from the DRUID project*, Thematic papers, Publications Office of the European Union, Luxembourg  
([www.emcdda.europa.eu/publications/thematic-papers/druid](http://www.emcdda.europa.eu/publications/thematic-papers/druid)).

EMCDDA (2013a), 'Table GPS-2: Last 12 months prevalence of drug use by age and country, most recent national general population survey available since 2000. Part (ii), young adults (15–34)', Statistical bulletin, European Monitoring Centre for Drugs and Drug Addiction, Lisbon  
([www.emcdda.europa.eu/stats13#display:/stats13/gpstab2b](http://www.emcdda.europa.eu/stats13#display:/stats13/gpstab2b)).

EMCDDA (2013b), *European Drug Report 2013: Trends and developments*, Publications Office of the European Union, Luxembourg  
([www.emcdda.europa.eu/edr2013](http://www.emcdda.europa.eu/edr2013)).

EMCDDA (2013c), *Perspectives on drugs: emergency health consequences of cocaine use in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.  
([www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies](http://www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies)).

EMCDDA (2013d), 'Table GPS-4: Lifetime prevalence of drug use by age, gender and country, most recent national general population survey available since 2000. Part (i), all adults (15–64)', Statistical bulletin, European Monitoring Centre for Drugs and Drug Addiction, Lisbon  
([www.emcdda.europa.eu/stats13#display:/stats13/gpstab3a](http://www.emcdda.europa.eu/stats13#display:/stats13/gpstab3a)).

European Commission (2012), *Commission implementing decision of 12.11.2012 on the award of grants for specific transnational projects within the frame of specific programme Drug Prevention and Information under the call for proposals JUST/DPIP/2011-2012/AG*, European Commission, Brussels ([ec.europa.eu/justice/newsroom/files/just\\_dpip\\_2011\\_2012\\_a4\\_decision\\_en.pdf](http://ec.europa.eu/justice/newsroom/files/just_dpip_2011_2012_a4_decision_en.pdf)).

European Commission (2013), *Specific programme 'Drug prevention and information' (2007–2013). Call for proposals JUST/2013/DPIP/AG. Action grants*, European Commission, Brussels ([ec.europa.eu/justice/newsroom/files/dpip\\_ag\\_2013\\_call\\_notice\\_\\_11\\_july\\_en.pdf](http://ec.europa.eu/justice/newsroom/files/dpip_ag_2013_call_notice__11_july_en.pdf)).

Farré, M., de la Torre, R., Llorente, M., et al. (1993), 'Alcohol and cocaine interactions in humans', *Journal of Pharmacology and Experimental Therapeutics*, 266(3), pp. 1364–1373.

Giraudon, I., Lowitz, K., Dargan, P. I., Wood, D. M. and Dart, R. C. (2013), 'Prescription opioid abuse in the United Kingdom', *British Journal of Clinical Pharmacology*, April 18. doi: 10.1111/bcp.12133.

Gossop, M., Manning, V. and Ridge, G. (2006), 'Concurrent use of alcohol and cocaine: differences in patterns of use and problems among users of crack cocaine and cocaine powder', *Alcohol and Alcoholism*, 41(2), pp. 121–125.

Hart, C. L., Jatlow, P., Sevarino, K. A. and McCance-Katz, E. F. (2000), 'Comparison of intravenous cocaethylene and cocaine in humans', *Psychopharmacology (Berl)*, 149(2), pp. 153–162.

Herbst, E. D., Harris, D. S., Everhart, E. T., et al. (2011), 'Cocaethylene formation following ethanol and cocaine administration by different routes', *Experimental and Clinical Psychopharmacology*, 19(2), pp. 95–104.

Kelleher, S. (2007), 'Health care professionals' knowledge and attitudes regarding substance use and substance users', *Accident and Emergency Nursing*, 15 (3), pp. 161–165.

Kelleher, S. and Cotter, P. (2009), 'A descriptive study on emergency department doctors' and nurses' knowledge and attitudes concerning substance use and substance users', *International Emergency Nursing*, 17(1), pp. 3–14.

Lepere, B. and Charbit, B. (2002), 'Cardiovascular complications of cocaine use: recent points on cocaethylene toxicity', *Annales de médecine interne (Paris)*, 153(3 Suppl.), pp. 1S45–6.

Leri, F., Flores, J., Rajabi, H. and Stewart, J. (2003), 'Effects of cocaine in rats exposed to heroin', *Neuropsychopharmacology*, 28(12), pp. 2102–2116.

McCance, E. F., Price, L. H., Kosten, T. R. and Jatlow, P. I. (1995), 'Cocaethylene: pharmacology, physiology and behavioral effects in humans', *Journal of Pharmacology and Experimental Therapeutics*, 274(1), pp. 215–223.

McCance-Katz, E. F., Price, L. H., McDougale, C. J., et al. (1993), 'Concurrent cocaine-ethanol ingestion in humans: pharmacology, physiology, behavior, and the role of cocaethylene', *Psychopharmacology (Berl)*, 111(1), pp. 39–46.

Measham, F. and Moore, K. (2009), 'Repertoires of distinction: exploring patterns of weekend polydrug use within local leisure scenes across the English night time economy', *Criminology and Criminal Justice*, 9, pp. 437–464.

Mena, G., Giraudon, I., Álvarez, E., et al. (2013), 'Cocaine-related health emergencies in Europe: a review of sources of information, trends and implications for service development', *European Addiction Research*, 19(2), pp. 74–81. Epub 2012 Oct 5.

Mittleman, M. A., Mintzer, D., Maclure, M., et al. (1999), 'Triggering of myocardial infarction by cocaine', *Circulation*, 99(21), pp. 2737–2741.

Mouhaffel, A. H., Madu, E. C., Satmary, W. A. and Fraker, T. D., Jr. (1995), 'Cardiovascular complications of cocaine', *Chest*, 107(5), pp. 1426–1434.

Mueller, O., Wersé, B. and Schell, C. (2011), *MoSyD Szenestudie. Die offene Drogenszene in Frankfurt am Main 2010 [The open drug scene in Frankfurt on the Main, 2010]*, Centre for Drug Research, Goethe-Universitaet, Frankfurt a.M. Nationales Zentrum Fruehe Hilfen (NZFH). Nationales Zentrum Fruehe Hilfen. NZFH, Koeln.

Observatorio Español sobre Drogas (2009), *Informe 2009, Situación y tendencias de los problemas de drogas en España [Situation and trends in the drug problem in Spain]*, Ministerio de sanidad y política social, Madrid ([www.pnsd.msc.es/Categoria2/observa/pdf/oed-2009.pdf](http://www.pnsd.msc.es/Categoria2/observa/pdf/oed-2009.pdf)).

Pavarin, R., Lugoboni, F., Mathewson, S., et al. (2011), 'Cocaine-related medical and trauma problems: a consecutive series of 743 patients from a multicentre study in Italy', *European Journal of Emergency Medicine*, 18(4), pp. 208–214.

Pennings, E. J., Leccese, A. P. and Wolff, F. A. (2002), 'Effects of concurrent use of alcohol and cocaine', *Addiction*, 97(7), pp. 773–783.

Perez-Reyes, M. and Jeffcoat, A. R. (1992), 'Ethanol/cocaine interaction: cocaine and cocaethylene plasma concentrations and their relationship to subjective and cardiovascular effects', *Life Sciences*, 51(8), pp. 553–563.

Polettini, A., Poloni, V., Groppi, A., et al. (2005), 'The role of cocaine in heroin-related deaths: hypothesis on the interaction between heroin and cocaine', *Forensic Science International*, 153(1), pp. 23–28.

Pozner, C. N., Levine, M. and Zane, R. (2005), 'The cardiovascular effects of cocaine', *Journal of Emergency Medicine*, 29(2), pp. 173–178.

Qureshi, A. I., Suri, M. F., Guterman, L. R. and Hopkins, L. N. (2001), 'Cocaine use and the likelihood of nonfatal myocardial infarction and stroke: data from the Third National Health and Nutrition Examination Survey', *Circulation*, 103(4), pp. 502–506.

Sanchez, J., Rodriguez, B., de la Fuente, L., et al. (1995), 'Opiates or cocaine: mortality from acute reactions in six major Spanish cities. State Information System on Drug Abuse (SEIT) Working Group', *Journal of Epidemiology and Community Health*, 49(1), pp. 54–60.

Santos, S., Brugal, M. T., Barrio, G., et al. (2012), 'Assessing the effect of patterns of cocaine and alcohol use on the risk of adverse acute cocaine intoxication', *Drug and Alcohol Review*, 31(4), pp. 439–446.

Shah, A. D., Wood, A. D. and Dargan, P. I. (2011), 'Survey of ICD-10 coding of hospital admissions in the UK due to recreational drug toxicity'. *QJM*, 104(9), pp. 779–84.

Smith, K. and Flatley, J. (eds) (2011), *Drug misuse declared: findings from the 2010/11 British Crime Survey England and Wales*, Home Office Statistical Bulletin 12/11 ([www.homeoffice.gov.uk/publications/science-research-statistics/research-statistics/crime-research/hosb1211/hosb1211?view=Binary](http://www.homeoffice.gov.uk/publications/science-research-statistics/research-statistics/crime-research/hosb1211/hosb1211?view=Binary)).

Tortajada, S., Herrero, M. J., Domingo-Salvany, A., et al. (2012), 'Psychiatric morbidity among cocaine and heroin users in the community', *Adicciones*, 24(3), pp. 201–210

Tseng, C. C., Derlet R. W., Stark, L. G. and Albertson, T. E. (1991), 'Cocaine-induced respiratory depression in urethane-anesthetized rats: a possible mechanism of cocaine-induced death', *Pharmacology, Biochemistry and Behavior*, 39(3), pp. 625–633.

United Kingdom National Focal Point (2012), *2012 National report (2011 data) to the EMCDDA by the Reitox National Focal Point, United Kingdom*

([www.emcdda.europa.eu/publications/searchresults?action=list&type=PUBLICATIONS&SERIES\\_PUB=w203](http://www.emcdda.europa.eu/publications/searchresults?action=list&type=PUBLICATIONS&SERIES_PUB=w203)).

Wagner, F. A. and Anthony, J. C. (2002), 'From first drug use to drug dependence: developmental periods of risk for dependence upon marijuana, cocaine, and alcohol', *Neuropsychopharmacology*, 26(4), pp. 279–488.

Wood, D. M. and Dargan, P. I. (2010), 'Putting cocaine use and cocaine-associated cardiac arrhythmias into epidemiological and clinical perspective', *British Journal of Clinical Pharmacology*, 69(5), pp. 443–447.

Wood, D. M., Hill, D., Gunasekera, A., et al. (2007), 'Is cocaine use recognised as a risk factor for acute coronary syndrome by doctors in the UK?' *Postgraduate Medical Journal*, 83(979), pp. 325–328.

Wood, D.M., Conran, P. and Dargan, P.I. (2011), 'ICD-10 coding: poor identification of recreational drug presentations to a large emergency department', *Emergency Medicine Journal*, 28(5), pp. 387–389.

## **Annex 1: Data collection sources and results, country by country**

### **Belgium**

#### **National reports 2007–10**

The National Poison Centre Belgium received 337 calls from health professionals and the general public regarding drug intoxications during 2010. Eighteen (5.3 %) were related to cocaine and another 124 concerned polydrug use, some of which involved cocaine. There were 312 calls in 2008, of which 19 (6 %) involved cocaine. Fewer calls (299) were received in 2009, of which 24 (8 %) related to cocaine.

The Minimal Psychiatric Data (MPD) is a registration system run by the Belgian Federal Public Service, Health, Food Chain Safety, and Environment, collecting data at every psychiatric inpatient admission. Diagnostic data are collected based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 2000) shortly after patients' admission. The MPD system explicitly requests the main diagnosis leading to the admission.

Among all psychiatric admissions in 2008 for which a substance-related disorder was reported by the MPD, the most frequently diagnosed psychiatric co-morbidities were personality disorders (41 %), substance-related disorders due to illicit drugs other than opiates, cocaine, stimulants, cannabis and hypnotics (27.3 %), psychotic disorders (17.4 %) and alcohol-related disorders (7.8 %). Cocaine was recorded as the reason for 740 of 5 289 (14.0 %) admissions due to a unique substance. Furthermore, cocaine was involved in one-third of the 2 253 polydrug cases. In total, 1 483 of 9 142 (16.2 %) admissions were related to cocaine. Roughly half of these cases were related to cocaine alone and the other half were related to cocaine associated with other drugs. Among cocaine users, the most prevalent co-morbidity was personality disorder (diagnosed in 40.5 % of those in which cocaine was the only drug involved).

#### **Most recent data (from the 2011 National report)**

There was a slight increase in the overall number of calls to the National Poison Centre in 2011 (346). Sixteen (4.6 %) of them were related to cocaine, almost equal to the number in 2010. Another 114 cases concerned polydrug use, some of them also involving cocaine.

There was no update of the cocaine data available from the MPD for 2008.

The 2011 National report refers to data from the DRUID project (EMCDDA, 2012b): 0.8 % of the 1 078 injured drivers who were admitted to an emergency department participating in the study between January 2008 and May 2010 tested positive for cocaine (0.1 % for cocaine alone). A total of 37 % were tested positive for one or more substances, including alcohol.

### **Bulgaria**

#### **National reports 2007–10**

In 2010 a total of 152 drug-dependent persons required emergency medical aid at the Clinic of Toxicology of the Multiprofile Hospital for Active Treatment and Emergency Medicine (MHATEM) 'Nikolaj Ivanovich Pirogov' because of acute poisoning, representing 2 % of all the patients registered at the admission toxicology surgery for 2010 (the corresponding proportion for 2008 was 1.8 %). This was the smallest number of drug dependent patients at the clinic during 2008–10 (159 in 2008 and 194 in 2009). Over half (57 %) of those attending in 2010 were treated as outpatients in the emergency admission ward. The majority of episodes were related to heroin (45 %), followed by cannabis (26 %), amphetamines (23 %) and cocaine (7 %, or 11 episodes).

There were more male than female patients every year (129:30 in 2008, 160:34 in 2009, and 113:39 in 2010), although the proportion of males decreased to 74.3 % in 2010 from 81 % in 2008

and from 82 % in 2009. Most (80 %) were aged 19–35 (75 % were in this age group in 2008, and 73 % in 2009).

Data from the Ministry of Health report 3 127 non-fatal drug-related emergencies in 2010, of which 1 116 were overdoses and 2 011 were other non-fatal drug-related emergencies. Regional data for Sofia (981 cases) suggest that two-thirds of the episodes were related to withdrawal syndrome, and 17 % to overdose. The remainder were classified as 'other non-fatal cases'. No specific data on cocaine-related emergencies are available, as individual substances are not identified.

In 2009 the ministry reported 1 583 drug-related emergencies but only 11 of 28 centres for Emergency Medical Aid (CEMA) had provided information. Therefore, the data for 2009 and 2010 are not comparable and do not allow the identification of trends.

#### **Most recent data (from the 2011 National report)**

According to the MHATEM 'Nikolaj Ivanovich Pirogov', in 2011 there was an increase in the number and proportion of cocaine related cases (12 % or 30 episodes in 2011, compared with 7 % or 11 episodes in 2010).

## **Czech Republic**

#### **DRD expert response to questionnaire**

Data on cocaine-related emergencies are collected from hospital emergency departments nationwide, but in practice there are substantial regional differences in coverage. Various health facilities, primarily emergency units, provide reports to the system. It would be possible to obtain access to hospital discharge diagnostic codes for emergency visits.

There are no research studies of illicit drug-related hospital emergency visits in the Czech Republic.

#### **National reports 2007–10**

A sentinel-type system (an early-warning and monitoring system) of data collection has been operated by the Public Health Service since 1995, and the data are collected centrally by the Public Health Office in Prague. In 2010 there were 849 reported cases of non-fatal intoxication with drugs, continuing a decreasing trend (1 255 in 2007; 1 146 in 2008; 1 018 in 2009). No cases involving cocaine were reported in 2010, although there were seven cases in 2008 and two in 2009.

#### **Most recent data (from the 2011 National report)**

The most recent data show a continuing decrease in the reported number of cases of non-fatal overdoses with drugs, with 805 cases recorded in 2011, of which one involved cocaine. As in previous years, the most common substances named as causing these were pervitin (150 cases in 2011), benzodiazepines (138 cases) and other sedatives and hypnotics (105 cases). In 2011 problems with reporting persisted in Prague and in other regions, which did not report a single case for that year. This suggests an underestimation of the number of emergency episodes related to drugs.

In 2011 information on the occurrence of intoxication with addictive substances from 2002 to 2011 was collected for the first time from the National Register of Hospitalisations (NRHOSP) and managed by the Institute of Health Information and Statistics (only cases requiring hospitalisation for more than 24 hours are reported to this register). There has been a long-term decline in the number of admissions for drug poisoning with illicit drugs, from 375 in 2002 to 232 in 2011. In 2011 cocaine was present in one case.

In 2011 a total of 781 individuals underwent an autopsy following their death in a road traffic accident. Of these, 397 had a toxicological examination and cocaine was not identified in any case.

## Denmark

### DRD expert response to questionnaire

Data from the Landspatientregistret or National Patient Register (LPR) include patients registered in somatic or psychiatric emergency departments with poisoning as the main diagnosis, and also those who have been hospitalised with poisoning symptoms without first being in contact with an emergency department.

The episodes recorded include those related to heroin, other opioids, methadone, ecstasy, amphetamines, cocaine, other stimulants and cannabis. From 2000, the coding was altered to record poisoning with amphetamines and with khat.

### National reports 2007–10

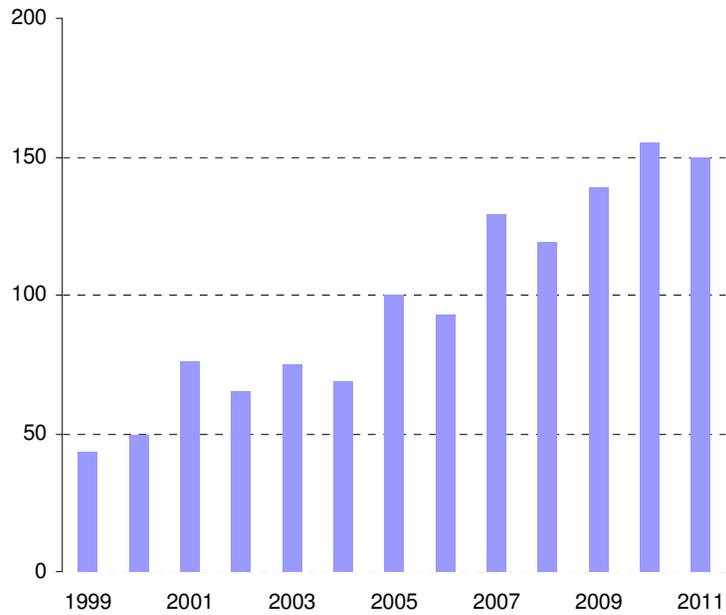
In Denmark the number of individuals admitted to emergency wards as a result of poisoning with illicit drugs has been rising steadily since 2005. From 1999–2010 between 1 147 and 1 868 people were registered annually, and although the number was stable between 1999 and 2005, in 2010 it had increased by 50 % from 2005. It should be noted that the 2010 data were retrieved in August 2011, whereas the data for the previous years had usually been retrieved in May or June. This might have contributed to the increase in 2010. The increase from 2009 to 2010 was particularly due to opioids other than heroin, and to stimulants, especially amphetamines and cocaine.

In 2009, of a total of 1 662 cases of poisoning, 140 (8.4 %) were related to cocaine, a similar proportion to those reported in 2010 (155, or 8.3 % of a total of 1 868). Most cases of poisoning were caused by opioids used by people aged 30 and over. Overall, the proportion of cases aged 30 and over has increased compared with 2005, from around 45 % (of 1 147 cases) in 2005 to around 55 % (of 1 660 cases) in 2010. Poisonings caused by stimulants are most frequently seen among young people (aged under 24) although 30 % of cocaine poisonings occurred among those aged 30 and over.

In 2010 a total of 5 031 people were admitted to psychiatric hospitals with a drug-related primary or secondary diagnosis (co-morbidity). This is fewer than in 2009 (5 464 persons). The decline appears after a linear increase in the number of persons admitted to psychiatric hospitals with a secondary drug-related diagnosis: 3 718 in 2009 and 3 445 in 2010. Those with a drug-related primary diagnosis totalled 1 536 in 2008; 1 746 in 2009; and 1 586 in 2010. Over the past 10 years those with primary diagnoses related to polydrug use have comprised the largest group.

Figure 1 shows the number of hospital contacts due to intoxications and poisoning caused by cocaine over a 13-year period.

**Figure 1**  
**Patients registered at emergency departments in Denmark due to intoxications and poisonings caused by cocaine, 1999–2011.**



Sources:

Reitox National Focal Point, Denmark (2012), *National report 2011: Denmark*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon ([www.emcdda.europa.eu/html.cfm/index213824EN.html](http://www.emcdda.europa.eu/html.cfm/index213824EN.html))

EMCDDA (2013c), *Perspectives on drugs: emergency health consequences of cocaine use in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon. ([www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies](http://www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies)).

### **Most recent data (from the 2011 National report)**

The number of cocaine-related emergency cases reported in 2011 remained stable compared with 2010: 155 (8.3 %) of 1 868 in 2010 and 150 (8 %) of 1 880 in 2011. Overall, two-thirds (66 %) of the drug-related cases were male. A large majority (90 %) of all cases were treated in somatic emergency wards and the others were treated in psychiatric emergency wards. These details were not available for cocaine users, however.

Stimulant users were younger compared to other groups of drug users. The most common age band for stimulant-related cases (including cocaine) was 20–24, whereas the cases related to opioid and to polydrug use were aged 30 and older. As in previous years, it is assumed that drug poisonings are underreported.

## **Germany**

### **National reports 2007–10**

The only recent data on non-fatal overdoses in Germany are from the Monitoring-System Drogentrends (MoSyD) study of the Frankfurt scene (Mueller et al., 2011). The study was conducted from 2002 to 2010, with cross-sectional interviews every second year. Almost two-thirds (293, or 64 %) of the drug users had survived an overdose at least once. The median number of overdoses was 2.5, and on average the last overdose occurred three years previously.

When asked about the drug(s) that had been used at the time of the last overdose in 2010, heroin was cited most frequently (by 94 %), followed by crack cocaine (40 %), medications — particularly benzodiazepines (34 %), alcohol (26 %) and cocaine (13 %). The proportion of cases related to cocaine has decreased compared with 2008 (25 % in 2008 and 13 % in 2010), whereas the proportion of cases related to crack has been stable (38 % in 2008 and 40 % in 2010). When asked about the substance that was primarily responsible for the overdose, heroin was cited most often (by 47 %), followed by the simultaneous use of several substances (26 %).

The main reason given for the overdose was mainly the unknown quality of the drugs used (47 %), followed by polydrug use (26 %). One-eighth of those who had overdosed said it was because they had used too much after a period of abstinence. Other reasons, such as being in poor health or the intention to commit suicide, were infrequently given.

The consumption room was the most frequently reported setting for overdose (by 57 %), followed by on the street (21 %) and at home or in other private settings (19 %).

Sixty per cent of respondents had received help from drug services when they overdosed, 36 % from emergency doctors, 13 % from other drug users, 6 % from acquaintances (non drug users) and a further 6 % stated that they had not received any help at all.

### **Most recent data (from the 2011 National report)**

The most recent data do not correlate with the study previously referred to, making it impossible to comment on trends.

## **Estonia**

### **National reports 2007–10**

Relevant data are limited to Tallinn. According to the Tallinn Ambulance Service, drug users were provided with emergency healthcare due to an overdose on 930 occasions in 2010, of which 75 resulted in hospitalisation. In 2009 emergency healthcare for overdose was provided on 1 399 occasions. In comparison with previous years, the number of drug overdoses decreased

dramatically in 2010 (1 308 in 2007; 1 225 in 2008; 1 399 in 2009). No specific data on cocaine-related emergencies are available.

### **Most recent data (from the 2011 National report)**

Compared with 2010, there was a slight increase in the number of overdose cases reported by the Tallin Ambulance Service in 2011 (952 cases, 84 of which resulted in hospitalisation). Again, no specific data on cocaine-related emergencies are available.

## **Ireland**

### **DRD expert response to questionnaire**

There is no national data collection system recording those attending hospital emergency departments only. If persons are admitted to and discharged from hospital, they are entered onto the Hospital In-Patient Enquiry system (further details below). The National Drug-Related Deaths Index (NDRDI) receives an electronic download of information on discharges relating to drug users who die when they are a hospital inpatient. If a person dies of an unnatural cause (such as an illicit drug overdose) in an emergency department, the death comes under the remit of the coroner and is also recorded by the NDRDI. It would not be possible to obtain access to hospital discharge diagnostic codes for emergency visits.

There are two relevant publications on illicit drug-related hospital emergency visits in Ireland: Kelleher (2007) and Kelleher and Cotter (2009), both concerning emergency doctors' and nurses' knowledge of and attitudes to substance use and users.

### **National reports 2007–10**

HIPE (Hospital In-Patient Enquiry) is a computer-based health information system, managed by the Economic and Social Research Institute (ESRI) in association with the Department of Health and Children (DoHC) and the Health Service Executive (HSE). It collects demographic, medical and administrative data on all admissions, discharges and deaths from acute general hospitals in Ireland. It was started on a pilot basis in 1969 and then expanded and developed as a national database of coded discharge summaries from the 1970s onwards. Each HIPE discharge record represents one episode of care: each discharge of a patient, whether from the same or a different hospital, or with the same or a different diagnosis, generates a separate HIPE record. The scheme therefore facilitates analyses of hospital activity rather than of the incidence of ill health.

Data extracted from HIPE in 2009 reveal that there were 4 202 overdose cases, of which 30 resulted in death in hospital (0.7 %), the other 4 172 cases being discharged. Of the discharges, the number of overdose cases decreased by 2.9 % between 2007 and 2008, and by 13 % between 2008 (4 772) and 2009.

During 2005–09, there were more overdose cases among females than among males: females accounted for 54 % of all overdose cases in 2009. In the four-year period 2005–08 one-quarter of overdoses occurred in persons aged 15–24 years, with the incidence of overdose decreasing with age. The proportion of under-25s who overdosed fell in 2009, accounting for 32 % (1 328 of 4 172 discharges), compared with 40 % (2 015 of 5 012 discharges) in 2005.

In 2009 HIPE data reveal 92 overdoses involving cocaine (2.1 % of 4 172 discharged overdose cases). This is a decrease compared with 121 of 4 918 discharges in 2007 (2.5 %) and 131 of 4 772 discharges in 2008 (2.7 %).

### **Most recent data (from the 2011 National report)**

In 2010 the HIPE data were stable compared with the previous year, with a total of 94 overdoses involving cocaine and discharged from hospitals (2.1 % of 4 522 cases). Cocaine represented 16 % of the 588 cases that involved narcotics and hallucinogens, far less common than opiates (80 % of these cases). Overall, the proportion of under-25s who overdosed was stable in 2010 (34 %) compared with 2009 (32 %), but these data were not available for cases related to cocaine.

## Spain

### DRD expert response to questionnaire

Data to monitor hospital emergencies related to the non-medical or non-therapeutic use of psychoactive drugs in Spain began to be collected in 1987 and comprised part of a broader range of information sub-systems developed within the framework of the National Plan on Drugs in collaboration with the Autonomous Communities.

### National reports 2007–10

Data collection on drug-related hospital emergencies includes the date of the emergency, gender, age, nationality, the patient's legal status (whether or not they are under arrest), detailed diagnoses of the emergency, psychoactive substances (up to six) used, routes of administration, evidence of the emergency being directly related to the drugs used and the most recent route of administration, and the treatment provided for the emergency.

The data are used to monitor the evolution and characteristics of problem psychoactive drug use, especially opiates and cocaine, which usually cause more frequent problems than other drugs. Unlike the treatment admissions indicator, this indicator has never been implemented in all of the Autonomous Communities and, with some exceptions, the areas covered and the number of hospitals that are monitored in each have varied from year to year. In addition, the system underwent some major definitional changes in 1996 and 2003. With this history, the national perspective presented below must be treated with caution.

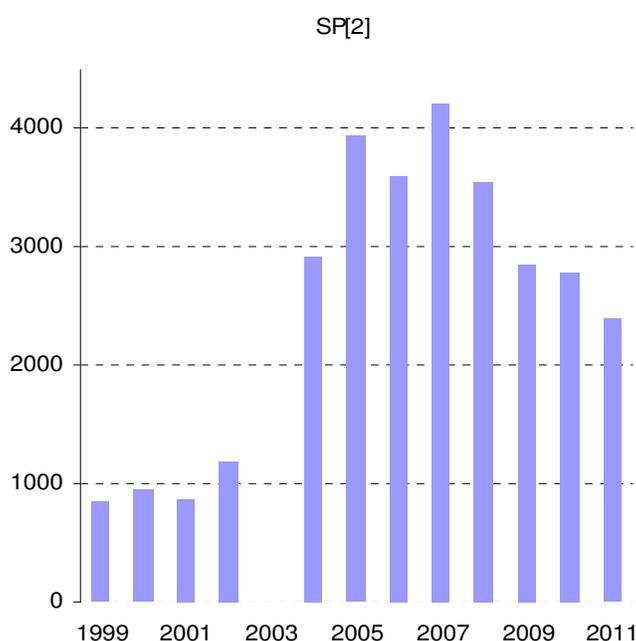
During 2009 a total of 11 890 emergency episodes involved those who had used non-therapeutic or non-medical psychoactive drugs (whether or not use was the reason for the visit to emergency services). The information came from 15 Autonomous Communities, in most areas confined to one randomly selected week per month, while in others, such as in the city of Barcelona or on the Island of Ibiza, data were generated continuously. Of these episodes, 5 567 (46.8 %) were related to the non-therapeutic use of psychoactive drugs, whether the drug was mentioned or directly related to the episode (compared with 7 838 in 2007 and 6 431 in 2008). In 2009:

- Most patients were male (77.3 %). The percentage of females has varied across the years, ranging from 20.8 % in 1997 to 28.0 % in 2004.
- The average age of the emergency department patients was 32.7, and the male average was older than the female average. Over the years, the general trend has been an increase in the age of patients, from an average of 27.8 in 1996 to 32.4 in 2008.
- The youngest cases related to volatile inhalable drugs (average 24.6 years), hallucinogens (average 27 years) and ecstasy (average 28.6 years). The oldest average age was in cases with mentions of heroin (36.2 years) or other opiates (37.8 years). The average age of those with cocaine involved was 33.4 years.
- The outcome of the 3 413 cases related to cocaine was mainly discharge (81.2 %), self-discharge (8.7 %), hospital admission (7.5 %) and transfer to another hospital (2.5 %).
- In 2009, of all 5 567 episodes related to drugs (whether the drug was mentioned or directly related to the episode), cocaine was the most commonly mentioned substance, reported by 61.3 % of emergency department patients. These episodes included the cases for which regular or sporadic use of cocaine was noted in the medical records, and episodes where cocaine was directly related to the emergency problem. The proportion of patients who had used cocaine rose from 27.4 % in 1996 to 63.4 % in 2005, but has stabilised at 60–63 % since then. Cocaine was also the drug most often mentioned as directly related to the emergency problem (in 51.1 % of cases).

- Of the emergency cases where the physician stated a direct relationship between drugs and the emergency episode, the average age was 32.9 years (33.4 years for cocaine), and 79.5 % (79.6 % for cocaine) were males.
- The most frequent administration route, reported by 60.0 % of cases where cocaine was directly related to the emergency, was intranasal (sniffing or snorting), followed by injection (18.3 %) and smoking (17.4 %).

Figure 2 shows the number of drug-related emergencies 1999–2011 that were directly related to cocaine use.

**Figure 2**  
**Emergency cases due to an acute reaction following the use of psychoactive substances with a direct relation to cocaine in Spain, 1999–2011.**



Sources:

Reitox National Focal Point, Spain (2012), *National report 2011: Spain*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon

([www.emcdda.europa.eu/html.cfm/index214091EN.html](http://www.emcdda.europa.eu/html.cfm/index214091EN.html)).

EMCDDA (2013c), *Perspectives on drugs: emergency health consequences of cocaine use in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.

([www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies](http://www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies)).

### **Most recent data (from the 2011 National report)**

The most recent data on cocaine-related emergencies confirmed the decreasing trend observed from 2008. In 2010, of all episodes related to drugs, cocaine was the most commonly used, reported by 58.5 % of emergency department patients. Cocaine was also the drug most frequently directly related to the emergency problem, in 2 779 of 5 626 cases (49.4 %). In 2011 this number had decreased again, down to 2 386 cases (communication of the 2011 total number by the Spanish National Focal Point with no further breakdown, mentioned in the revision of *Perspectives on drugs*, dated 10 June 2013).

In 2010 the age distribution of the cases where cocaine was directly related to the emergency was stable compared with previous year, with patients aged 33 on average and aged 33.3 for those

where cocaine was among the substances mentioned. The proportion of female cases in which cocaine was directly related to the emergency increased from 20.4 % in 2009 to 25.5 % in 2010. The increased proportion of females was also observed for other drugs.

The main route of administration of cocaine by patients seen at emergency services in 2010 was intranasal, and the proportion of patients who had used this route slightly increased from 2009. The most frequent administration route for cases in which cocaine was directly related to the emergency was also intranasal (63.4 %, compared with 60.0 % in the previous year) followed by injection (16.3 %) and smoking (15.5 %).

## France

### National reports 2007–10

The ENa-CAARUD (Centres d'accueil et d'accompagnement à la réduction des risques pour usagers de drogues) national survey is conducted every two years (Chalumeau, 2010). Of the drug users interviewed in 2008 a total of 7.4 % (224) reported having had an episode of loss of consciousness after taking psychoactive substances in the previous twelve months. Where the information was available, the substances that 211 of these users most commonly presumed to be responsible for this were heroin (21.3 %), alcohol (19.0 %), and cocaine (18.5 %).

### Most recent data (from the 2011 National report)

The most recent data are similar to those from 2009. In 2010 a total of 6.5 % (144) of the ENa-CAARUD users reported having had an episode of loss of consciousness after taking psychoactive substances in the previous twelve months. Where the information was available, the substances most commonly reported by users to be responsible for this were heroin (23.6 % of cases) and cocaine (18.8 %). Alcohol (13.9 %) showed a decrease.

## Italy

According to the Italian Ministry of Health, nationally, the number of hospital admissions with principal or secondary diagnoses related to psychoactive drug use was 26 601 in 2007; 25 910 in 2008; and 23 997 in 2009. These cases represented around two per thousand of all annual hospital admissions, for each of these three years. There was a 10 % decrease over the three-year period in question, a greater decrease than that observed overall for admissions related to all causes.

In 2009 the average age of the drug-related cases was 40 years for men (46 years for women) and 58 % were male.

The most frequent outcome of cases in 2009 was discharge to home, for around eight in ten cases, followed by self-discharge for around one in ten. The other cases were transferred to another facility and less than 1 % died. Around one-third of these hospital admissions were related to non-urgent or planned care, whereas two-thirds were urgent and required emergency care: 15 445 cases in 2008 and 14 470 in 2009.

Cocaine was the cause of the admission in 2 408 cases in 2008, compared with 1 898 cases in 2009 (a 21.2 % decrease). The proportion of hospital admissions accounted for by cocaine has increased from 2004 to 2008, when it reached a peak with 9.3 % of the admission related to drugs. It decreased afterward and cocaine represented 7.9 % of all the drug-related admissions in 2009.

### Most recent data (from the 2011 National report)

The data presented above were not updated in the most recent National report, although there is some analysis of the mortality of patients admitted to hospital for drug-related causes.

In 2010 a total of 208 people died after a drug-related admission, representing less than 1 % of the total number of drug-related admissions during that year. A third of the hospital admissions related to opiates ended in deaths (32 %), compared with 6 % of those related to cocaine.

Between 2008 and 2010 the number of drug-related hospital admissions fell by 7.8 %. Over this period, drug-related hospital admissions represented two per thousand of all hospital admissions and were mostly related to psychiatric problems, traumas and poisoning. Medical emergencies accounted for most of these admissions. There was no information on how many of the admissions followed cocaine-related episodes.

The National Institute of Statistics reported 211 404 road traffic accidents in 2010 in which persons were injured or killed, a decrease of 1.9 % compared with 2009. In the course of these accidents, 302 735 persons were injured and 4 090 died. Drugs were the cause in 0.43 % (916) cases; in 0.49 % (1 471) of the injuries; and in 1.47 % (60) of the deaths. There was no information on the specific substances involved.

## Cyprus

### **DRD expert response to questionnaire**

A large percentage of drug users are treated for overdose at hospital emergency units. However, there is a scarcity of resources at such units for recording non-fatal overdoses and drug-related fatal poisoning, injury, and acute health episodes.

### **National reports 2007–10**

Only basic information was collected from four of the country's five hospital emergency units. Four cocaine-related cases were reported in 2010, and nine in 2009.

During 2009, in order to determine the profile of overdose patients presenting at hospital emergency departments, representatives of hospital emergency units that participate in the Special Registry's working group were given precise instructions on how to improve reporting non-fatal illicit drug-related emergencies. Currently, some sporadic recording of cases does take place and some relevant training of hospital emergency department staff has also been conducted. Although they have repeatedly asserted that it will be very difficult to collect information, emergency unit representatives have nevertheless expressed a commitment to doing so.

### **Most recent data (from the 2011 National report)**

In 2011, basic information was requested from all five of the country's hospital emergency units. Four cases of non-fatal overdose were reported by two hospitals. Two hospitals did not collect information, and one mentioned only 'many cases of known drug users'. Due to a lack of human resources, the recording of information continues to be scarce. There was no information available specifically on emergencies related to cocaine.

## Latvia

### **DRD expert response to questionnaire**

The Latvian National Focal Point does not currently have data from hospital emergency departments, although work is planned with them to collect data on those receiving assistance in drug overdose cases.

### **National reports 2007–10**

At the Riga Eastern Clinical University Hospital Toxicology Centre, 186 overdoses due to illicit drugs were registered in 2007 and 143 in 2009. These cases are limited to inhabitants from Riga and the Riga district. There were two cases of cocaine overdose in 2007 (1 % of all overdoses) and one in 2009 (0.7 %). No data were available for 2008.

### **Most recent data (from the 2011 National report)**

Data on non-fatal overdoses and on drug-related emergencies are still not compiled nationally. According to the information provided by the Riga Eastern Clinical University Hospital Toxicology Centre, the number of overdose cases has decreased compared with the 143 cases in 2009: there were 46 cases in 2010 and 61 in 2011.

In 2011 the average age of the persons treated was 25 years, and 80 % were males. The number of cases in which cocaine was identified is not available.

## **Lithuania**

### **DRD expert response to questionnaire**

National data are routinely collected by the State Patients' Fund at the Ministry of Health and the Lithuanian National Focal Point reports on drug-related poisoning. It would be possible to obtain access to hospital discharge diagnostic codes for emergency visits.

### **National reports 2007–10**

In 2010, according to the State Patients' Fund, healthcare institutions recorded fewer cases of poisoning with drugs than in the previous four years. There were 255 cases in 2010 compared with 308 in 2009. Opioids (opium, heroin, codeine, morphine or methadone) were involved in 130 cases (51 %) in 2010 compared with 124 (40 % of 308 cases) in 2009.

Of these cases, the proportion with heavy intoxications (defined as those who required referral to intensive care units) increased. In 2010 emergency hospitals reported 127 such episodes involving 117 individuals. Heavy intoxication episodes accounted for 50 % of all cases of drug intoxication. This compares with 75 episodes involving 68 persons in 2009 and 118 episodes involving 106 persons in 2008.

During the five years from 2006–10 a total of 8.9 % (127 of 1 423) of intoxications involved cocaine.

In 2010 there were four times more males than females registered as hospital inpatients due to poisoning with drugs and psychotropic substances: 204 males (191 in 2009) and 51 females (47 in 2009). Fourteen (5.5 %) of these 255 cases were attributed to cocaine (11 males and 3 females).

### **Most recent data (from the 2011 National report)**

In 2011 there was a significant decrease in the total number of poisonings with drugs: 211 cases and 181 individuals compared with 255 cases and 238 individuals in 2010. The average age of the patients was 28.6 years and the majority (140/181; 77 %) were males. The drugs most often involved were opium (53 cases) and heroin (41 cases). The proportion of heavy intoxication episodes decreased from 127 of 255 (50 %) in 2010 to 78 of 211 (37 %) in 2011. Cocaine accounted for 9 % (19 of 211) of cases in 2011, a slight increase compared with 6 % (14 of 255) of cases in 2010.

## **Hungary**

### **DRD expert response to questionnaire**

There is no routine national data collection system on drug-related visits to hospital emergency departments in Hungary. However, the Clinical Toxicology Department of Péterfy Sándor Street Hospital in the Municipality of Budapest reports to the Országos Statisztikai Adatgyűjtő Program (OSAP, the National Statistical Data Collection Programme) which includes national data on drug-related treatment. Since all drug-related intoxications are treated in this department and clients from Pest county are also brought here, the system can be categorised as a regional data collection system.

It would be possible to obtain access to hospital discharge diagnostic codes for emergency visits, from the National Health Insurance Fund.

There are no studies of illicit drug-related hospital emergency visits in Hungary.

### **National reports 2007–2010**

During 2010 a total of 1 962 people were treated at the Clinical Toxicology Department of Péterfy Sándor Street Hospital due to illicit drugs or organic solvents (670 in 2006; 672 in 2007; 1 692 in 2008; 1 808 in 2009). There was therefore an increase of 8.5 % from 2009 to 2010.

There was a slight increase in the number of males who were treated in 2010 (1 042 in 2009 and 1 111 in 2010) and an 11 % increase in the number of females (766 in 2009 and 851 in 2010). The age groups 20–24, 25–29 and 30–34 were the most represented in 2010 (respectively 209, 246, 221 male cases and 141, 122, 137 female cases).

The number of people treated in 2010 due to cocaine use did not change much compared with the previous year (67 people compared with 64 in 2009), but there was a 26 % increase between 2008 (53 persons) and 2010.

### **Most recent data (from the 2011 National report)**

In 2011 there was a significant increase in the number of people who were treated at the Clinical Toxicology Department of Péterfy Sándor Street Hospital due to illicit drugs or organic solvents: 2 662 cases compared with 1 962 in 2010 — a 36 % increase. The increase was larger among males (+ 59 %) and was mainly accounted for by episodes related to ‘amphetamine-type stimulants (ATS)’ (+86 %). About two-thirds of all cases were related to ATS (61 %). No more data are available on the nature of the drugs classified in this group but it is suggested than many could be due to the increasing use of cathinones.

In 2011 a total of 22 people were treated due to cocaine, a decrease from 67 compared with the previous year.

In 2011 some 132 cases of road traffic accidents were suspected to be related to drugs. The Institute of Toxicology screened urine samples for drugs and 87 were positive. The most common substances identified were THC (23 cases), benzodiazepines (16 cases) a combination of THC and amphetamines (11) and amphetamine alone (7). Two cases were positives for cocaine alone and 7 cases were positive for a combination of cocaine and THC.

## **Malta**

### **National reports 2007–10**

Data on non-fatal overdoses are obtained on a yearly basis from police drug squad records. There were 65 cases of non-fatal overdoses related to illicit drugs in 2009, representing 29 % of all overdose cases, and 59 cases in 2010 (26 % of all overdose cases). Although there was a small decrease in the number of cases from 2009 to 2010, there was an overall substantial increase compared with previous reporting years, with only 19 cases reported in 2007 (20 % of all overdoses) and 28 cases in 2008 (27 %). The vast majority (88 %) of non-fatal overdose cases related to illicit drug use were male.

No specific data on cocaine-related emergencies are available.

### **Most recent data (from the 2011 National report)**

Police drug squad records showed a decrease in non-fatal overdoses in 2011, with 42 cases related to illicit drugs compared with 59 in 2010. Cases related to illicit drugs represented 25 % of all overdose cases, similar to the proportion in 2010 (26 %). No specific data on cocaine-related emergencies are available.

## Netherlands

### National reports 2007–10

There are five relevant data collection systems in the Netherlands: Monitor Drugs Incidenten (MDI), a monitor of drug-related emergencies; ambulance transportation data in Amsterdam; Letsel Informatie Systeem (LIS), a drug-related emergencies monitor covering several regions of the country; requests for information on drug intoxications at the National Poison Information Centre (NVIC); and data from the National Drug Monitor on hospital admissions due to drug use or dependence (as a primary or secondary diagnosis). Data from each of these sources is presented below.

### Monitor Drugs Incidenten (MDI)

MDI has been running since 2009. In eight sentinel regions in the country, data on emergencies related to drug use are collected in a standardised format at the emergency department of the hospital, at the ambulance and by forensic doctors (in the pilot phase, GPs were found to be not an informative source as they rarely saw these cases). In addition, several first aid organisations serving at large parties contribute to the monitor. These four sources deliver very different types of drug emergencies, and therefore contribute to providing a complete picture. The regions have not been selected for being representative but for being the most informative. Amsterdam is included as highly atypical, both in the types of drugs used (e.g. magic mushrooms are only used here) and in the atypical population seeking help, of which almost half are tourists. Also included are: a typical student city; a fisherman's region with high reported cocaine use;; a border region; the region where GHB first came up, etc. It is thought that using sentinel regions instead of representative regions, allows new developments to be picked up earlier. The MDI system does not aim to produce national estimates of drug-related emergencies <sup>(8)</sup>.

Since 2009 data on drug-related emergencies at dance events and other setting mentioned above have been collected by the MDI from eight regions. The number of participating regions increased from four in 2009 to six in 2010. Cases are reported by the police, ambulance transportation services, hospitals and two first aid organisations at dance parties. Reported incidents totalled 2 525 in 2009 and 2 852 in 2010. Two-thirds of the emergencies involved males and 39 % involved young adults aged 18–24.

Cocaine alone was involved in 188 episodes in 2010 — 7 % of the total number of emergencies (11 % in 2009). In terms of cases involving the use of a single drug, cocaine was in fourth place, after cannabis (29 %), ecstasy (20 %) and gamma-hydroxybutyric acid (GHB, 13 %). The intoxications related to cocaine-only use were mostly categorised as 'light' or 'mild' (87 %). Males accounted for 79 % of incidents related to cocaine-only use and their median age was 31. Of the cocaine-related emergencies, 67 % also involved alcohol.

### Amsterdam ambulance transportation data

The Public Health Service of Amsterdam (GGD Amsterdam) provides trend data on non-fatal emergencies brought to its attention by the Central Post for Ambulance Transports (CPA). The link between the emergency and drug use is based on case history and circumstantial data: there is no toxicological confirmation.

The annual number of drug-related requests for emergency assistance by the CPA almost doubled from 2001 to 2010 (from 703 to 1 306). In 2010 most drug-related emergencies were related to the use of cannabis (45 %), followed by GHB and cocaine (130 cases, 10 % each). Two-thirds (67 %) of the cocaine-related cases required transportation to hospital (a proxy measure for the seriousness of the emergency), compared with 39 % of cannabis cases and 85 % of GHB cases. Although there was a small increase of the total number of cases requiring assistance in 2010,

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<sup>(8)</sup> This background information on the MDI system was provided by Esther Croes from the Trimbos-instituut.

cocaine intoxications decreased compared with the previous year, from 13.2 % (144 of a total of 1 095 intoxications) in 2009 to 10.0 % (130 of 1 306).

### **Letsel Informatie Systeem (LIS) data**

LIS, of the Consumer Safety Institute, provides information on the number of people treated annually at the emergency departments of hospitals. These data are derived from a representative selection of hospitals and extrapolated to yield national estimates. Because of the estimation method and associated error margin, data are averaged over five years.

It is estimated that from 2005–09 around 4 270 people were treated annually at a hospital emergency department following a drug-related accident, violent incident or self-mutilation (compared with 16 000 related to alcohol). Of these cases, 46 % were aged 20–29 and 73 % were male. Poisoning was the most frequent cause of the emergency (75 %). The proportion of drug-related emergencies following an accident, violent incident or self-mutilation requiring hospitalisation was relatively high at 36 %. From the cases in which the drug was known (63 %), cocaine was the most frequently cited (in 45 % of the cases).

### **Data from the National Poison Information Centre (NVIC)**

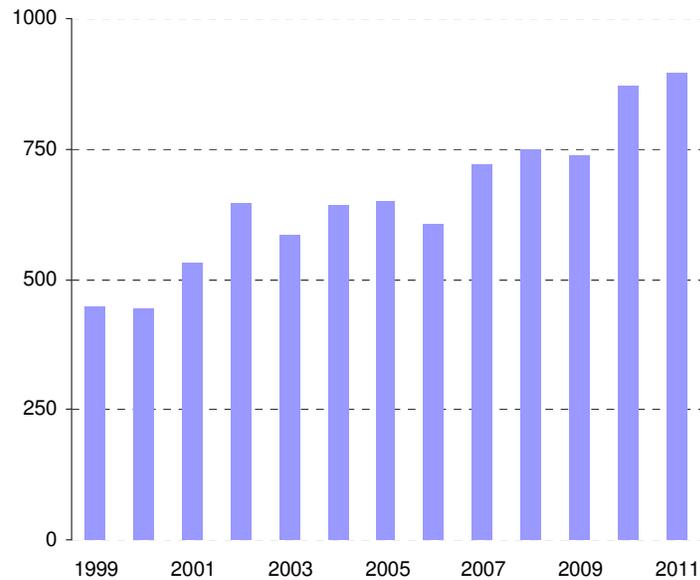
Another source of information on trends in drug-related emergencies is provided by the number of intoxications about which physicians, health authorities, and others have requested information by telephone (and, since, 2008, via the internet) from the NVIC at the University Medical Centre Utrecht. These data are only indicative, however, and do not reliably represent the actual number of acute intoxications.

The number of requests for information on acute intoxications recorded by the NVIC increased between 2000 and 2005 but dropped slightly in 2006. During 2008, 2009 and 2010 there were 1 212, 1 158 and 1 243 requests respectively. In 2010 the most common request was related to cocaine (243 of 1 243, or 20 %), almost the same proportion as in the previous two years (255, or 21 %, in 2008 and 238, or 21 %, in 2009).

### **National Drug Monitor**

The four data collection systems on drug-related emergencies in the Netherlands described above are completed by the National Drug Monitor, administered by the Trimbos-instituut (the Netherlands Institute of Mental Health and Addiction). This system collects the number of clinical admissions in general hospitals due to drug use or dependence (as a primary or secondary diagnosis). Data on clinical admissions in the hospitals are from the Dutch Hospital Registration (LMR), which is held by the Dutch Hospital Data Foundation (DHD) and covers all hospitals in the Netherlands. The exact proportion of clinical admissions that has resulted from an emergency is not known, and some (likely to be few) admissions might not be emergencies. Nonetheless, this indicator is presented as it allows identification of trends in cocaine morbidity: Figure 3 shows clinical admissions in general hospitals due to cocaine use or dependence in the Netherlands over a 13 year period from 1999.

**Figure 3**  
**Hospital admissions in general hospitals due to emergencies related to cocaine use or dependence (primary or secondary diagnosis) in the Netherlands, 1999–2011.**



Sources:

National Drug Monitor, Trimbos-instituut (the Netherlands Institute of Mental Health and Addiction), Utrecht, 2011.

Reitox National Focal Point, Netherlands (2012), *National report 2011: Netherlands*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon ([www.emcdda.europa.eu/html.cfm/index213775EN.html](http://www.emcdda.europa.eu/html.cfm/index213775EN.html)).

EMCDDA (2013c), *Perspectives on drugs: emergency health consequences of cocaine use in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon. ([www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies](http://www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies)).

**Most recent data (from the 2011 National report)**

In 2011 the number of regions participating in the **Monitor Drugs Incidenten (MDI)** increased to eight and a total of 25 institutions participated. As in previous years these included ambulance services, emergency departments in hospitals, forensic doctors and organisations with a first aid medical post at dance parties.

A total of 3 652 emergencies were reported, from ambulance transportation services (2 022), hospital emergency departments (257), forensic doctors (327) and emergency posts at dance parties (1 046). It is not possible to compare these statistics with those from previous years, as the nature and number of contributors to the MDI has changed.

Similar to previous year, most patients were males. The majority were aged 25 or over, except for those reported from dance parties, the majority (57 %) of whom were under the age of 25. Around 85 % or more of the cases had used a combination of drugs. Around 90 % suffered intoxication and the remainder suffered trauma.

Similar to previous years, cocaine alone was involved in 8 % of the cases reported from both ambulance transportation and hospital emergency departments. Cocaine cases were rare at dance parties (1 %) but more frequent in forensic cases (19 %).

In 2011, **Amsterdam ambulance transportation** data reported 179 ambulance attendances to patients who had used cocaine, an increase on the 130 reported in 2010. More than half (55 %) of the cocaine-related cases in 2011 required transportation to hospital (a proxy measure for the seriousness of the emergency) compared with 67 % in 2010.

**Letsel Informatie Systeem (LIS)** data are averaged over five years and, compared with the previous 2005–09 figures, the 2006–10 figures are stable, with an estimated 4 200 people treated annually at a hospital emergency department for drug-related episodes. Around 17 000 were treated because of alcohol use. Similar to previous estimates, around half of the patients (47 %) were aged 20–29 years, and three-quarters (74 %) were males. Poisoning was the most frequent cause of emergency (74 %). The information on the type of drug involved was available in around four in five cases. In these cases, cocaine was the most frequently mentioned drug (28 % of the cases), followed by GHB (22 %) and cannabis (18 %). The National report 2011 suggests that it is likely that patients underreport drug use, and thus these statistics might be an underestimate of the actual number of emergencies related to drug use.

Data from the **National Poison Information Centre (NVIC)** show that, as in 2010, cocaine was the most frequent drug on which the NVIC was consulted. There was a small decrease in the number of cocaine-related calls in 2011 (219 compared with 243 in 2010).

As shown in Figure 3, the **National Drug Monitor** reports a slight increase in 2011, with 896 cases admitted to the hospital with primary (86) or secondary diagnosis (800) related to cocaine. This compares with 870 cases in 2010.

## Romania

### National reports 2007–10

In 2009 data on drug-related cases were requested from 56 emergency hospitals from the administrative territorial units of Romania, 15 in the Bucharest Municipality. Of these, 45 responded to the request (including 11 in the Bucharest Municipality) and they reported a total of 999 drug emergency cases.

In 2010 data were requested from 70 emergency hospitals and 65 responded, reporting 2 935 non-fatal drug-related emergency cases. However, the number of reporting hospitals changed, and no details were available on trends in those hospitals that had reported data in both 2009 and 2010. Valid comparisons between 2009 and 2010 are therefore limited.

In 2010 data were reported for each of nine regions. The Bucharest-Ilfov region had the highest number of non-fatal drug-related emergencies, followed by the North East region. Bucharest-Ilfov had also reported the most cases in 2009, followed by the North West region.

Almost three-quarters of the cases reported in 2010 were males (2 114 of 2 935, or 72 %) and the male:female ratio was 2.6. Over half (57.7 %) of the patients in drug emergency units in 2010 were aged 24 or younger; just over a quarter (28.1 %) were aged 25–34; and the remaining 14 % were aged over 35. The average age of the cases was 26 years (27 for females and 25 for males). In males, the predominant age group was 20–24 years (35 %) compared with 21 % of females in this age group. Among females, the predominant age group was 15–19 years (27 % compared with 20 % for males). The modal value of all cases is 20 years and there is a concentration of a very large segment of the analysed population in the age group 15–39 years.

Compared with 2009, there was an increase in the proportion of cases aged under 35 (from 72 % in 2009 to 87 % in 2010). While there was a small change in the age of males compared with the previous year (80 % were aged under 35 in 2009, compared with 89 % in 2010), there was a considerable increase of the proportion of females aged under 20 (12 % in 2009 and 34 % in 2010) and a decrease of the proportion aged over 30 (from 51 % to 30 %). The male:female ratio is

higher for those aged under 45. The male:female ratio is the highest (4.2 males:1 female) for the age group 20–24, while there are more females than males among those aged over 45 (1.3 female:1 male).

Of the 2 935 cases of drug-related emergencies reported in 2010:

- 89 % (2 622) were caused by acute intoxication with a variety of licit and illicit substances. This represents an increase from 77 % in 2009. In 2010 the most common cases (43.6 %) were related to 'ethno-botanicals' (substances from plants), followed by acute intoxication with medicine (17.5 %).
- 5.7 % (168) had withdrawal syndrome. This was similar to the proportion of 6 % in 2009.
- 1.6 % (46) had overdosed, a significant decrease from 14 % in 2009. There were no registered cases of cocaine overdose in 2010, while they comprised 0.4 % of drug-related emergencies in 2009.
- 1.4 % (41) presented with symptoms of coma, a significant decrease from 3.1 % in 2009.
- 1.9 % (58) were diagnosed with emergencies related to the use of psychoactive substances (self-induced lesions and trauma, accidents and other external incidents), an increase from 0.2 % in 2009.
- Cocaine was involved in 0.5 % of drug-related emergencies, compared with 0.2 % in 2009.

From 2009–10, there was an large increase (from 275 to 1 023) in the number of cases that were toxicologically tested, meaning that cases for which the diagnoses based on clinical assessment made by the specialist medical doctor could be confirmed or complemented by the toxicology findings. In 2010, half (512) of the 1 023 tests were positive for at least one substance. However, only 35 % of the 2 935 cases underwent toxicological tests and so in most cases a doctor had to establish a diagnosis based only on talking to the patient and their symptoms.

#### **Most recent data (from the 2011 National report)**

In 2011 the National Anti-drug Agency improved the process of data collection on medical emergencies caused by the use of psychoactive substances, by upgrading and disseminating at national level the methodology for monitoring non-fatal emergencies. As in 2010, however, only in a small part of the country was covered and data were only reported by the counties of Bucharest and Iași.

In 2011 a total of 2 578 medical emergencies cases caused by psychoactive substance use were reported, of which 34 were excluded (31 of these cases were not specified as an emergency and three were caused exclusively by nicotine use). There was a 12 % decrease in the number of medical emergencies compared with 2010.

Males accounted for 73.4 % of the cases. More than the half (55 %) of the patients were under 24 years old, almost a quarter (25.5 %) were aged 25–34, and the rest (11.7 %) were over 35 years old. The average age of the cases was 25 and female patients were slightly older than males.

Of the 2 578 cases, 88.4 % (2 279) were caused by acute intoxication with different substances (alcohol and medicines included). Of these, acute intoxications with new psychoactive substances ('ethno-botanical plants') had the highest preponderance (46.5 % compared with 42.6 % in 2010), followed by acute intoxications due to polydrug use (18.7 % compared with 8.8 % in 2010). The proportion of acute intoxications with cocaine, methamphetamine, volatile chemical solvents, ecstasy and toxic substances was below 1 %. Of the 15 recorded cases of overdose, 10 were reported as overdoses with medicines and five as opiate overdoses.

Toxicological tests were positive in 741 of the 1 238 cases that were tested. A single substance was identified in 512 cases, two substances in 137 cases, three in 49 cases, and four substances in 20 cases. The remainder had between five and 10 substances in their bodies.

Compared with the previous years, despite the increase in the number of cases that underwent toxicological testing (275 in 2009; 1 023 in 2010; 1 238 in 2011), the proportion of the cases undergoing such testing hardly covered half of the number of cases. Thus the doctor on duty is put in the position to make a diagnosis based only on the medical history and the current symptoms.

## Slovenia

### National reports 2007–10

The number of illicit drug poisonings is ascertained from the database of the medical emergency department at the University Medical Centre in Ljubljana, where diagnoses are classified according to the International Classification of Diseases (ICD-10) <sup>(9)</sup>. However, patients treated in outpatient departments are classified only according to their main diagnosis, which limits the details available for analysis. In addition, the classification of illicit drug poisonings according to ICD-10 is reported to be complicated (e.g. it is sometimes difficult for the pathologists to prioritise which drug is responsible for their main diagnosis) and incomplete, as some substances have no specific ICD-10 codes.

In 2010 illicit drug poisonings accounted for at least 0.24 % (51) of a total of 21 700 of cases admitted to the medical emergency department at the University Medical Centre in Ljubljana, although the proportion could be higher because these diagnoses are frequently incorrectly classified. The mean age of the cases was 29.5 and the majority (79 %) were male. Of those treated for heroin poisoning, 83 % were males, whose mean age was 31.5. Cocaine was involved in 12 (23.5 %) cases (cocaine alone in five cases, with heroin in six, and in combination with alcohol in one). All 12 cases were male, with a mean age of 33.

In 2009, according to data from the National Institute of Public Health (NIPH), there were 3 015 hospitalisations due to mental and behavioural disorders related to the use of psychoactive substances (3 042 in 2007; 3 058 in 2008). In all three years the cause of the majority of these cases was related to alcohol use, followed by the simultaneous use of multiple drugs, use of sedatives and hypnotics, opioids, and cannabinoids. Four cases (0.1 %) were related to cocaine in 2009, six (0.2 %) in 2008 and four (0.1 %) in 2007.

### Most recent data (from the 2011 National report)

In 2011 drug poisonings accounted for 0.19 % (42) of all cases treated in medical emergency units. The mean age of the cases was 29 years and most were males (67 %).

In 2011 the number of cocaine poisoning cases remained almost unchanged from the previous year (10 cases compared with 12 in 2010).

## United Kingdom

### National reports 2007–10

In 2009 the United Kingdom National Focal Point convened a working group to discuss the potential use of hospital data on drug poisoning/misuse and to agree on a common case definition that could be applied across the United Kingdom's constituent countries. One of the decisions

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<sup>(9)</sup> World Health Organization, International Classification of Diseases, 10<sup>th</sup> version (ICD-10) ([www.who.int/classifications/icd/en/](http://www.who.int/classifications/icd/en/)).

made was to include cases with a secondary diagnosis of drug poisoning/misuse rather than only those with a primary diagnosis, in order to better identify the impact of drug use on hospital services.

In the National reports, several sources and data are mentioned:

- **Hospital inpatient admissions data** are from individual UK countries. The data for England uses primary diagnosis only but provides the longest trend data, with records available from the end of the 1990s.
- **Inpatient discharge data** records poisoning by drugs across the whole country. The case definition for these data includes secondary diagnoses, which is a relatively over-inclusive definition compared to that used for the long-term data in England. Therefore, no comparison can be made. The limitation of this source is that data have only been published from 2007–08 onwards, due to concerns about the comparability of previous data.
- **Data on discharges of psychiatric inpatients with a diagnosis of drug misuse** are available from 2007–08 to 2010–11, although the 2010–11 data were not systematically reported on in the National report (although included in some cross-indicator analyses).

Data on drug poisonings/misuse for the United Kingdom are based on hospital discharges while the data from England are on admissions. The effect this has on the data is unclear and further investigation is required. Another difference between the case definition for England and the one for the whole of the United Kingdom is that the latter are based on the country in which the hospital is located rather than the address of the patient.

Detailed data based on ICD-10 codes are only available for those who are admitted to hospital as an inpatient <sup>(10)</sup>. Research has shown that only a small proportion of those presenting to hospital with drug toxicity were admitted and many of these were assigned to a wide variety of codes, with so-called 'recreational' drug use often not recorded (Wood et al., 2011).

Data for 2009–10 show that:

- There were 30 618 inpatient discharges recording poisoning by drugs (compared with 28 811 in 2007–08 and 31 319 in 2008–09). Almost all (99 %) of drug poisoning cases were emergency admissions.
- Heroin was most commonly identified in drug poisoning discharges: 3 155 cases were recorded in 2009/10 (10.3 % of all drug poisoning discharges). Cocaine was the second most common, with 1 986 cases (6.5 % of discharges). This was a decrease from the proportion of cocaine poisonings in 2008–09 (2 627 or 8.4 % of discharges).
- There were 22 271 inpatient discharges related to mental and behavioural disorders due to drugs (compared with 21 115 in 2007–08 and 23 065 in 2008–09). This figure excludes

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<sup>(10)</sup> Hospital activity (Hospital Episode Statistics — HES) ([www.ic.nhs.uk/statistics-and-data-collections/hospital-care/hospital-activity-hospital-episode-statistics-hes](http://www.ic.nhs.uk/statistics-and-data-collections/hospital-care/hospital-activity-hospital-episode-statistics-hes)).

Patient Episode Database Wales ([www.infoandstats.wales.nhs.uk/page.cfm?orgid=869&pid=40977](http://www.infoandstats.wales.nhs.uk/page.cfm?orgid=869&pid=40977)).

ISD Scotland Inpatient and Day Case Activity ([www.isdscotland.org/Health-Topics/Hospital-Care/Inpatient-and-Day-Case-Activity](http://www.isdscotland.org/Health-Topics/Hospital-Care/Inpatient-and-Day-Case-Activity)).

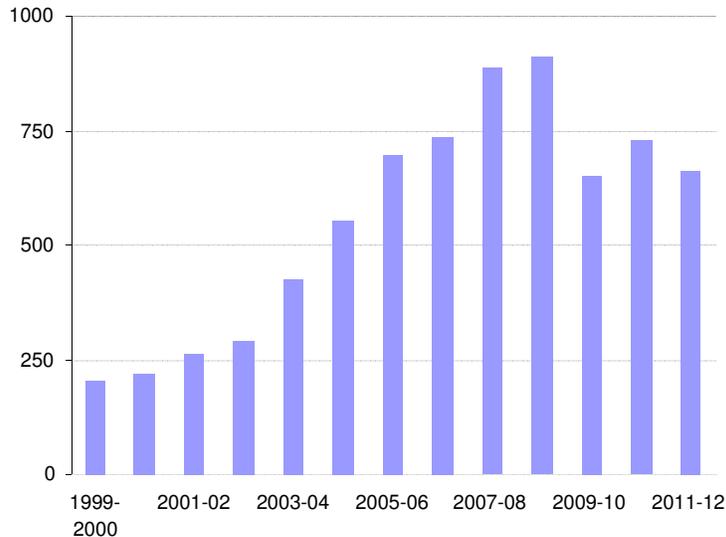
Northern Ireland Hospital Statistics ([www.dhsspsni.gov.uk/index/stats\\_research/hospital-stats/inpatients.htm](http://www.dhsspsni.gov.uk/index/stats_research/hospital-stats/inpatients.htm)).

Experimental accident and emergency data are available in England but record only limited diagnosis data ([www.hscic.gov.uk/searchcatalogue?productid=4731&q=title%3a%22accident+and+emergency+attendance%22&topics=0%2fHospital+care&sort=Relevance&size=10&page=1#top](http://www.hscic.gov.uk/searchcatalogue?productid=4731&q=title%3a%22accident+and+emergency+attendance%22&topics=0%2fHospital+care&sort=Relevance&size=10&page=1#top)).

cases related to dependence syndrome, since these are likely to be planned inpatient treatment patients. Cocaine was involved in 3 502 (15.7 %) of these cases in 2009–10 (4 403 or 19.8 % in 2008–09).

Using a different case definition, Figure 4 illustrates the number of hospital admissions, with a primary diagnosis of cocaine poisoning (code T40.5) in England over a 13-year period from 1999.

**Figure 4**  
**Cocaine-related health problems as the primary diagnosis: inpatients admitted from hospital emergency settings\* in England, 1999/2000–2011/2012.**



\*The figure does not include those with cocaine-related health problems who are discharged directly from the emergency department, nor those with a primary diagnosis of mental and behavioural disorders due to the use of cocaine.

Sources: National Health Service Information Centre ([www.hscic.gov.uk/searchcatalogue?q=title%3a%22Hospital+Episode+Statistics%2c+Admitted+patient+care+-+England%22&sort=Relevance&size=20&page=1#top](http://www.hscic.gov.uk/searchcatalogue?q=title%3a%22Hospital+Episode+Statistics%2c+Admitted+patient+care+-+England%22&sort=Relevance&size=20&page=1#top)).  
 Reitox National Focal Point, United Kingdom (2012), *National report 2011: United Kingdom*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon ([www.emcdda.europa.eu/html.cfm/index214115EN.html](http://www.emcdda.europa.eu/html.cfm/index214115EN.html)).  
 EMCDDA (2013c), *Perspectives on drugs: emergency health consequences of cocaine use in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon. ([www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies](http://www.emcdda.europa.eu/topics/pods/cocaine-related-emergencies)).

### Most recent data (from the 2011 National report)

In 2010–11, there were 33 889 inpatient discharges recording poisoning by drugs, almost two-thirds of which (21 509 or 63 %) were due to ‘other opioids’ (including morphine and codeine). As in previous years, almost all drug poisonings were emergencies (97 %).

There were 2 500 heroin poisonings. Cocaine was the next most commonly cited individual drug (2 247 inpatient discharges) followed by methadone (1 954 discharges).

The number of inpatient discharges recording heroin poisonings was relatively stable until 2010–11 when it decreased by 21 % from the previous year (from 3 155 in 2009–10 to 2 500 in 2010–11). In contrast, methadone poisonings increased by 27 % (from 1 533 in 2009–10 to 1 954 in 2010–11) and poisonings by other opioids increased by 12 % (from 19 266 in 2009–10 to 21 509 in 2010–11).

Following an increase in cocaine poisonings between 2007–08 and 2008–09 (from 2 477 to 2 627), the number then decreased in 2009–10 (to 1 986). The emergence of mephedrone during the same period of time has been hypothesised as a possible factor in the reduction in cocaine-related harms. The decline in cocaine purity reported in the United Kingdom in recent years might be another factor in the reduction in these harms. However, cocaine poisonings increased by 13 % in 2010–11 on the previous year (from 1 986 to 2 247), although they are still at a lower level than in the previous two years.

In England, where longer time data are available (Figure 4), the most recent figures show a stabilisation of the number of cocaine poisoning admissions in the 2011/12 data (663 cases).

In 2010–11 there were 27 436 inpatient discharges with a diagnosis of drug misuse in the United Kingdom, 15 % (4 209) of which were due to the use of cocaine. This is a higher number than in 2009–10, but a similar proportion of all discharges.

The contributory factor system enables up to six factors to be recorded for road accidents attended by the police. The police use a form that includes 77 contributory factors, which fall into nine categories. One of the nine categories for drivers is 'impairment or distraction', which includes the factor 'impaired by drugs (illicit or medicinal)'. The 'pedestrian only (casualty or uninjured)' category contains the factor 'pedestrian impaired by drugs (illicit or medicinal)'. In 2010 impairment by drugs (illicit and medicinal) was recorded as a contributory factor in 39 fatal road traffic accidents (2 % of the total) and 158 serious accidents (1 %). Pedestrians involved in these accidents who were impaired by drugs (illicit or medicinal) were a contributory factor in nine fatal accidents (1 % of the total) and 57 serious accidents (0.3 %).

## **Norway**

### **National reports 2007–10**

According to the 2009 National report, data were collected by a survey conducted by Oslo University Hospital, Ullevål, and the Norwegian Institute of Public Health. This survey showed that around one in four drivers of cars and motorcycles who were injured in serious accidents had alcohol, tranquilisers and/or narcotic substances in their blood.

Over a year, all patients admitted to the emergency admission department at the hospital with injuries resulting from road accidents were asked if they were willing to take part in the study. The analyses of the 132 blood samples of those who agreed showed that 34 (26 %) had amounts of psychoactive substances in their blood and that a third of them had a combination of two or more substances. The most frequently found substances (alone or in combination with other substances) were alcohol (50 %), diazepam (Stesolid, Valium) (30 %), zopiclone/Imovane (12 %), amphetamines (24 %), and cannabis (15 %). There were no reports of the presence of cocaine.

There were no new nor updated data in the 2011 National report.

## **Annex 2: Data from the US Drug Abuse Warning Network (DAWN)**

Data from DAWN (2012) reveal that in 2010 there were nearly 4.9 million drug-related emergency department visits in the United States, of which almost half (47.4 % or 2.3 million) were attributed to adverse reactions to pharmaceuticals and almost half (46.8 % or 2.3 million) were attributed to drug misuse or abuse. The latter category comprised 1 346 000 cases of the misuse or abuse of pharmaceuticals and 1 171 000 of illicit drugs. Emergency department visits resulting from the misuse or abuse of pharmaceutical drugs occurred at a rate of 434.9 visits per 100 000 population, compared with a rate of 378.5 per 100 000 population for illicit drugs. The total number of drug-related emergency department visits increased by 94 % from 2004 (2.5 million visits) to 2010 (4.9 million visits). Unlike cases involving pharmaceutical drugs, the number of visits involving illicit drugs was generally stable during the same period, from 991 640 cases in 2004 to 1 171 000 in 2010.

In 2010 cocaine and cannabis were the most frequently used drugs of hospital emergency department cases involving illicit drug use. Cases related to the use of cocaine and marijuana were responsible for the highest number of visits, with 488 101 related to cocaine and 470 845 to cannabis. There were 157.8 and 152.2 visits per 100 000 population respectively for cocaine and for cannabis in 2010. About a quarter of the cocaine-related visits in 2010 were patients aged 20 or younger (23.8 %) and more than one-third were female (36 %). The rate of cocaine-related visits was double in males (206.0 visits per 100 000 males) compared with females (111.0 visits per 100 000 females).

There was a 15 % increase in the number of cocaine-related visits compared with the 422 896 visits reported in 2009. In 2009 mentions of cocaine by emergency department patients had decreased by 12 % compared with 2008 and by 24 % compared with 2007, when a peak was reached with 553 530 visits related to the drug.

## Annex 3: Relevant findings from the DRUID project

We summarise below the main findings of the DRUID project (EMCDDA, 2012b), with a focus, where available, on the prevalence and the increased risk of a road traffic accident associated with cocaine. This summary provides the background against which some countries reported emergencies following a cocaine-related road traffic accident for the present report.

The DRUID project aimed to quantify the size of the drink- and drug-driving problem in Europe, including alcohol, medicines and drugs. The three sources of information used are:

roadside surveys, using tests positive for drugs among sampled drivers to measure the prevalence of the substance among the driving population;

studies using positive drug tests to estimate the prevalence among the hospitalised, seriously injured or dead drivers; and

experimental studies with measured doses of drugs given to drivers on the road or in simulators.

Roadside surveys were conducted in 13 countries across Europe, in which blood or oral fluid samples from 50 000 drivers were analysed. Results revealed that alcohol was present in 3.48 % of cases, illicit drugs in 1.90 %, medicines in 1.36 %, combinations of drugs or medicines in 0.39 %, and alcohol combined with drugs or medicines in 0.37 %. Cocaine was present in 0.42 % of the drivers with a range from 0–1.45 % depending on the countries. Drivers were considered positive with at least 10 ng/ml of cocaine in their blood, or 170 ng/ml in their oral fluid.

Studies of hospitalised, seriously injured car drivers were conducted in six countries, and studies of car drivers killed in accidents took place in four. Among the injured or dead drivers, the most commonly consumed substance was alcohol alone, followed by alcohol combined with another substance. The use of illicit drugs alone was infrequently detected.

After alcohol, the most frequently found substance among injured drivers was tetrahydrocannabinol (THC) followed by benzodiazepines, whereas among drivers killed in accidents, it was benzodiazepines. Cocaine (and/or benzoylecgonine, one of its metabolites) was found in 0–1.3 % of seriously injured car drivers. This compared to a higher prevalence for alcohol (found in 14.1–30.2 % of the cases) and cannabis (found in 0.5–2.2 % of the cases). No cocaine was found in the dead drivers in the four countries in which they were tested.

The relative risk of being seriously injured or killed in a traffic accident was estimated by combining the roadside and hospital study results in a case control study. The project assigned the investigated substances to one of four groups, according to whether the increased risk was considered to be slight, medium, high or extreme. Results showed that alcohol is one of the most dangerous psychoactive substances used by drivers. The highest risk for a driver of being seriously injured or dying in a traffic accident arises from high blood alcohol levels (>1.2 g/l) or from combinations of alcohol, drugs or medicines. The risk of being seriously injured or killed in a traffic accident for these drivers was greatly increased: it was 20–200 times higher than the risk for other drivers.

The increase in risk for drivers who tested positive for multiple drugs, for amphetamines or for a blood alcohol concentration just above the common legal limit ( $\geq 0.8$  g/l and  $< 1.2$  g/l) was 5–30 times higher than for other drivers.

For cocaine alone, or benzoylecgonine, there was a medium increase in the risk, estimated as 2–10 times higher than for drivers who tested negative for this drug. Other drugs such as

benzodiazepines and z-drugs (a group of non-benzodiazepine drugs with effects similar to benzodiazepines that are used in the treatment of insomnia), illicit opioids and medicinal opioids sit in the same category of risk as cocaine. The risk associated with benzoylecgonine, which is not an active agent, might be caused by sleep deprivation after consumption of cocaine.

The risk increase was 1–3 times for drivers positive for low alcohol in their blood ( $0.1 \text{ g/l} \leq \text{alcohol in blood} < 0.5 \text{ g/l}$ ) and for cannabis.

With regards to stimulants in general, including amphetamines, ecstasy and cocaine, the authors concluded, based on experimental studies, that these drugs had no negative influence on fitness to drive. Nonetheless, studies of drivers injured and killed in accidents found considerably higher median drug levels for stimulants. Such levels may have detrimental effects on self-perception, critical judgement and risk-taking and the authors concluded that stimulants do not compensate for alcohol use or sleep deprivation.

The main conclusion of the report was that as the risk and share of injuries is higher for alcohol, the first priority of law enforcers should always be to target driving under its influence.