



European Monitoring Centre  
for Drugs and Drug Addiction

# THE EMERGING TRENDS IN SUBSTANCE USE AND HARM

GHB AND ITS PRECURSOR GBL:  
AN EMERGING TREND CASE STUDY

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## Key issues at a glance

Use of GHB, also commonly referred to as 'liquid ecstasy', surfaced on the recreational nightlife scene in some parts of Europe, the USA and Australia during the 1990s. It is usually consumed in recreational nightlife settings, where it is taken orally in liquid form for sought-after effects that are close to alcohol. More recently, there have been reports of direct consumption of the precursor chemical, gamma-butyrolactone (GBL) which is rapidly converted into GHB in the body.

Use of GHB/GBL is, generally, low in the EU but there is evidence of some sub-populations, settings and geographical areas where it is commonly used, such as in gay nightclubs. Among 15–16 year old school students lifetime prevalence is between 0.5 % and 1.4 % in 12 of the EU countries. Surveys conducted in dance music settings report higher prevalence estimates for ever in lifetime use of GHB that range from 3 % to 19 % but prevalence drops to less than 3 % in all estimates for last month use. Little is known about use of GHB in private settings for purposes of recreation, bodybuilding and self medication.

In March 2001, GHB (shown as gamma-hydroxybutyric acid) was added to Schedule IV of the 1971 UN Convention on Psychotropic Substances. Therefore, all EU Member States were bound to control it under their legislation addressing psychotropic substances. The new controls rapidly curtailed the previously open sale of GHB. They may also help to explain the emergent use of GBL, which does not fall under the controls of the international drug control convention.

GHB has a steep dose-response curve where even a small increase in dose can cause serious toxic effects, including impaired consciousness and coma. Combined use of alcohol or other psychoactive substances, both depressants and stimulants, may intensify the toxic effects of GHB. With the increased direct consumption of GHB's precursors, additional health challenges may arise.

Concerns are increasing about the use of GHB precursor chemicals, gamma-butyrolactone (GBL) and 1,4-butanediol (1,4-BD), that are rapidly converted to GHB when ingested. Furthermore, GHB can be easily manufactured from GBL and 1,4-BD, which are widely used in the chemical industry and commercially available. Some Member States (Italy, Latvia, Sweden) have chosen to control one or both precursors under drug control or equivalent legislation. The European Community and the Member States have taken additional voluntary measures to prevent their diversion.

The ease with which GBL can be acquired allows potentially much easier and cheaper access than that usually found in illicit drug markets in the EU. On the internet, prices of GBL vary between 9 cents and 2 euros for a 1-gram dose.

Accidental overdoses that occur in recreational nightlife settings account for a substantial proportion of the overall drug related emergencies that require emergency ambulance or hospital services in a number of European cities.

Media coverage of 'drink spiking' with GHB — particularly cases of 'drink spiking' to facilitate sexual assault (often referred to as 'date rape') — has brought GHB into the spotlight. However, forensic evidence points to the more common presence of alcohol in cases of reported sexual assault. Evidence for this type of crime is notoriously difficult to obtain and true incidence may be higher than identified due to non- or delayed reporting.

Responses to the use of GHB commonly target nightlife settings and usually consist of training club staff and disseminating information about the risks of using GHB. Such prevention often takes place in conjunction with other interventions related to 'club drugs' and use of alcohol and drug combinations. On the internet a wide range of information sources on GHB/GBL exist, generally targeting drug users, recreational drug users or users attending electronic dance music events.

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## Introduction

GHB is a compound which occurs naturally in the body, but is also a medicinal product and a recreational drug. Non-medical use of GHB is reported to have begun in the 1980s by body builders. Use of GHB surfaced on the recreational nightlife scene in some parts of Europe, USA and Australia during the 1990s, specifically in night clubs where many other drugs were being commonly used. Concerns quickly arose about the health risks associated with its use. In particular, anxieties arose about the potential for surreptitiously adding GHB to drinks (commonly referred to as 'drink spiking') to facilitate sexual assault.

At the EU level, GHB has been under surveillance since 2000, when the Horizontal working party on drugs of the European Council requested a risk assessment to be carried out on GHB under the terms of the 1997 Joint action on new synthetic drugs (EMCDDA, 2002). On the basis of the resulting risk assessment report, the Council requested the EMCDDA and Europol to 'actively' monitor GHB. In March 2001, GHB (shown as gamma-hydroxybutyric acid) was added to Schedule IV of the 1971 UN Convention on Psychotropic Substances. Therefore all EU Member States were bound to control it under their legislation addressing psychotropic substances.

There are no known reported industrial uses of GHB and new controls rapidly curtailed the previously open sale of GHB. However, concerns are increasing about the direct consumption of GHB's precursor chemicals, gamma-butyrolactone (GBL) and 1,4-butanediol (1,4-BD). These are rapidly converted to GHB when ingested, yet are widely used in the chemical industry and are commercially available. Furthermore, GHB can be easily manufactured from GBL and 1,4-BD. In view of concerns about the diversion of GHB from the domestic distribution channel and illicit trade of GBL, some Member States — Italy, Latvia and Sweden — have chosen to control one or both precursors under drug control or equivalent legislation (EMCDDA, 2007b).

### About the E-POD project

This paper is part of a series of EMCDDA E-POD case studies. Each E-POD case study provides practical knowledge to help to build a better European understanding of emerging drug trends, and to develop optimal responses to them.

GHB/GBL has been selected as the focus for this study based on the following criteria: there is a lack of routine data about prevalence of GHB use in the EU; there are potentially severe health risks associated with its consumption and there is a potential for its use to spread. In addition, there have been anecdotal reports about an increase in hospital emergency admissions related to the illicit use of a precursor chemical to GHB, GBL.

Main sources of information for the case study on GHB are:

- EMCDDA reporting form (Detecting, tracking and understanding emerging trends, between July 2005 and October 2005)
- Early Warning System reports
- National Reitox reports
- EMCDDA risk assessment report
- EMCDDA drug profiles
- ESPAD School Survey Project
- Scientific articles published in peer reviewed journals
- Published literature
- Forensic science bulletins
- Official governmental and international organisations documents
- Grey literature
- Newspaper and magazine media articles
- Internet websites and discussion groups
- Personal communication with key informants

Although GBL and 1,4-BD are not included in the Tables of the 1988 UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, the European Community and the Member States have taken additional voluntary measures to prevent their diversion. These include guidance for operators to be vigilant when placing these substances onto the international market. Discussions about possible further controls of the two precursors are in progress in the UK.

## Description

GHB is an abbreviation for both gamma-hydroxybutyric acid (protonated form) and gamma-hydroxybutyrate (deprotonated form of the carboxylic acid moiety). GHB was first synthesised in 1960 (Laborit, 1964), but was later discovered to be an endogenous compound present at very low levels in the body (Bessman and Fishbein, 1963). Importantly, GHB is also a product of post-mortem decomposition.

GHB can form salts (e.g. sodium and potassium salts), which are soluble in water and alcohol. It is colourless and easily mixes in aqueous solutions; however, a salty taste may be noticeable (Ward et al., 1998).

Recreationally, GHB is usually obtained in the form of a liquid formulation. Rarely, it is also encountered as a powder, either loose or in capsules. Prior to sale or consumption the powder (usually GHB sodium salt) is typically mixed with water and the route of administration is usually oral. 1ml of such liquid usually contains approximately 1g GHB, although there may be variances in the GHB concentrations of such solutions.

GHB is a central nervous system (CNS) depressant but its specific action is not fully understood. However, it is believed that GHB binds to GABAB and GHB-specific receptors (Benavides et al., 1982 and Maitre et al., 1990) that lead to an increase in dopamine in the brain. There may also be an accompanied increase in the release of endogenous opioids, for example, dynorphin (Hechler et al., 1991).

At low doses, GHB effects are similar to those of alcohol. Sought after effects from ingestion of GHB are euphoria, relaxation, reduced inhibition and sedation depending on the dose taken. Non-medically, GHB is used for its relaxant and euphoric effects, to enhance bodybuilding, to induce sleep and as an alcohol/drug substitute (self-medicating insomnia, depression and alcohol

### Medical use of GHB

Since the 1960s GHB has undergone various pre-clinical and clinical trials and has been evaluated for a range of potential therapeutic uses in obstetrics, anaesthesia, alcohol/opiate withdrawal and treatment of narcolepsy and cataplexy. Furthermore, some reports have suggested anti-depressant effects of GHB as well as sex enhancing effects in humans.

The international non-proprietary name of GHB is sodium oxybate. Pharmaceutically, it is presented as sodium gamma-hydroxybutyrate in liquid form. It was originally evaluated and is used as an anaesthetic, particularly in France and Germany as Gamma OH™ and Somsanit™, respectively. It has also been assessed in the treatment of narcolepsy and associated disorders such as cataplexy <sup>(1)</sup>, in addition to its use as an aid to opiate and alcohol withdrawal as Alcover™ in Austria and Italy. In June 2005, the European Medicines Agency (EMA) recommended granting a marketing authorisation for the medicinal product Xyrem®, where the active substance is sodium oxybate (500 mg/ml), to treat adults who have narcolepsy with cataplexy (EMA, 2005). Consequently, in October 2005 the European Commission granted a marketing authorisation for Xyrem valid throughout the European Union. Xyrem can only be obtained with a special prescription; it is given at a dose of 4.5 to 9g per day in two equally divided doses (EMA, 2005). GHB is not authorised for veterinary use.

<sup>(1)</sup> Narcolepsy is a sleep disorder that causes excessive daytime sleepiness; cataplexy is a symptom of narcolepsy involving sudden muscle weakness in response to an emotional reaction.

dependence) for sexual relaxation and disinhibition.

If pharmaceutical-grade GHB (i.e. >99 % purity) cannot be obtained, illicit GHB can be easily synthesized from a chemical precursor, gamma-butyrolactone (GBL) by changing the pH with addition of an alkali (e.g. sodium hydroxide). There are dangers associated with this, particularly as the reaction is exothermic <sup>(2)</sup> and GBL is flammable. Commercially and widely available as a solvent, GBL is also a metabolic precursor, which when ingested can be converted in the body to GHB. The other precursor, 1,4-BD, is also rapidly converted in the body to GHB. GBL and 1,4-BD produce effects that are identical to those of GHB (ACMD, 2002). It is important to note that in vivo 1,4-BD is converted into GHB by alcohol dehydrogenase (González and Nutt, 2005), therefore its metabolism may be affected by alcohol co-ingestion. Preparations of both precursors may be ingested by users, consequently information about GHB that is based on self-reports of users (in the absence of forensic or toxicological analysis) may relate to direct use of a precursor chemical (most likely GBL) rather than GHB.

## Methods

Information about GHB that is based on self-reports of users (in the absence of forensic analysis) may relate to direct use of a precursor chemical (most likely GBL) rather than GHB. The relatively recent introduction of GHB/GBL into the illicit drug market means that information on its use is not within the routine reporting scope of many general population surveys. However, ESPAD and some other representative school student surveys that were developed during the 1990s include questions about the use of GHB/GBL. Prevalence estimates of GHB/GBL use reported in these surveys are very low and because they are usually based on a very small number of students they can only be indicative. In addition to school surveys, information about the prevalence and patterns of GHB/GBL use is derived from a range of non-probability surveys conducted in dance music settings and other surveys that target individuals with a prior interest in recreational drugs. These non-probability surveys (conducted in a limited number of countries) almost always show higher prevalence estimates of illegal drug use than those found in general population surveys. They cannot, therefore, be regarded as representative in any statistical sense, and drawing comparisons between different countries or over time based on these surveys must be done with caution.

## Prevalence and use patterns

Most information about the prevalence of GHB use is derived from surveys which ask respondents about their drug use. Whilst respondents may report that they have used GHB, they may in fact have used one of its precursor chemicals. There have been reports of the precursor chemical (GBL) being sold as GHB which are based on chemical analyses of liquid drugs seized from individuals attending nightclub venues in London (Wood et al., 2007). Hence, when referring to prevalence and patterns of use, the term GHB/GBL may include known or unknown use of GBL or 1,4-BD, particularly in surveys conducted after GHB was placed under drug control and when it began to be substituted by GBL.

On the basis of the limited information available, use of GHB/GBL is, generally, low in the EU but there is evidence of some sub-populations, settings and geographical areas where it is commonly used, such as in gay nightclubs.

In 2003, national school survey data collected in 25 Member States plus Norway, Croatia and Turkey indicated that GHB/GBL has been tried by a very small proportion of 15-16 year olds

<sup>(2)</sup> Exothermic reaction, i.e. which releases energy (heat).



(somewhere between 0.5 % and 1.4 %) in 12 EU countries. These school surveys show that the students generally perceive GHB/GBL to be considerably less available than cannabis, despite current concerns about the ease of access to GHB/GBL. With regard to risk perceptions, the majority of students view the risks associated with trying GHB/GBL to be as low, or even lower, than the risks of trying cannabis in more than half the countries surveyed (Hibell et al., 2005).

Surveys conducted in dance music settings and other targeted surveys report prevalence estimates for ever in lifetime use of GHB/GBL that range from 3 % to 19 %. For example, a large UK Independent Drug Monitoring Unit (IDMU) survey, using anonymous questionnaires distributed at popular music festivals and similar outdoor events between 1999 and 2002, reported that approximately 3.4 % of over 8,000 respondents had ever used GHB/GBL (Atha and Davis, 2003). An Austrian study of 225 young people attending raves in Vienna in 2002 reported that 12.6 % had ever used GHB/GBL (EMCDDA Reitox Early Warning System Report). A survey of 408 pub-goers in Amsterdam conducted in 2005 reported lifetime prevalence of 10 %. However, evidence suggests a rather niche market for GHB/GBL where use is concentrated in very specific subpopulations. Among respondents sampled in 'gay' Amsterdam bars prevalence estimates for GHB/GBL use rose to 17.5 % and in the city's 'hip' bars 19 % compared to less than 5 % among respondents in the more mainstream or student pubs (Nabben, Benschop, Korf, 2006). A UK clubber's magazine survey, based on a self-selected sample of readers of Mixmag in 2004 represents a population that generally reports higher than average prevalence estimates for drug use, reported lifetime prevalence estimates of 18.1 % for use of GHB/GBL. Prevalence drops to less than 3 % in all estimates for last month use (Mitcheson, 2007: personal communication). A UK survey shows that the peak age for first trying GHB/GBL is in young adulthood and not in the teenage years which are associated with first trying cannabis and other drugs. This suggests that most GHB/GBL users will have tried many other drugs before experimenting with GHB/GBL (Atha and Davis, 2003). It should be noted that data sources located in recreational dance music settings will inevitably under-represent those who generally take GHB/GBL in more private settings for the purposes of relaxation and recreation or to self-medicate in relation to sleep, alcohol or other substance abuse problems.

## Methods

During the early stages of an emerging drug trend, prevalence estimates are inevitably very low and confined to specific geographical areas and sub population groups. Data are limited and usually lack the methodological requirements needed for making robust comparisons over time. Therefore methods to assess developments in a new drug trend must invariably tap into a wide range of different sources rather than rely on the key indicators commonly used for assessing changes in the more common and well established drug trends.

Two European surveys provide a more profound understanding about the effects of GHB/GBL and about the users themselves and the context of their use. These surveys have been conducted among targeted population groups that use or have used GHB/GBL. The first was a Dutch survey conducted in 2001 among 72 GHB/GBL users (3). It reported that three quarters of the respondents had taken GHB/GBL at least once a month in the past year and half of these had taken it at least once a week. Most took GHB/GBL in combination with other substances (Korf et al., 2002). The second survey, conducted in the UK in 2006, was an internet survey of 189 GHB/GBL users (4). This survey reported that a third of the 189 users had taken GHB/GBL during the last month and two thirds reported mixing GHB/GBL with other drugs (Sumnall et al., 2007).

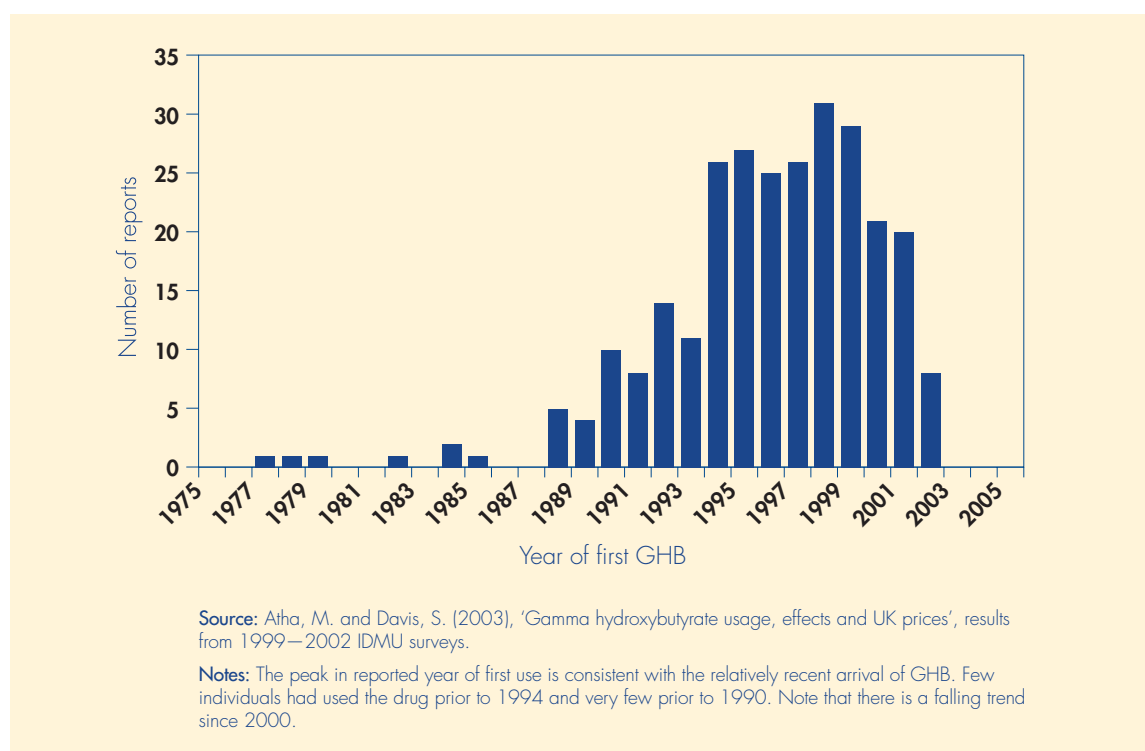
(3) GHB users defined as having taken GHB 5 times or more in their lifetime and at least once in the past year.

(4) GHB users defined as having taken GHB at least once in their lifetime. The majority of internet respondents (129) resided in the UK.

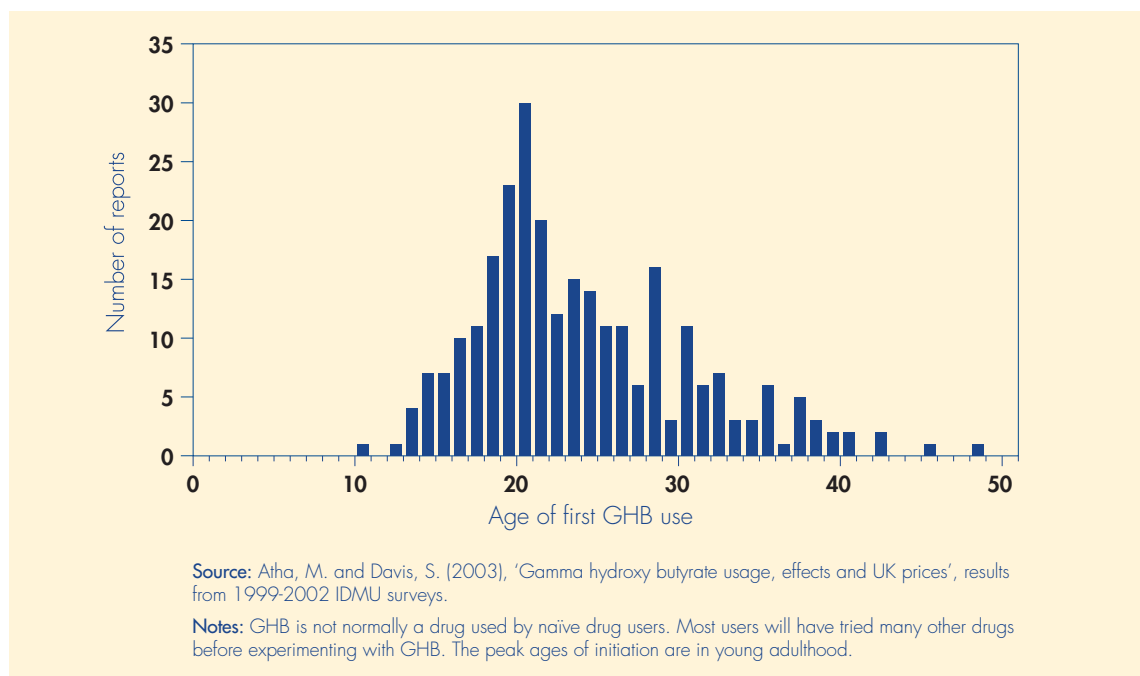
## Trends

There are a small number of surveys that shed light on the diffusion of GHB/GBL use and its emergence as a new drug trend. A UK clubbing magazine survey which was conducted annually between 1999 and 2003 reported that ever in lifetime use of GHB/GBL increased over this 5-year period (Mitcheson, 2007: personal communication). Similarly, the Independent Drug Monitoring Unit (IDMU) survey, which has been conducting large scale surveys of drug use in the UK since 1997, reported a small but steady year on year rise in prevalence of GHB/GBL use up to 2000 and then a falling trend. However, it should be noted that these surveys cannot be regarded as representative in any statistical sense. Respondents are often self-nominated and comparability between samples and over time is usually poor. So any conclusions about trends must be drawn with caution. However findings from the IDMU survey (Figure 1) illustrate that the trend in GHB/GBL use is a relatively new phenomenon in the UK. In a sample of 172 GHB/GBL users, only a few individuals reported, retrospectively, that they had first used GHB/GBL prior to 1994 and even fewer prior to 1990 (Atha and Davis, 2003).

**Figure 1: Year of first GHB use in the UK IDMU survey (Atha and Davis, 2003)**



The IDMU survey also reported a relatively widespread of initiation ages for use of GHB/GBL (Figure 2). This shows that a number of people in their thirties and forties are trying it for the first time, which is also consistent with the relatively recent arrival of the substance onto the market (Atha and Davis, 2003).

**Figure 2: Age of first GHB/GBL use in the UK IDMU survey (Atha and Davis, 2003)**

The annual Amsterdam drug monitoring system <sup>(5)</sup> reported a modest upward trend in the use of GHB/GBL around 2000 but by 2002 the spread seemed to have halted. However the 2005 report notes that use of GHB/GBL may be relatively high among some small and specific sub-populations (Nabben, Benschop, Korf, 2006). In Germany, the Federal Office of Criminal Investigation (BKA) reported some diffusion in the consumption of GHB/GBL during this period but no prevalence data was provided (EWS report Germany, 2003).

The number of individuals who made contacts with drug help lines with questions or seeking help about GHB/GBL (by telephone, e-mail and internet chat rooms) have been reported to have increased in 6 countries in recent years, however this may simply reflect increased concern generated by media attention rather than concrete increases in prevalence (European Foundation of Drugs Helplines, 2004–2006).

### Context of use

Most individuals who use GHB/GBL are likely to have tried other drugs before experimenting with GHB/GBL. This, together with the relatively delayed age at which individuals first use GHB/GBL, suggests that it is not a substance commonly used by naïve drug users (Sumnall et al., 2007; Atha and Davis, 2003; Wood et al., 2007). Furthermore, the two main surveys conducted among users show that GHB/GBL is commonly used in combination with other substances, particularly cannabis, alcohol and ecstasy (Sumnall et al., 2007; Korf et al., 2002). However it should be noted that anecdotal information from London suggests that recently some individuals in club settings are using GHB/GBL alone. Such single substance use may be a result of information campaigns conducted in

<sup>(5)</sup> Antenna Amsterdam is a multi-method monitoring system aiming to identify and interpret new trends and developments in legal and illicit drugs use and gambling among young people in Amsterdam, and to update and improve drug prevention.

the area about the risks of combining GHB/GBL with alcohol and other drugs. However, it may also reflect informal controls exerted by individuals in mainstream society who wish to avoid the debilitating hangover effects associated with drug and alcohol combinations that affect daily functioning.

Evidence suggests that GHB/GBL is probably used in private settings as often, or more often, as in public nightlife settings. The UK survey of GHB/GBL users reported that GHB/GBL — unlike ecstasy and other stimulant drugs — is used in private home settings more than in nightlife settings (67 % and 26 % respectively) (Sumnall et al., 2007), while the Dutch survey reported equal numbers in each setting. In the Dutch survey GHB/GBL consumption in private homes was usually in the context of a social event or in the presence of friends or acquaintances (Korf et al., 2002). It has been noted that individuals who commonly took GHB/GBL in club settings were more likely to report problems associated with use than those who usually consumed it at home (Sumnall et al., 2007). The rapid and often unpredictable sedative effects of GHB/GBL pose a greater health risk in a crowded nightclub than they might in the relative security and comfort of a private home. Despite security searches to limit drug use in nightlife venues there are reports that in London GHB/GBL is regularly smuggled into clubs mixed with water in miniature plastic bottles, condoms and balloons (Druglink January/February 2007).

The reported lack of hangover, or other sub-acute, effects may contribute to the relatively high proportion of users (one third) in the Dutch study who had driven a car after taking GHB/GBL and others had been passengers in cars driven by someone who had taken it (Korf et al., 2002).

While GHB/GBL appears to be holding, or gaining, ground in some specific populations and geographical locations, the more mainstream Independent Monitoring Unit (IDMU) UK survey, reported that respondents gave GHB/GBL an average positive rating of only 2.11 on a scale of 0 to 10, which is much lower than the rating given to other drugs. Furthermore, the overall rating in 2002 was significantly lower than in previous years. In both the UK and the Netherlands the sound of critical voices in some nightlife circles has been heard regarding the incidence of vomiting and sudden collapses, which reflect negatively on a club. Researchers there have suggested that negative reports and the decline in positive rating may also reflect growing publicity about the use of GHB/GBL for the purpose of sexual assault (Atha and Davis, 2003; Korf et al., 2002).

### GHB and 'drink spiking'<sup>(6)</sup>

Media coverage of 'drink spiking' with GHB, particularly cases of 'drink spiking' to facilitate sexual assault <sup>(7)</sup>, has brought GHB into the spotlight. However, forensic evidence points to the more common presence of alcohol in cases of reported sexual assault. Evidence for this type of crime is notoriously difficult to obtain and true incidence may be higher than identified due to non-, or delayed, reporting. In cases of drink 'spiking' that are not reported immediately, the narrow time window allowed for detecting GHB/GBL in body fluids limits the possibility of establishing evidence. A number of forensic studies have been conducted in France and the UK since 2000 to investigate cases of sexual assault which were allegedly facilitated by covert administration of a drug. However, these have failed to find strong evidence of GHB/GBL use for this purpose. These studies have revealed that high concentrations of alcohol use and also prescription benzodiazepine drugs are much more commonly associated with cases of alleged sexual assault than GHB (EMCDDA, 2008; Scott-Ham and Burton, 2005; Puri, 2007; Hurley et al., 2006; Hughes et al., 2007).

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<sup>(6)</sup> Covertly adding a drug to a drink usually to incapacitate a potential victim or for entertainment

<sup>(7)</sup> Often reported in the media as 'date rape'

## Market and availability

### User terms

The most commonly used abbreviation for the substance are 'GHB' or 'G', but GHB is also widely referred to as 'liquid X', 'liquid E', 'liquid ecstasy'. The inclusion of references to ecstasy portrays GHB as having disinhibiting and social effects on a par with MDMA, despite the fact that the two drugs are chemically very different.

Other market user terms refer to other effects of GHB. The term 'growth hormone booster' relates to its growth hormone promoting effects, 'woman Viagra' to its libido-enhancing effects. Its relaxing properties are expressed through 'natural sleep 500', 'organic quaalude' or 'oxy sleep'. With reference to its use in the context of drug facilitated sexual assault it is commonly referred to as 'grievous bodily harm', 'k.o-Tropfen' (knock out drops) or 'easy lay', 'drogues du viol' (French for 'date rape drug'). Other terms for GHB include 'biberones' (Spanish for 'baby's bottle'), 'oro bebibile' (Spanish for 'drinkable gold')<sup>(8)</sup>, 'fantasy', 'cherry meth', 'scoop', 'Georgia home boy'. The terms 'soap' and 'salty water' are probably a reference to the reportedly salty taste of GHB.

Since the sale of GHB was controlled under drug laws in all Member States, information suggests that there has been an increase in use of the precursor chemical GBL. User market terms for gamma-butyrolactone (GBL) include: 'GBL', 'paint stripper', 'serenity 2', 'gamma G', 'blue nitro', 'revivariant', 'renewtrent', 'revitalize plus' or 'weight belt cleaner'. 'Paint stripper' is a reference to the use of GBL as a solvent found in industrial cleaners and superglue removers.

### Internet information and sales

The internet is an increasingly important platform for users, retailers and lobby groups, as well as drug demand reduction organisations and professionals, to exercise influence and disseminate information. The amount of information on GHB/GBL published on the internet is relatively small compared to information on other illegal drugs. For example in a UK drugs forum, the proportion of posted messages in a sub-forum on 'GHB' constitutes approximately 3 % of the total posted messages compared to the sub forum on cannabis, opium/opiates and cocaine/crack which account for more than 50 %<sup>(9)</sup>. Despite the relatively low number of messages posted on 'GHB', analysis of the type of information exchanged via forums and retailer sites provides important insight into patterns of use and acquisition opportunities.

In order to obtain a snapshot of the type of information available on GHB/GBL — including the number and type of retailers selling GHB/GBL — direct observation of users postings in forums or chat-room settings — a systematic search via the search engine GoogleTM (<http://www.google.com>) using advanced search strategies was conducted in February 2007. The search used key words in Dutch, English, French, German, Hungarian, Polish and Spanish. Key words were selected to identify the sale of GHB/GBL, information sites, as well as forums where discussions and information exchange take place. Out of all the hits that were listed, the first 100 for each key word were analysed.

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<sup>(8)</sup> [http://www.fad.es/Sustancias?id\\_nodo=65&tipo=0&accion=1&sustancia=13](http://www.fad.es/Sustancias?id_nodo=65&tipo=0&accion=1&sustancia=13) (accessed October 2007)

<sup>(9)</sup> <http://www.drugs-forum.co.uk/forum/index.php>, accessed May 2007

**Table 1: Overview of the EMCDDA's internet search and findings**

| Main area and key words  | Research questions  | Total number of sites identified                               |
|--|---|--|
| <b>Sale</b><br>'Buy GBL/GHB gamma'   | Who sells GHB, GBL? Where are the retailers based?<br>What are prices, delivery modalities and conditions?<br>Do retailers include warnings and contraindications?  | 15 sites that sell GBL   |
| <b>Forums</b><br>'Drug(s) forum GHB, gamma'  | Do GHB specific forums exist (also within general user drug forums) in various countries and languages?<br>What type of forums include information on GHB/GBL (e.g. user forums for illegal drugs, bodybuilder forums, gay/lesbian forums, alcohol forums)?<br>What type of information is discussed (e.g. type of benefits, where to buy, negative effects, warnings)? | 85 sites where information on GHB/GBL is exchanged via a forum |
| <b>Information sites</b><br>'Use GHB gamma'<br>'Experiences GHB gamma'<br>'GHB trip reports gamma'<br>'GHB information site gamma' | What type of information is provided (e.g. safe-use advice, references, health risks, etc.)   | 135 GHB/GBL information sites                                  |

### Sales of GHB and GBL

The EMCDDA risk assessment in 2000 stated that GHB was being distributed through retail outlets and over the internet. By 2007 the situation had changed. Following its inclusion in the UN convention, GHB is now bound to be controlled under legislation by all EU Member States. Accordingly no internet sites with EU country code domains (e.g. .fr, .de, .es) or other indications of being EU-based (contact address) are allowed to or were identified as selling GHB.

On the other hand, because the precursor chemical GBL is not controlled in many Member States there are online chemical suppliers that sell GBL. These chemical suppliers market GBL as cleaning solvents, multi-purpose removers or chrome polish and wheel cleaners. A total of 15 chemical suppliers that sell 99.9 % pure GBL were identified located in the UK, Germany, the Netherlands and Poland. All except three suppliers provided health warnings. In 2007 the internet was facilitating the sale of GBL and so in 2007 there was widespread distribution from overseas even if restrictions were imposed in the EU. Prices of GBL vary between 24 and 59 euros per 250 ml, which equates to around 9 cents to 2 euros for a recreational dose (1ml). GHB is easily manufactured by adding aqueous sodium

### Methods

Information from internet sources is highly relevant for detecting, tracking and understanding new drug trends. The internet offers direct access to the drug users world via online forums and chat rooms. It provides information about: the working methods of online retailers; the way that they respond to users' demands, changes in the law and other supply issues. However, the nature of internet sources presents challenges in the research field to develop standardised and comparable methods for searching the internet and assessing the validity of the information. Methods are needed to identify and describe the evolving features and concepts around a specific substance such as changes in its content, appearance, use and distribution over time. The development of such internet monitoring methods in the field of drugs has begun but more multi-disciplinary exchange is necessary to improve and develop optimal methods.

hydroxide to gamma-butyrolactone (GBL) and recipes for making GHB can be viewed on the internet. Nine sites providing GHB recipes were identified, but the sale of GHB kits that include all the necessary ingredients and instructions to produce GHB appear to be rare. Only two sites selling such kits to customers were identified. It must be noted however, that there may be kits offered disguised as e.g. computer cleaning solvents or other solvents that were not captured by the internet search (US Department of Justice, 2002) <sup>(10)</sup>.

Only a few data are available as regards street prices of GHB/GBL. Reports from available data suggest that prices for 5ml range from 2 to 8 euros. The UK Independent Drug Monitoring Unit (IDMU) survey, using anonymous questionnaires distributed at popular music festivals and similar outdoor events between 1999 and 2002, reported for 2002 an average price of 27 euros (GBP 19.50) per bottle of GHB with average bottle sizes of 62.5 ml. The reported average price of 1ml was 40 euro cents (31 pence). In a Dutch survey among 72 GHB users conducted in 2001, the price of a vial of GHB containing approximately 5ml fluctuated between 3 and 6 euros (Korf et al., 2002). In 2006, the average price of GHB samples (5ml) delivered at the Drugs Information and Monitoring System (DIMS) in the Netherlands was between 2 and 8 euros. DIMS tests drug samples supplied by consumers and samples confiscated by security staff (Trimbos Institute, 2007).

### Forums discussing GHB/GBL

The internet snapshot revealed a total of 85 forums that contained GHB/GBL-related information. The majority were general drug forums, fitness/bodybuilder forums, gay forums, dance scene forums and others (women's forums, students forums etc.). Separate subsections used for the discussion of GHB/GBL within these forums are however rare <sup>(11)</sup>. A content analysis of all posted messages on 'GHB' was undertaken for three large drugs forums <sup>(12)</sup>. Approximately 60 % of the posted messages concerned GBL, which strongly supports other evidence from grey literature and media reports <sup>(13)</sup> that GBL is being used in place of GHB.

Roughly estimated, a third of posted messages are about the effects of GHB/GBL, about 10 % include discussion and questions about dosage, and another 7 % about the differences between GHB and GBL as well as how to produce GHB from GBL and the effects of GHB/GBL when used with other drugs. Online chemical suppliers of GBL provide easy access, and user descriptions of their purchasing experiences are the subject of another 5 % of posted messages. The image of GHB as a 'date rape' drug is portrayed in frequent exchanges between forum visitors warning of this danger. Such internet warnings may themselves provide the oxygen of publicity that can promote copy cat crime (Sturman, 2000).

### Seizures

No Member State has reported information on large-scale production, trafficking and distribution of GHB. The proportion of reported seizures of GHB in the EU is very small compared to seizures of other types of synthetic drugs such as amphetamines and MDMA.

<sup>(10)</sup> <http://justice.gov/ndic/pubs1/1621/index.htm>

<sup>(11)</sup> <http://1001newsgroups.1001annonces.com/lmess.php?name=alt.drugs.ghb&first=1&last=40>, <http://www.drugs-forum.co.uk/forum/forumdisplay.php?f=36>, accessed September 2007

<sup>(12)</sup> <http://www.drugs-forum.uk>, <http://www.drogen-forum.com>, <http://1001newsgroups.1001annonces.com/lmess.php?name=alt.drugs.ghb&first=1&last=40#>, accessed September 2007

<sup>(13)</sup> BBC, October 2005, [http://news.bbc.co.uk/2/hi/uk\\_news/magazine/4261788.stm](http://news.bbc.co.uk/2/hi/uk_news/magazine/4261788.stm), [http://icsouthlondon.icnetwork.co.uk/0100news/0400lambeth/tm\\_headline=ghb](http://icsouthlondon.icnetwork.co.uk/0100news/0400lambeth/tm_headline=ghb), December 2006, 9.12.2006, Julia Littmann, [www.badische-zeitung.de](http://www.badische-zeitung.de) (<http://www.frsw.de/gbl.htm#Zahl%20der%20GBL-Abh%C3%A4ngigen%20nimmt%20in%20Freiburg%20zu>), <http://www.koeln.de/artikel/Koeln/Zwei-Koelner-sterben-durch-Partydroge-GBL-31709-1.html>, 7.11.2006



Between 2005 and 2006, seizures of GHB were reported in 12 countries including Belgium, Czech Republic, Denmark, Finland, Estonia, Germany, Hungary, Netherlands, Norway, Poland, Sweden and the UK (EMCDDA, Reitox National reports, 2005, 2006; EMCDDA Reitox Early Warning System Reports, 2005, 2006; EMCDDA Reporting form: Detecting, tracking and understanding emerging trends, 2005).

Reported trends in seizures of GHB are mixed and difficult to interpret due to a lack of data. Countries reporting an increase in 2005 compared to the previous year are Estonia and Norway. The largest quantity of seized GHB was reported from Estonia where 11.44 kg of GHB were seized when an illegal laboratory manufacturing GHB was discovered by the police in 2005 (EMCDDA Reitox National reports, 2006; EMCDDA Reitox Early Warning System Reports, 2005).

There is some evidence that GHB is produced locally in illegal laboratories. Between 2003 and 2005, clandestine laboratories were discovered in Belgium, Estonia and Germany (EMCDDA Reitox National Reports, 2006, 2004). The most recent data on illegal production of GHB was reported from Norway at the beginning of 2007 when the police detected a 'basement factory' that produced GHB (EWS system alert, 2007, Norway).

To supplement seizure data, some countries collect and analyse samples of substances collected in night club or dance music settings. For example, in the UK individuals who attend nightclubs in specific areas are searched at the door and any drugs that are found are taken and subsequently analysed. Between August 2006 and January 2007, 418 samples were collected from clubbers in a London area with a high concentration of gay club venues. Over half of the samples were in liquid form. Analysis of 225 liquid samples found that 85 (37.8 %) contained GHB and 140 (62.2 %) contained the precursor chemical GBL. These findings show that GBL has made significant inroads into the market for GHB, at least in this area of London (Wood et al., 2008). No samples were found to contain the other precursor chemical 1,4-BD. In addition none of the non-liquid seizures were found to contain GHB powder.

Due to the importance of GBL for use in the chemical industry there has been resistance to the reclassification of the precursors under the national legislation. However there are attempts to minimise diversion to the recreational drugs market. For example Sweden, Italy and Latvia have chosen to control one or both precursors and discussions about further controls are in progress in the UK, where all 'large imports' have to specify the 'end user' (Wood et al., 2008). 1,4-BD has recently been the subject of substantial media attention due to its use in the manufacture of a Chinese-made toy called Bindeez (Aqua Dots in North America) which allegedly led to several intoxications of children in North America and other countries. The toy was recalled by the distributor in November 2007.<sup>(14)</sup> <sup>(15)</sup>.

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<sup>(14)</sup> For example, <http://www.cnn.com/2007/US/11/08/toy.recall/index.html>; <http://www.spiegel.de/wirtschaft/0,1518,516193,00.html>, accessed December 2007

<sup>(15)</sup> Australia, New Zealand, UK



## Dose and effects

Pharmacologically, GHB is believed ultimately to increase the levels of dopamine in the brain with relatively little effect on other neurotransmitter systems. GHB appears to induce some bradycardia but no effect on blood pressure. An increase in prolactin and growth hormone secretion has also been observed in humans.

GHB-induced sleep maintains the natural stages of sleep (1-2-3-4-REM) but has been noted to lengthen stages 3-4 (delta/slow-wave sleep) followed by REM (rapid eye movement) sleep. The effect of GHB enhanced sleep appears to wear off after 3-4 hours at doses <2-3g.

GHB toxicity is dose-dependent and can, in varying degrees, result in nausea, vomiting, aggressive behaviour, ataxia, somnolence, bradycardia, hypothermia, random clonic movements, hallucinations, amnesia, coma, respiratory depression and apnoea (cessation of breathing). A steep dose-response curve has been observed where even a small increase in dose can produce serious toxic effects. Also, adverse interactions can occur with other sedative drugs (e.g. benzodiazepines), stimulant drugs (e.g. amphetamine) and alcohol. A recent double-blind controlled study, which compared the clinical effects of sedative-like drugs in twelve male recreational club drug users, found that GHB induces euphoria, a feeling of wellbeing, pleasurable effects and some stimulant-like effects. The effects were close to those induced by flunitrazepam and ethanol, although GHB tended to produce higher euphoric and pleasurable effects (Abanades et al., 2007).

The clinical effects of GHB usually occur 15 minutes after ingestion and can last approximately 3-4 hours (González and Nutt, 2005). GHB is rapidly absorbed, metabolised and eliminated with a plasma half-life of approximately 20-30 minutes and is undetectable in urine after approximately 12 hours. This has implications for its detection in body fluids. However, in cases of GBL ingestion, it is suggested that muscle tissue can sequester a large part of the initial GBL dose, thereby delaying conversion to GHB and prolonging the duration of action (EMCDDA, 2002).

GHB appears to 'affect different people in different ways'. A euphoric dose for one person could be a sedative dose for another (Kam et al., 1998). However, it has been generally suggested that a 0.5g dose be taken for relaxation and disinhibition, a 1g dose for euphoric effect and a 2-3g dose for deep sleep (Ward et al., 1998). Recreational doses of GHB are reported to be around 2.5g or more, often imprecisely measured as a 'capful of liquid'. Some users however report ingestion of doses up to 4-5g in a single session (Erowid - accessed November 2007; Korf et al., 2002).

Non-medically, GHB appears to be most commonly used in recreational nightlife settings for its relaxant, euphoric and disinhibiting effects. It may also be used for its sleep-inducing effects by people suffering sleep disorders or as an alcohol/drug substitute by those self-medicating symptoms of depression, or alcohol/drug dependence. It has also been used by bodybuilders who exploit the possible growth hormone promoting properties of GHB in their attempts to increase muscle mass. In the past, the potential anti-ageing effects of GHB have been used to actively promote sales due to claimed indirect anti-oxidant properties of the compound (EMCDDA, 2002). Furthermore, GHB has also been promoted in 'sex shops' as a sexual adjunct to enhance libido and sexual function among both heterosexuals and homosexuals (Romanelli et al., 2003).

In addition to the danger of steep dose response, further dangers associated with illicit use of GHB or its precursors are due to variances in the concentrations of the solutions. When GHB is produced illicitly from GBL, the purity can vary depending on the reagents used and method of synthesis. Furthermore, commercially-available domestic or industrial products, which could be used for synthesis, are not produced for human consumption and invariably contain other potentially toxic substances, including heavy metals and other organic solvents such as acetone or toluene. Use of such products as reagents may result in serious toxic effects if the resultant impure product is consumed (EMCDDA, 2002).

## Negative health consequences

### Dependence and tolerance

Dependence on GHB is a recognised clinical syndrome evidenced by a withdrawal syndrome when the drug is abruptly discontinued following regular or chronic use. There is evidence that physical dependence may occur in recreational users and various cases of withdrawal symptoms on cessation from GHB and its precursors have been documented (Miotto et al., 2001; Degenhardt et al., 2002; Craig et al., 2000; Catalano et al., 2001; Dyer et al., 2001; McDaniel and Miotto, 2001; Schneir et al., 2001). However, the clinical features have not been fully characterised (McDonough et al., 2004). The withdrawal syndrome appears to be similar to those from other CNS depressants such as alcohol, sedatives and hypnotics. Symptoms include insomnia, anxiety and tremor which usually resolve themselves within two weeks (Galloway et al., 1997). There are indications that in frequent, heavy users these symptoms can progress to severe delirium (Dyer et al., 2001).

Tolerance can develop to GHB with chronic use or long-term treatment and cross-tolerance between GHB and alcohol may exist. A Dutch survey, conducted in 2001, offered some evidence of tolerance among 72 GHB users who had taken GHB five times or more in their lifetime and at least once in the past year. Some users admitted they were taking increasing doses in order to match previous effects (Korf et al., 2002). Some clients who attend drug treatment services may have problems related to their use of GHB. However drug treatment monitoring systems in EU Member States do not, at present, report specific figures about such clients.

### Methods

There is an absence of an accurate and comparable system for recording the number of deaths and non-fatal emergencies related to the use of GHB and its precursors. EU Member States rarely report such cases which may be due to low prevalence of GHB use for a number of reasons such as low awareness of the substance or to difficulties in its detection. When critically assessing cases of GHB related deaths and non-fatal hospital emergencies, the following factors should be carefully considered: (a) the presence of other drugs (particularly, alcohol, opiates and stimulants); (b) the concentration of GHB found; and (c) the post mortem presence of GHB where there has been no evidence of GHB usage. Often the evidence for GHB or related product ingestion (e.g. GBL or 1,4-BD) is based on anecdotal or circumstantial evidence. Therefore, a detailed analysis and assessment of each case should be attempted.

### Reports of negative effects by users

Information about negative effects from use of GHB/GBL from the users' perspective is limited to a few surveys conducted among users and from comments made on internet websites. The negative effects most commonly mentioned by users of the substance are nausea and vomiting, stomach pain and sudden collapse or slipping rapidly into deep unrousable sleep. One UK-based internet survey conducted among 189 users of GHB/GBL reported that the most frequently reported adverse reaction that required intervention after taking GHB/GBL was deep, unrousable sleep. However, the location of use was significantly associated with the adverse reactions reported, and those using GHB/GBL in club settings were more likely to report negative effects than those who used GHB/GBL at home (Sumnall et al., 2007). The Dutch study of 72 GHB/GBL users reported that the majority had passed out at least once while on GHB/GBL, and some had done so frequently. In addition, a high incidence of vomiting and sudden collapses were reported (Korf et al. 2002).

### Non-fatal emergencies reported by emergency services

A small number of intoxications and emergencies associated with GHB have been reported from the late 1990s onwards — albeit unsystematically — via the Reitox Early Warning System in Belgium, Denmark, Finland, Luxembourg, the Netherlands, Spain, Sweden, UK and Norway. It is, however, important to note that it is not possible analytically to determine whether GHB clinical presentations are due to ingestion of GHB or its precursors. Sweden and Norway are the only EU countries which report yearly national figures of GHB detections in biological samples (blood or urine).

In Sweden, for example, detections in body fluid specimens increased from 24 in 1997 to 367 in 2004, then dropped to 290 in 2005 and increased again to 452 in the first eight months of 2006. In Norway, the number of GHB detections increased from 4 in 1998 to 37 in 2006. Both countries' figures, however, do not provide enough contextual information to distinguish between prescribed medical and illicit use (EWS reports). The Swedish Poisons Information Centre compiles national data on non-fatal intoxications through an analysis of the discharge summaries sent voluntarily by hospital emergency rooms, toxicology ambulance services etc. According to these data, the number of non-fatal GHB related intoxications increased from 87 in 2000 and to 115 in 2004. It should be noted that a substantial proportion of the recorded non-fatal GHB intoxications — 40 in 2000 and 38 in 2004 — were reported by one hospital in Gothenburg, in what might be described as a 'problem district' in south-west of the country. Although overall numbers were higher in 2004 the proportion of GHB related cases from this one hospital was less marked than it had been in 2000, which may signify diffusion of the trend in use to other areas of Sweden (Swedish reporting form to the EMCDDA on Detecting, tracking and understanding emerging trends, 2005). The helpline of the Swedish Poisons Information Centre recorded 81 inquiries in 2003, 108 in 2004 and 62 in the period January to September 2005 (*Ibid.*, 2005). It should be noted that data on information requests to the Poisons Centre do not represent the actual number of acute intoxications and serve only to reflect perceptions about risk.

In the Netherlands, the Municipal Health Service in Amsterdam reported that the number of non-fatal hospital emergencies due use of GHB rose from 25 in 2000 to 98 in 2004, but fell again to 76 in 2005. This number in 2005, as in previous years, exceeded the number of medical emergencies attributed to use of hallucinogenic mushrooms (70 cases), ecstasy (63 cases), amphetamine (3 cases) and LSD (1 case). The proportion of requests for emergency assistance requiring

transportation to a hospital in Amsterdam was also higher for cases related to the use of GHB than to the use of other drugs. Proportions varied between 35 % for amphetamine to 75 % for ecstasy but rose to 84 % for GHB <sup>(16)</sup>. In the Netherlands information requests made to poison centres concerning GHB, also increased by over 25 % between 2004 and 2005 from 190 to 241 (2006 Reitox national report, Netherlands).

In the UK, one London hospital emergency department — with a catchment area that includes local club venues which typically, but not exclusively cater for the gay club scene — recorded a total of 158 GHB and GBL presentations in 2006. The vast majority of cases related to self-reported recreational use of GHB, with five cases of accidental misadventure or deliberate self-poisoning. 34 % of patients reported that they had ingested GHB or GBL alone, but there were no reports of 1,4-BD ingestion. 34 % of patients reported combinations with alcohol, 32 % with MDMA, 22 % with ketamine, 14 % with cocaine and 14 % with amphetamines. It should be noted that whilst most self-reports referred to consumption of GHB, chemical analysis of samples collected from night clubs in the same catchment area during the same time period found that over half of the samples contained GBL rather than GHB. Most of the individuals presenting to the emergency department were males aged 20 to 34 years. (Wood et al., 2008). Reports from an Edinburgh hospital show that GHB-related admissions have increased from only 3 in 2000 to 39 in 2006. Although these make up only a very small proportion of all toxicology admissions, the proportion of those related to GHB has grown steadily since 2000 (Scottish Poisons Information Bureau, 2007: personal communication).

In Spain, there is evidence of a significant number of GHB-related emergencies occurring in Spanish club settings. In Barcelona 104 GHB overdoses presented to a public hospital emergency department during a 15 month study period (2000–2001) representing 3.1 % of all toxicological emergencies and ranking second among all illicit drugs requiring emergency consultation. The patient profile for GHB intoxication was defined as mainly young and male, with 90 % presenting at weekends. 73 % had simultaneously consumed alcohol and 86 % had ingested additional illicit drugs. Decrease of consciousness was the main complaint in all cases (Miro et al., 2002). In Ibiza, 8 % of all drug related emergencies at the Can Misses hospital in 2005 were related to GHB <sup>(17)</sup>.

### Deaths related to GHB

Deaths involving GHB or related products may not be identified since GHB is not usually detected during routine toxicological analysis. Furthermore, deaths involving only GHB are rare since the pattern of GHB use often involves the use of other drugs such as alcohol, ecstasy etc. The presence of other psychoactive substances, above all sedatives and depressants, is believed to intensify the toxic effects of GHB.

EU Member States rarely report death cases associated with GHB. Altogether, five Member States and Norway have reported GHB related deaths to the EMCDDA, as follows: Denmark and Italy (one case each), Finland (two cases), Norway and UK (3 cases each). Many more cases have been reported from Sweden and other sources in the UK, where specific studies have been carried out (Reitox National reports 2006).

In Sweden, a study with a specific focus on deaths related to GHB and its precursors found 36 cases in the period 1996 (when one case was recorded) to 2004 (when 9 cases were recorded).

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<sup>(16)</sup> In all of these cases the link with drug use was established on case history and circumstantial information rather than no toxicological confirmation.

<sup>(17)</sup> <http://www.ultimahora.es/ibiza/segunda-ib.dba?2-1+1007+416662>, accessed November 2007

The majority of the cases were classified as accidental poisoning, together with reports of some suicides (Steinholtz et al., 2005; quoted through the Swedish Reitox National report, 2005). In the first ten months of 2005, however, GHB had been detected in 5 cases of death (Swedish reporting form to the EMCDDA on Detecting, tracking and understanding emerging trends, 2005).

An unpublished UK study — using data from the General Register, the Birmingham Regional Laboratory for Toxicology and the National Programme on Substance Abuse Deaths at St George's, University of London — recorded a total of 44 GHB/GBL-related death cases in the period 1995 to 2006. The number of cases appears to have first peaked in 2001–2 and then risen to higher levels in 2005–6. Of the total 44 cases, 4 involved GBL, mostly in 2005–6, including one case where GBL was the only substance used. The majority of cases involved the ingestion of at least two other substances, typically alcohol and/or stimulants. It should be noted there is considerable variability in the range of GHB/GBL levels at post mortem. Several cases with low levels are being closely examined to determine if the GHB detected is endogenous in origin. Where the circumstances were known, the majority of deaths (22 of 38) followed recreational use, often by individuals with a history of substance use. A small number of cases involved the use of GHB to aid sleep and in one of these to assist body-building (Corkery, 2007).

### Responses in clinical settings

Typical presentation of GHB overdose patients attending emergency departments are coma, bradycardia and hypothermia. Various possible reversal/antagonising agents have been tested against the clinical effects of GHB toxicity, but with little or limited effect. Furthermore, due to the rapid gastro-intestinal absorption of GHB, gastric lavage and administration of activated charcoal are of limited use. Treatment of GHB intoxication is therefore largely supportive and intubation with mechanical ventilation is sometimes used, particularly to protect the airway if the patient is vomiting (Kam et al., 1998). However, in the majority of cases the patient awakes spontaneously within 1.5 to 3 hours.

### Risk reduction and prevention

#### Interventions on the internet

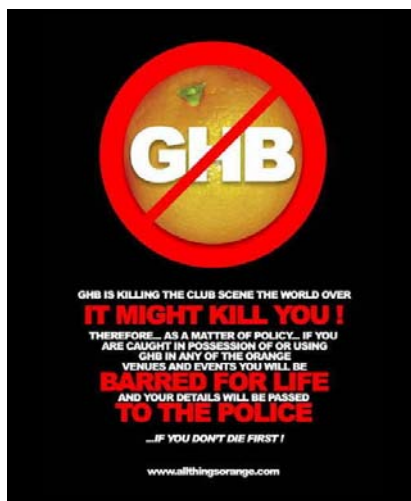
A total of 135 web sites were identified that provided prevention or harm reduction information on GHB/GBL. The majority are drug prevention sites, either generally targeting drug users or, more specifically targeting recreational drug users, particularly those attending rave and techno events. Three quarters of information sites were located in the UK, Netherlands, Spain, Germany and France. The vast majority describe the effects and risks of GHB/GBL. In particular, the websites stress the risk of overdosing, together with the dangers of mixing alcohol with GHB (Figure 3). About one third of sites included advice about using GHB safely. This typically includes advice to consume low doses, not to mix GHB/GBL with other drugs, in particular alcohol and opiates, not to consume whilst alone, as well as not to consume GHB/GBL if suffering from heart or kidney diseases or epilepsy.

**Figure 3: Warnings on internet sites about the dangers of mixing GHB with alcohol**

Sources: <http://www.partyrack.de/>; <http://www.drugsinfoteam.nl/>

#### Interventions in recreational settings

Interventions for drug prevention and harm reduction in responses to the use of GHB/GBL are most commonly provided by national or community projects targeting nightlife settings. These usually consist of training club staff and disseminating information about the risks of using GHB/GBL (Germany, France, the Netherlands, Austria, United Kingdom). Information typically comprises warnings about the legal implications of the use of GHB, the dangers of consuming 'GHB' together with alcohol, as well as advice on precautions to be taken in nightlife settings to avoid having drinks 'spiked', and measures to be taken in case of severe intoxication and coma.



Source: <http://www.allthingsorange.com/orange/>

**Figure 4: Warning label from a UK club about GHB**

Prevention activities take a number of forms. For example, in Paris a 'nightclub charter' was developed by the project 'Fêtez Clairs' signed by nightclubs to reduce drug-taking in their venues (18). Also in Paris, the project 'les nuits claires' is a coalition of the city and the Parisian law enforcement authority, prevention organisations, night clubs and local radio. Its project consists of training club staff and information dissemination on GHB/GBL (19). The city authority in Paris has also funded a poster on the risks of taking GHB which is displayed in some clubs (Figure 5, left). Another example of prevention activity is a GHB awareness campaign led by the local police and a charity in one of the London boroughs with a large lesbian, gay, bisexual and transgender communities, and home of some of London's most popular night clubs (20). In London, a guide for 'Safer

(18) <http://www.fetez-clairs.org/index.php?id=8>, accessed January 2008.

(19) Forum Français pour la sécurité urbaine/ French Forum for Urban Safety (2007), <http://www.ffsu.org>

(20) <http://www.tht.org.uk/mediacentre/pressreleases/2004/june/ghbawarenessinitiative.htm>, accessed 1 March 2007



clubbing' about health and safety practice at dance venues recommends the presence of trained first aid personnel on-site to provide support when a drug-related emergency occurs (London Drug Policy Forum, 1996). In Germany, a poster by a coalition of health organisations warns of the dangers of GHB overdose (Figure 5, right) as part of a general safer clubbing programme (Partypack.de).



**Figure 5: Posters on GHB risks from France (Paris) and Germany (Cologne)**

In the Netherlands, the nationwide Clubs and Drugs projects provide information on GHB/GBL to party drug users as well as training to club and pub staff. There are also First Aid for Drugs and Alcohol (EHBD) teams that attend clubs and large events and respond to GHB-related incidents (21). In London, incidents involving GHB and GBL overdoses have prompted some club owners to initiate the provision of paramedic backup in night clubs (22). The managing director of All Things Orange, the parent company of the Fire nightclub in Vauxhall's gay district, stated that the club

**Sources:** Paris - <http://www.fetez-clairs.org> ; Germany - <http://partypack.de>; <http://www.checkup-koeln.de/>

highlights the dangers of GHB to its clients in order to avoid any negative ramifications on the club scene. The reasons he give are explicit in his statement that 'GHB is the main reason that the New York club scene is in tatters right now and we want to do all we can to eliminate the same thing happening here in the UK (Druglink, 2005) (23).

### Interventions targeted at 'drink spiking'

In response to fears about 'drink spiking', the most common advice offered in nightlife settings is to be attentive and not to leave drinks unattended. Other practical commercial aids to prevent or detect 'drink spiking', such as plastic stoppers and special glasses have been promoted and marketed in some countries. Some night clubs in the UK offer plastic 'use once only' stoppers that glow in UV light. Once inserted into the neck of a bottle, the stopper cannot be easily removed, creating a seal that helps stop pills and illicit substances being slipped into the drink (24). Another measure to prevent drink spiking has been the production of conical glasses with a sealed hole at the top where a straw can be inserted. After filling the glass from underneath, the barman seals it so that the drink cannot be tampered with until the seal at the top is broken with a straw. However, the efficacy of some of these measures have been questioned. Campaigns have been criticised for undue emphasis on 'drug spiking', when forensic evidence points to the more common association of alcohol in cases of alleged sexual assault or 'date rape' (Puri, 2007; Meyers and Almirall, 2004; Beynon et al., 2006). The Roofie Foundation was established in the UK in 1997 to provide telephone helpline

(21) <http://www.ehbd-team.nl/>, accessed May 2007

(22) <http://www.knightlifemedicalservices.co.uk/>, accessed May 2007

(23) <http://scene-out.com/forums/showthread.php?t=823>, accessed December 2007

(24) <http://www.spikey.co.uk/>, accessed March 2007

support and counselling for women who reported being victims of drug facilitated sexual assault. This was set up in response to concerns about the benzodiazepine Rohypnol being misused for this purpose.

In response to increasing concern about drug-facilitated sexual assault, at the beginning of 2007 the European Parliamentary Assembly made a series of recommendations to Council of Europe Member States. The measures recommended include: a revision of sexual assault legislation; development of information campaigns; improved support for victims; better and more standardised methods for forensic analysis and pressure on pharmaceutical companies to alter products that might be used for sexual assault and that drugs used to facilitate sexual assault be placed on lists of controlled drugs (Council of Europe, 2006).



## Conclusions

Although use of GHB is generally low in the EU, the health costs are relatively high compared with other drugs. In some European cities, accidental GHB overdoses that occur in recreational nightlife settings account for a substantial proportion of the overall drug emergencies that require emergency ambulance or hospital services. Negative effects from using GHB/GBL, such as vomiting and risk of sudden loss of consciousness may serve as a deterrent to many young people in mainstream nightlife settings. However, survey evidence suggests that a sub-population of practised users may be able to limit some of these risks and continue to use GHB/GBL. GHB's low price, easy availability and the ease with which it can be taken may serve to promote diffusion of the trend. Little is known about the use of GHB/GBL in private settings and about use among marginal or vulnerable populations that may find the strong sedative effects of GHB/GBL a cheap and accessible substance.

### Possible drivers of the trend

- The internet plays a ubiquitous role in Europe in raising awareness about almost everything, including GHB and GBL. It provides both advice and sales information about both substances. The ease with which GBL (and thus GHB) can be acquired allows potentially much easier and cheaper access than that usually found in illicit drug markets in the EU.
- Other factors more specifically related to the substance itself have contributed to the emergence of a trend in the use of GHB. The multi-purpose characteristics of GHB and GBL and their pharmacological effects ensure a very wide customer base. Potential consumers include: clubbers seeking relaxation and euphoria; bodybuilders with an interest in increasing muscle mass; people interested in purported anti-aging remedies or seeking enhanced sexual function. The pharmacological status of GHB as a prescribed drug may make it attractive for those with sleep and drug or alcohol problems, by lending legitimacy to acts of self medication for these purposes.
- The similarity of GHB to alcohol with regard to both its effects and its liquid form may in due course, through its familiarity and convenience, facilitate widespread diffusion.

### Barriers to the trend

- Changes in drug legislation since 2000 appear to have had an immediate impact on the open sale of GHB and on the volume of Internet sales and promotion. However, there is evidence to suggest that GHB's precursor GBL is being sold and used as a substitute for GHB.
- Negative health and social effects such as vomiting, sudden collapse and passing out may, for many, tip the balance against using GHB, particularly in social settings. These undesirable affects and deaths in particular appear to have prompted campaigns to limit the use of GHB. Club owners have clear vested economic interests to ensure the safety of their clients and protect the reputation of the leisure industry and consequently some are investing in prevention activity.
- It has also been suggested that the association of GHB with sexual assault that has commonly been portrayed by the mass media and on the internet may be contributing to its 'negative image' and thus to limiting diffusion.

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The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) is one of the European Union's decentralised agencies. Established in 1993 and based in Lisbon, it is the central source of comprehensive information on drugs and drug addiction in Europe.

The EMCDDA collects, analyses and disseminates objective, factual reliable and comparable information on drugs and drug addiction. In doing so, it provides its audiences with an evidence-based picture of the drug phenomenon at European level.

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