

Chapter 15

Variations in problem drug use patterns and their implications for harm reduction

Richard Hartnoll, Anna Gyarmathy and Tomas Zabransky

Abstract

This chapter describes the diversity of problem drug use patterns across Europe, the different harms that may arise, and the implications for harm reduction responses. Harm reduction developed in response to concern about heroin injecting in the 1980s in western Europe. Since then, other patterns of problem drug use have increased and the geographical context has expanded. While heroin continues to present challenges, the problematic use of stimulants such as (meth-)amphetamine or cocaine, of other opioids such as home-made opiates or synthetic opiates, and of multiple drug combinations calls for innovative responses. These responses need to be flexible and based on consensus and cooperation between key actors, in particular from the health, social and law enforcement sectors.

Keywords: problem drug use, Europe, harm reduction, drug use patterns, responses.

Introduction

Historically, harm reduction has been heroin-focused and driven by concern over the risks of injecting. However, patterns of problem drug use vary widely across the European region. Different patterns of use can have different impacts on the burden of drug-related harms. The aim of this chapter is to highlight this diversity and to discuss the implications for harm reduction priorities and interventions.

The chapter does not provide an overview of drug use patterns in Europe but focuses on selected key themes together with illustrative case studies to underline the importance of innovative harm reduction responses that are adapted to the particular harms that different drug use patterns may incur. The emphasis is on health-related harms. For reasons of space, social harms such as drug-related crime or public order, though important, are not covered.

The Annual reports of the EMCDDA provide information on the broad differences in problem drug use ⁽¹⁾ observed across Europe.

- Historically (from the 1970s/1980s) there has been a predominance of heroin in western and southern European countries compared to amphetamines in northern countries and home-made opiates and/or misuse of medicines in central and eastern Europe (Hartnoll, 2003).

⁽¹⁾ Problem drug use is defined by the EMCDDA as 'injecting drug use or long-duration/regular use of opioids, cocaine and/or amphetamines'. This definition is currently being reviewed in the context of changes in the drug situation in recent years.

- More recently (1990s to early 2000s) there has been an increase in heroin/opiates in eastern and central countries compared to stabilisation or some decreases in western and southern countries; after 2003, there are signs of heroin increasing again.
- Also, more recently, there has been a significant increase in cocaine as the predominant stimulant in south and west Europe compared to amphetamines in northern, central and eastern countries.
- There has been a continuing high level of injecting (whether opioids or stimulants) in northern, central and eastern countries compared to relatively lower levels of injecting, together with increases in smoking or sniffing, in south and west Europe.

Some exceptions to this general picture are described later in this chapter. In all countries, multiple drug use, especially of opiates and stimulants, often together with heavy alcohol use or pharmaceuticals such as benzodiazepines, is common amongst problem drug users. Unless otherwise referenced, information on patterns of problem drug use in the EU is based on the Annual reports of the EMCDDA and national reports from the Reitox network of focal points in Member States.

Amphetamine and methamphetamine

While heroin and more recently cocaine have been the main drugs of concern in many European countries, in parts of northern and central Europe amphetamine use has been important among problem drug users for many years, either as a primary drug or in combination with opiates (Sweden, Finland, Norway, Czech Republic). Over recent years, relatively high levels of amphetamine injecting have also been reported from other countries around the Baltic, as well as from Slovakia and Hungary. Some problematic use is reported from other northern and north-western countries, though only the United Kingdom reports a substantial proportion of injectors. The drugs involved are mainly amphetamines (amphetamine sulphate powder, or in some cases tablets). Methamphetamine, which is more potent than amphetamine, is not common in European Union (EU) countries, with the notable exception of pervitin in the Czech Republic and, quite recently, Slovakia (EMCDDA, 2008; Griffiths et al., 2008). Reports of smoking crystal methamphetamine are rare in Europe (in contrast to the United States).

In the Czech Republic, methamphetamine has been the primary problem drug since the 1970s (see Case study 15.1). Recently, substantial increases have occurred in neighbouring Slovakia. In addition, increased availability and use of methamphetamine is reported from countries where amphetamine use has traditionally been prevalent (Norway, Sweden, Finland). For example, in Norway methamphetamine has been increasingly found in blood samples from arrested drivers (21 % in 2007 compared to 10 % in 2003) while the trend for amphetamine appears to be declining (SIRUS, 2008). Latvia, Lithuania and Hungary also report some increases.

Important levels of injecting home-made liquid forms of methamphetamine ('vint') or methcathinone ('jeff' or 'boltushka')⁽²⁾, derived from ephedrine or pseudoephedrine, are reported in parts of Russia, Ukraine and other former Soviet Union countries (Grund et al.,

⁽²⁾ Methamphetamine is produced by reduction of (pseudo)ephedrine, while methcathinone is produced by oxidation. The latter is a simpler process though methcathinone is less potent than methamphetamine.

2009). The (pseudo)ephedrine is usually extracted from common prescription medicines or over-the-counter cold preparations.

Legal restrictions on the sale of ephedrine-containing medicaments have led to the development of alternative methods of producing stimulant-type drugs. For example, a recent study in Odessa, Ukraine describes young drug users injecting home-made drugs containing cathinone, a weaker, shorter-lasting stimulant obtained by mixing freely available medications containing phenylpropanolamine with vinegar and potassium permanganate (Chintalova-Dallas et al., 2009). However, Czech customs report seizures of larger shipments of pure pseudo/ephedrine thought to originate in Balkan and/or in former Soviet countries. This may signal a renewed interest of criminal groups in the Czech pervitin market following failed attempts to control it in the late 1990s and early 2000s (Zabransky, 2009).

With some exceptions (e.g. the Czech Republic or Sweden) data on drug users in treatment facilities may underestimate the extent of problem use of amphetamines, and of stimulants in general, perhaps because of limited treatment options for amphetamines or because users may not have, or may not perceive, a need for treatment. For example, in Finland the estimated prevalence of problem use of amphetamines in 2005 was four times that of opiates. Despite that, opiates were the most common primary drug for which treatment was sought (Stakes, 2008).

Risks, harms, protective factors

Evidence on the risks and harms of injecting (meth)amphetamine, relative to heroin or other opioids, is variable, with different studies showing different results (see also Grund et al., 2010). For example some studies have shown lower HIV prevalence among amphetamine users, despite high levels of risk behaviour (e.g. Käll and Olin, 1990; Talu et al., 2010), while others report similar or higher HIV rates (e.g. Shaboltas et al., 2006; Zeziulin et al., 2008). It is likely that differences in risk behaviours and rates of infection reflect differences in the populations involved, in the contexts of use, and in the forms in which the drugs are prepared and used more than they reflect the specific substance per se. It has also been suggested that opiate-mediated immuno-suppression increases the likelihood of HIV infection in opioid compared to amphetamine users (Vallejo et al., 2004).

For example, a study of stimulant injectors in Ukraine (Booth et al., 2008) found a lower prevalence of HIV among stimulant users compared to opiate users in some cities and the reverse in others. Furthermore, despite an overall lower HIV prevalence, stimulant injectors showed higher risk scores on composite measures of both injection and sex risk. Since stimulant injectors were younger with shorter injecting histories, the study concluded that without intervention HIV was likely to increase among stimulant injectors.

Studies also suggest that the type of drug injected is associated with different profiles of risk behaviour. For example Kruse et al. (2009) report that risks specific to stimulant-only users were related to direct syringe sharing (sharing needles and rinse water) while risks specific to heroin users were related to sharing drugs while preparing for injection (front/backloading, sharing cotton and cookers). These differences only became apparent when geographical clustering by neighbourhood was included. The authors suggest that attention to neighbourhood differences might improve the impact of interventions for injectors of different drugs.

The frequency and intensity of injecting are also important aspects of infection risk (Colfax and Shoptow, 2005; Braine et al., 2005). For example, in a cohort study of predominantly heroin injectors in St Petersburg, frequent psychostimulant use was the main factor associated with HIV seroconversion (Koslov et al., 2006).

In settings where amphetamines are used in small, private groups, or on an intermittent or binge basis rather than daily, user groups may display lower levels of marginalisation and lower levels of risk behaviours than is often found among heroin using populations (see Case Study 15.1). In other populations of amphetamine users, health risks remain high, for example where use is associated with social exclusion, marginalised lifestyles, working in the sex industry, or imprisonment (March et al., 2006).

There is consistent evidence of increased sexual risk behaviour among (meth)amphetamine users, both injectors (Booth et al., 2008; Molitor et al., 1999; Käll and Nilsson, 1995; Klee, 2006) and non-injectors (Molitor et al., 1998).

Overdose deaths appear to be relatively uncommon (EMCDDA, 2009a), in part because amphetamines are not central nervous system depressants and the range between effective and deadly dose is wider than with opiates. However overdoses can be more difficult to manage since there is no equivalent to naloxone that might be distributed to street workers or users — the only option is rapid, sophisticated medical help to deal with the threat of acute heart failure (personal communication, T. Zabransky).

The form of the drug preparation is also important regarding the risk of injection-related complications. Thus home-based methods of preparing central nervous system stimulants leave traces of chemicals such as phosphorus, permanganate or sulphuric acid. The additives may cause damage to blood vessels and liver (Pavlenko, 2008) or neurological damage and, in the case of permanganate, irreversible Parkinson-like symptoms (de Bie et al., 2007).

Implications

If, as appears to be the case in Finland (see above, Stakes, 2008), amphetamine injectors are less likely than their opiate-using counterparts to contact services, then greater emphasis is needed on outreach and peer education approaches targeted at amphetamine-using networks and groups. This is especially important where the populations involved are young. The high levels of sexual risk behaviour associated with methamphetamine use mean that sexual risk education needs to be addressed systematically in service development and delivery, not only in services targeting sex workers, and to go beyond providing condoms (Corsi and Booth, 2008).

The current lack of an equivalent low-cost and effective treatment such as substitution treatment for opiate addiction implies that higher priority should be given to developing treatments for stimulant users. Several studies are underway in this regard (Elkashef et al., 2008).

In developing responses it may be useful to consider whether distinct approaches or services might encourage stimulant users to seek help. Thus opening hours could take account of more socially integrated users with regular jobs, or the locations and images projected of services

could be more discrete in order to overcome barriers such as perceptions that drug services are for heroin addicts or ‘junkies’. The distribution of hard gelatine capsules for pervitin users described in Case study 15.1 is another example of a specific, targeted intervention.

At the level of policy, several studies have noted that efforts to suppress home-production of amphetamine-type stimulants may have paradoxical adverse consequences in terms of users turning to potentially more risky patterns of drug production and consumption, or in terms of production becoming more professionally organised, leading to an expansion in the market (Grund et al., 2009; Chintalova-Dallas et al., 2009; see also Case study 15.1). This implies a need for discussions between those responsible for different aspects of drug policy.

Case study 15.1: Methamphetamine (pervitin) injecting in the Czech Republic

In contrast to other EU countries, the major drug used by problem drug users in the Czech Republic is crystal methamphetamine, locally known as pervitin⁽³⁾. The predominance of pervitin has persisted from the early 1970s to the present.

Hard gelatine capsules

Quite recently, a remarkable harm reduction intervention specifically for pervitin users was introduced in the Czech Republic and is quickly spreading through the country.

Distribution of empty hard gelatine capsules was introduced in 2006 in South Moravia (personal communication, B. Janiková). The inspiration for providing capsules was the practice of some methamphetamine users of swallowing the drug in a bolus, wrapped in paper or a plastic bag, when they were experiencing severe problems with injecting due to injured veins. In English, this is nicknamed ‘parachuting’ (Hendrickson et al., 2006).

According to the only Czech study to date (Škařupová et al., 2009) in 2008 almost 29 000 capsules were distributed by at least 17 harm reduction organisations in different parts of the country⁽⁴⁾. A further 20 facilities plan to introduce capsule distribution shortly. Drug users usually fill the capsules with pervitin powder before swallowing, though some report using liquid pervitin (dissolved powder) after failed attempts to inject.

The study reports that drug users perceive the effects of ‘piko’ used in this way as comparable in intensity to injecting the same amount of the drug. Administered rectally, the onset is perceived as even more intense. Oral use in capsule form reduces the intolerably bitter taste of methamphetamine and, compared to intravenous administration, has an exiguous onset of effect. The study identified that in addition to drug users switching to capsules from injecting, other groups were successfully targeted: sniffers looking for enhanced drug experience, and relatively stable, employed injecting drug users (IDUs) wishing to reduce injecting at work in order to avoid discovery.

⁽³⁾ Originally a German label name for industrially produced methamphetamine. Commonly known as ‘piko’ (pronounced as ‘pee-koh’) in the Czech drug subculture.

⁽⁴⁾ This is quite low compared to approximately 4 500 000 needles and hypodermic sets distributed by Czech needle and syringe programmes (NSPs) in the same year, and another 1 500 000 needles and sets sold to drug users by pharmacies in 2007 (Mravčík, et al., 2008).

Overall, providing hard gelatine capsules is perceived as a successful harm reduction intervention, averting risks of injecting (and sniffing) pervitin. However, professionals are concerned that titration of dosages can be difficult for inexperienced users, and that gastric ulcers may develop after long-term daily oral use of methamphetamine. Further studies are needed.

Drug markets and harm reduction

Many drug-related harms arise more from the characteristics of drug markets than from drug use per se (e.g. MacCoun and Reuter, 2001; Join Together, 2007). A specific aspect of pervitin in the Czech Republic is its mode of production. Most of what is consumed is locally produced and distributed in very small quantities (Mravčík et al., 2008). The producers ('cooks') use simple tools, freely available industrial chemicals and pseudoephedrine extracted from anti-cough medications that until recently were readily available from pharmacies. Production and subsequent use usually occurs in small groups of three to eight people who share the logistics of production ⁽⁵⁾. There is little communication between these groups in terms of drug distribution and, most importantly, in terms of use (Miovský et al., 2007) — an aspect that probably contributes to the very low prevalence of HIV (<0.01 %) and hepatitis C (HCV (<35 %) among Czech users of pervitin. Finally, the atomised Czech pervitin market is comparatively non-violent since 'turf fights' associated with criminalised drug distribution are rare, and recruitment of new drug users is low due to the social seclusion of the 'squads'.

However, this relatively low-harm ('balanced' in economic terms) situation could rapidly change if small production patterns were destroyed — for example by restricting pseudoephedrine-containing medications to prescription only or by a complete ban ⁽⁶⁾. Disrupting the 'balanced' drug market could well result in increased violence and health harms (e.g. Goldstein, 1989; Rasmussen et al., 1993; Rasmussen and Benson, 1997). The transition from atomised drug production and use into a 'standard' pyramidal drug market with marketing driven by high monetary profits could have long-term negative consequences.

Harms resulting from unintended consequences of drug policies — especially legal and law enforcement interventions — represent an area of harm reduction that needs to be further explored and the room for manoeuvre assessed.

The other important issue in terms of reducing the harms of homemade drugs is the production process and quality of the final product. For the Czech 'cooks', it is imperative to evaporate the final methamphetamine liquid into crystals and to share only the powder between the squad (Grund et al., 2009). From the public health point of view, sharing powder (that is subsequently dissolved and injected by each individual) is, compared to communal sharing of the liquid, substantially less risky in terms of disseminating blood borne diseases within the group.

⁽⁵⁾ Procuring the pseudoephedrine-containing pharmaceuticals and other chemicals, providing the house or apartment for preparing the drug, sharing the necessary know-how.

⁽⁶⁾ Both options were recently discussed by the Czech decision makers together with less severe forms of regulation such as electronic ID registration of buyers of pseudoephedrine products.

Cocaine and crack

In western and southern Europe the predominant stimulant is cocaine rather than amphetamines, though there are large differences in the extent of problematic use, with high rates reported from Italy, Spain, the Netherlands and the United Kingdom. Different sub-groups of problem cocaine users can be distinguished (EMCDDA, 2007).

One common pattern among socially integrated groups involves escalating use of cocaine, mainly by snorting, alongside heavy alcohol consumption, cannabis, benzodiazepines and, less commonly, heroin. In other groups, cocaine is more closely associated with heroin use as either a primary or secondary drug. Cocaine-injecting is mostly reported among heroin injectors (including clients of methadone programmes who were primary heroin injectors before entering treatment). In countries where heroin is mostly smoked rather than injected then cocaine is mainly either snorted or smoked. Crack appears to be mostly restricted to areas of some large cities and, as in the United States and Canada, is concentrated among more marginalised groups of heroin users, sex workers and certain minorities (Fischer et al., 2006). As shown in Case study 15.2, in the United Kingdom crack use appears to be more prevalent and widespread than in the rest of Europe, though still concentrated in major cities, especially London (GLADA, 2004) and other large metropolitan centres. While crack is usually smoked, the injection of crack in crack-heroin speedballs has been reported from several cities in the United Kingdom (Rhodes et al., 2007) and in a few cases from Dublin (Connolly et al., 2008).

As with amphetamines, cocaine-related problems may be less visible in services, especially in drug treatment, partly because of limited treatment options (no equivalent to methadone or buprenorphine), partly because of the more socially integrated profile of many primary cocaine users. This is reflected in long lag-times reported between first cocaine use and first treatment demand (9–12 years). Despite this, countries such as Spain, Italy or the Netherlands report relatively high numbers of cocaine users entering treatment. In Spain and the Netherlands, cocaine is more prevalent than heroin in treatment demand data (EMCDDA, 2009a). In Spain, the number of cocaine-related incidents seen in hospital emergency departments exceeds those for heroin or other drugs (Ministerio de Sanidad y Consumo, 2007).

Risks, harms, protective factors

Injecting cocaine, whether as a primary drug or in addition to heroin or methadone, involves more frequent injection than other drugs, including (meth)amphetamine, because of cocaine's shorter duration of action. This high frequency of injecting may carry higher risks of infections related to injecting (Tyndall et al., 2003; Chaisson et al., 1989; van Beek et al., 1994). The compulsive nature of crack use combined with user profiles also implies higher-risk use patterns (Edlin et al.; 1994, McCoy et al., 2004; van Beek et al., 2001). The use of both powder cocaine and crack is also linked to health risks such as medical emergencies and cardiovascular problems (Egred and Davis, 2005; Pozner et al., 2005). Smoking crack cocaine involves particular risks and harms, including mouth ulcers and the potential for transmission of HCV via sharing of crack pipes (Tortu et al., 2004; Fischer et

al., 2008; Neaigus et al., 2007). The possibility that crack smoking methods might constitute risk factors for HIV infection had been suggested in the mid-1990s (Porter et al., 1994). Crack use is also associated with increased sexual risk behaviours (Booth et al., 2000). Cocaine injecting or crack use can also adversely affect opiate substitution treatment outcomes (Williamson et al., 2006).

Snorting cocaine, though less risky than injecting in terms of mortality or transmission of infectious diseases through sharing paraphernalia, also has risks, including dependence, damage to nasal membranes or escalating financial problems among heavy users (Smith et al., 2002; Grund et al., 2010). Sexual risk behaviours are also relevant. For example, a study comparing young cocaine users with young heroin users in three Spanish cities found that cocaine users were less marginalised, reported much lower levels of injecting or borrowing syringes, and were much less likely to be HIV or HCV positive than heroin users. However, cocaine users reported higher levels of unprotected sex with occasional partners, and higher rates of sniffing through tubes used by more than 10 persons (Brugal et al., 2009).

Implications

Problem cocaine users may be harder to reach than users of opiates. Socially integrated users may be slow to acknowledge problems and may not perceive drug services for 'junkies' as relevant to them. This implies the need for different approaches and messages for socially integrated users, for example as tried in Italy (Ministerio della Salute, 2007) and Ireland. The Irish pilot project suggested that cocaine users' reluctance to approach heroin-oriented programmes could be reduced through separate access during evenings, or immediately before and after the weekend (Horgan, 2007). However, the social networks and economic resources of more socially integrated users may also enable them to resolve problems without contacting services (Cohen and Sas, 1993; Decorte, 2000), though users do not consider recovery to be easy (Cunningham, 2000).

Highly marginalised heroin/cocaine/crack users may also be reluctant to contact regular treatment or harm reduction services, or may lead such chaotic lives that services are unable (or unwilling) to attract or retain them in treatment or facilitate reductions in risk behaviour (Prinzleve et al., 2004). This has several implications.

Intensive, targeted outreach projects are needed to access and deliver treatment or harm reduction interventions to such populations. Examples are found in the Netherlands and Ireland (Henskens et al., 2008; Connolly et al., 2008). The high-frequency injection needs of cocaine users have important implications for the number and manner of distribution of syringes/needles by NSPs, the capacity and opening hours for consumption rooms, and the type of health education and prevention messages (e.g. regarding syringe re-use). Crack use implies reviewing needs regarding provision of relevant paraphernalia and information on the risks associated with using and sharing crack pipes. For example, in several Canadian cities 'safer crack use kits' are distributed (Haydon and Fischer, 2005; Boyd et al., 2008; O'Byrne and Holmes, 2008). The distribution of materials for crack or heroin smoking or freebasing — such as aluminium foil and straws or crack pipes — takes place in low-

threshold centres in Austria, Belgium, the Czech Republic, France, Luxembourg and Spain (EMCDDA national reports, 2008). An evaluation of the impact of distributing crack-smoking equipment at the needle exchange programme in Ottawa found that not only did infection-related risk behaviours associated with crack smoking diminish, but that there was also a shift from injecting to smoking the drug (Leonard et al., 2008).

Cocaine-injecting methadone clients may be seen as a group for whom substitution treatment is not working effectively (Williamson et al., 2006; Tyndall et al., 2003; Booth et al., 2003; Audit Commission, 2002). This points to the need to reinforce links between treatment, harm reduction sectors and the wider care system (e.g. joint case management of individual cases) and to the need to improve the quality of treatment services. Marginalisation, serious physical and mental health problems and the acute effects of crack such as paranoia and aggression impose special demands on staff and imply specific strategies for training staff as well as for contacting and delivering services to crack users.

Case study 15.2: The diffusion of crack-based speedball injection in the United Kingdom

Whereas only 1 % of heroin injectors in London reported crack injecting in 1990, over 50 % regularly did so by 2003, usually as part of a crack-heroin 'speedball' (Rhodes et al., 2006). In some metropolitan centres of the United Kingdom, such as Bristol and Manchester, over 70 % of injectors regularly inject crack-heroin speedball (Health Protection Agency et al., 2006). Patterns of injection in some United Kingdom cities have changed dramatically over the last decade. There is an emerging culture of crack-based speedball injection among many injectors that is quite distinct from injecting opiates alone, and almost unique to the United Kingdom (Rhodes et al., 2007).

In the United Kingdom, the odds of having HCV infection are elevated among injectors of crack and crack-based speedball (Hickman et al., 2007). The regular injection of crack-heroin speedball also appears linked to increased vein damage, including abscesses and bacterial infections. Qualitative research links such vein damage to 'missed hits' related to the local anaesthetic action of crack, the excess use of citric in the preparation of speedball injections, 'flushing' when making a hit, and the interplay of homelessness and crack injecting (Rhodes et al., 2007). Importantly, various data sources in the United Kingdom link speedball injection with shifts towards groin (femoral vein) injection, articulated by speedball injectors as an 'acceptable risk' and not merely as a 'last resort' in the face of increased vein deterioration (Rhodes et al., 2007). Surveys show that almost half (45 %) of injectors in England report groin injecting in the last month, with crack injectors significantly more likely than opiate-only injectors to inject into their femoral vein (Rhodes et al., 2006; Hickman et al., 2007). Groin injection may persist despite awareness of increased health risks and medical complications. Groin injectors are more likely to report open wounds at their injection sites and to have had deep vein thrombosis.

This emphasises an urgent need to review how harm reduction services respond in relation to vein care. Shifts to crack-based speedball and groin injection highlight a need for interventions to consider how to promote safer speedball injecting alongside emphasising basic vein care and injecting hygiene. Interventions also need to focus on preventing transitions towards groin and crack injection among users of heroin.

Opiates and opioids

Over the past decade or so, heroin injecting appears to have decreased, at least to some extent, in many western European countries, and its use by other routes, notably smoking or chasing (?), has increased. This is especially notable in the Netherlands, Spain and Denmark, and to a lesser extent in some other countries such as Ireland, Portugal, Germany and the United Kingdom. Sniffing heroin has increased in countries such as Austria, France and Greece. In some areas, this has led to decreases in demand on needle and syringe programmes.

However, despite the trend towards smoking or sniffing in some countries, there are large differences between countries, and injecting remains the predominant route of administration of opiates in most of the newer Member States as well as in some older members such as Finland, Italy and Luxembourg. Even in countries where injecting has decreased, important proportions of heroin users still inject and new groups of injectors continue to emerge. In France, for example, where injecting had decreased substantially in earlier years, increased injecting has been reported since 2005 among some groups of young people (Cadet-Tairou et al., 2008; CEIP de Marseille, 2006). In Italy, the estimated incidence rate of new heroin use has not decreased over this decade and injecting remains the most common route of administration despite some increases in heroin smoking (Drug Policy Department, 2008). This is in marked contrast to Spain, where estimated incidence of new heroin use has dropped sharply, especially regarding use by injection (Sánchez-Niubò et al., 2009).

Although public and professional attention is often focused on recent trends, the legacy of the past may impose heavy burdens on current services. In many western European countries, the aftermath of the heroin 'epidemics' of the 1980s/90s and the heritage of two decades of harm reduction can be seen in cumulative populations of ageing addicts, especially in substitution programmes, with increasing needs for care, chronic health problems, co-morbidity, unemployment, and service dependency (EMCDDA, 2010b).

Heroin is not the only illicit opiate used in Europe. Market conditions sometimes limit or interrupt the availability of heroin leading to the use of a variety of other opiates or synthetic opioids.

Injecting home-produced liquid opiates has been observed in many central and eastern European countries since the 1980s (e.g. Poland, the Baltic States, Hungary, Czech Republic, Slovakia) (Grund, 2005). Since the disintegration of the Soviet Union and the opening up of previously closed economies, drug markets have also changed and heroin has become the predominant opiate. However, in parts of Russia, Ukraine, Belarus,

(?) Technically, smoking and chasing are not the same. Smoking is mixing heroin with, for example, tobacco or marijuana, or both, and smoking it in cigarettes. Chasing is inhaling the evaporated fumes of heroin from a metal foil that is heated from underneath. In many studies and sources of data, however, these are not distinguished. In this chapter, the term 'smoking' is used in a generic sense to cover both meanings. With smoking, combustion occurs at high temperatures (about 1 000°C), which destroys many organic substances. With chasing, vaporisation occurs at lower temperatures (about 200°C), resulting in much lower levels of destruction.

Moldava and other former Soviet Union countries, as well as in the Baltic States, injecting liquid opiates remain an important component of problem drug use patterns (Grund, 2001; Abdala et al., 2006).

Since 1985 there has been a substantial expansion of methadone substitution treatment across the EU (Hedrich et al., 2008). This expansion has been accompanied by the emergence of an illicit market in diverted or stolen methadone. This is reflected, for example, in increasing mentions of methadone in fatal overdose cases, often in combination with other drugs or alcohol (EMCDDA, 2008). Methadone tablets are also sometimes crushed and injected.

In recent years the use of buprenorphine for substitution treatment has grown as an alternative to methadone. Initially implemented on a large scale in France (OFDT, 2003; Canarelli and Coquelin, 2009), other countries have also introduced it, and by 2007 buprenorphine accounted for 20 % of substitution treatment in the EU (Hedrich et al., 2008). Alongside this therapeutic use illicit markets have also developed, with the tablets often being crushed for snorting or injecting (Roux et al., 2008; Cadet-Taïrou et al., 2008).

For example, since 2000 the injection of buprenorphine tablets (which are intended for oral administration) has become an increasingly important pattern of problem use in Finland (Aalto et al., 2007) and in 2007 was reported as primary drug by a third of clients entering treatment (Stakes, 2008). Counselling centres report similar patterns among their clients, with buprenorphine often used in combination with amphetamines. Buprenorphine is also the most commonly reported substance found in drug-induced deaths (Alho et al., 2007). In both treatment and mortality data buprenorphine has almost entirely replaced heroin as the main problem opiate. Buprenorphine-naloxone and buprenorphine alone account for over half of the substitution treatment provided in Croatia, Cyprus, Finland, France, Latvia and Sweden (EMCDDA, 2009d).

Combined buprenorphine-naloxone tablets were introduced in 2006 in an attempt to reduce the risks of misuse, particularly by injection, and increased controls on prescribing were imposed in countries such as France. Despite this, buprenorphine remains available on the illicit market in many countries through diversion, theft from pharmacies or importation. Apart from Finland and France, these include the Czech Republic (Mravčík et al., 2008), Sweden (Hakansson et al., 2007) and Georgia (Otiashvili et al., 2009).

The illicit use of fentanyl⁽⁸⁾, as well as overdose deaths, has been reported in parts of the United States since the 1980s (Henderson, 1988). Since 2002, following a heroin shortage, fentanyl powder, marketed as 'China White' or 'White Persian', has become the most widely used drug along with amphetamine among injecting drug users in Estonia (Talu et al., 2008). Some availability and use of fentanyl has also been reported from Finland, Lithuania and Sweden (EMCDDA, 2008) as well as from Russia and Belarus (Lelevich et al., 2008).

⁽⁸⁾ Fentanyl is a potent synthetic opioid widely used in surgery for anaesthesia and analgesia, and sometimes to manage chronic pain. In medical use it is administered via injection, transdermal patch or as a lozenge.

Risks, harms, protective factors

The different patterns of opiate use outlined above affect the balance of risks and harms. Relative to injecting, smoking (or sniffing) heroin carries lower risks in terms of injection-related damage, transmission of infections and overdose, though health risks remain including, of course, dependence. However, new groups of users and injectors noted above may emerge among populations who have not been exposed to harm reduction messages and interventions like the previous generation, putting them at higher risk of harms such as HIV/HCV or overdose.

Regarding chronic heroin users, there is a risk that the scenario of growing populations of institutionalised users with a low quality of life will be repeated in countries currently expanding substitution programmes. This may reflect a diminished (political) priority for old heroin users who become seen as less 'attractive'.

The injecting of home-produced opiates, which are found largely in countries bordering the EU, brings its own risks, as described in Case study 15.3.

Case study 15.3: Health risks of drugs purchased in liquid vs. solid form

In most of western and central Europe, drugs that are injected are purchased almost exclusively in powder form, whereas in most of the Baltic States, while drugs in powder form are also available for street purchase, a large proportion of IDUs inject home-made opiates purchased in liquid form (EMCDDA, 2008). The types of drugs injected by injecting drug users have several implications for harm reduction. Issues of concern are syringe type and related infection probability, drug injecting hygiene, and sharing of other injecting equipment.

Different types of syringes may be used for injecting different types of drugs. Drugs purchased in powder form (such as heroin) are most often injected using one-piece syringes, while drugs purchased in liquid form (such as 'shirka' or 'kompot') are nearly always injected using two-piece syringes (Gyarmathy et al., 2009b). The one-piece syringe, also called the low dead-space syringe, has minimal dead space between the needle and the depressed plunger, and has a very small, thin needle (Grund and Stern, 1991; Zule et al., 1997; Zule et al., 2002; Zule and Bobashev, 2009; Gyarmathy et al., 2009b). The two-piece syringe, also called the high dead-space syringe, has a detachable needle, and the syringe is attached to a hollow hub at the end of the needle. When the plunger of a two-piece syringe is completely depressed, there is still considerable space between the syringe and the needle. Two-piece syringes have larger, thicker needles. The larger space in the two-piece syringe enables it to hold more blood than the one-piece syringe, and studies have shown that those IDUs that inject with two-piece syringes are more likely to be infected with HIV (Zule et al., 1997; Zule et al., 2002; Zule and Bobashev, 2009), and possibly with HCV (Gyarmathy et al., 2009b). In addition, there is an indication that thorough cleaning of one-piece syringes may reduce the probability of HCV infection in low HCV-prevalence populations where syringe sharing is uncommon (Gyarmathy et al., 2009b), although this association has yet to be confirmed in

longitudinal studies. The harm reduction implication of this is that in countries where drug users inject (almost) exclusively drugs purchased in powder form, syringe exchange programmes should offer only one-piece syringes, and in countries where both liquid and powder drugs are available for street purchase, syringe exchange programmes should offer both types of syringes. Providing drug users who inject drugs purchased in powder form with one-piece instead of two-piece syringes will have implications of reduced HIV and possibly HCV infection prevalence on the population level.

Infection prevalence is not the only harm reduction implication of one- and two-piece syringes and drugs purchased in powder vs. liquid form. Another aspect is drug injecting hygiene and infections related to lack of hygiene. As two-piece syringes have larger needles than one-piece syringes, injecting wounds caused by them are also larger. This may lead to more infections and abscesses among IDUs who use two-piece syringes. Furthermore, injecting liquid drugs usually involves purchasing the drugs in a large syringe and sharing the content of the large syringe with other drug injectors by means of syringe-mediated drug sharing (Jose et al., 1993; Grund et al., 1996). Drug users cannot be sure whether the syringes that they purchased that were pre-loaded with the liquid drug, or the other syringes used for syringe mediated drug sharing, are sterile or not. This constitutes a risk of drug-related infections for all drug users injecting the liquid drug. Furthermore, as drugs sold in liquid form are produced and sold under very unhygienic circumstances (J. Kulsiene, personal communication), there is a heightened risk of infections related to hygiene, such as, for example, hepatitis A (Perevosckovs et al., 2009; O'Donovan et al., 2001). Lastly, the reason why injectors of drugs purchased in liquid form use two-piece syringes is that these liquid drugs have a lot of floating larger particles (J. Kulsiene, personal communication), and the thin needles of one-piece syringes get clogged with the particles. The combination of larger puncture wounds by two-piece syringes, unhygienic drug preparation and distribution practices, and large floating particles in the drugs may explain the larger sized and more common abscesses, skin lesions and skin infections among IDUs in Baltic countries compared to IDUs in western and central European countries (V. A. Gyarmathy, unpublished ethnographic findings). Harm reduction efforts in countries where drugs are sold in liquid form should also address injecting hygiene, provide filters and teach IDUs how to use and dispose of them properly, and teach users how to treat abscesses and infected injecting wounds.

Sharing injecting equipment other than syringes (e.g. filters and cookers) may also be associated with infection with drug-related infectious diseases (Hagan et al., 2001). In populations with low HCV and HIV prevalence where mostly sterile syringes are used by IDUs, no such association was found (Gyarmathy et al., 2009a). When two-piece syringes are used to inject liquid drugs in populations where syringes are often re-used, sharing other injecting equipment may also be a source of infection risk. Harm reduction efforts in such populations may include promoting the use of non-injectable sterile syringes for drug distribution.

Crushing and injecting buprenorphine tablets is linked to higher health risks than heroin in terms of vein and tissue damage, endocarditis and limb amputations, since it is difficult to grind the tablets finely enough (Mravčik et al., 2007; Partanen et al., 2009). Similar risks may arise from injecting other pharmaceutical products intended for oral administration, such as crushed methadone tablets.

The risks arising from the high potency and rapid onset of action of fentanyl is reflected in mortality data, with 117 fatal fentanyl overdoses reported in Estonia in 2005–06 (Ojanperä et al., 2008). Furthermore, fentanyl injectors reported higher-risk behaviours and were three times more likely to be HIV positive compared to amphetamine injectors (Talu et al., 2010).

Implications

The increase in the smoking of heroin may imply a greater need for facilities for heroin smokers at drug consumption rooms and for interventions that may discourage smokers from starting to inject (Hedrich et al., 2010). It has also prompted interventions to encourage injectors to reduce risks by switching to smoking. For example, a study at four needle and syringe programmes in the United Kingdom suggested that distributing foil packs to attendees can be a useful means of engaging clients in discussions of ways to reduce injecting risks and can reduce injecting in settings where there is a pre-established culture of heroin chasing (Pizzey and Hunt, 2008).

For countries with existing populations of older, long-term users, there is the need for more dignified options and ‘normalised’ conditions for living, in line with efforts to improve quality of life for elderly or handicapped elderly people in general (e.g. protected housing), or discussions on the changing role of drug consumption rooms in Switzerland (Sozialdepartement der Stadt Zürich, 2008).

For countries dealing with more recent ‘epidemics’ it would be valuable to anticipate the longer-term consequences of implementing harm reduction programmes that are concerned with keeping people alive and reducing infectious diseases and other harms now. This might include emphasising the importance of linking programmes to social reintegration options, education, training or work schemes in order to reduce the number of long-term ‘institutionalised’ users in the future.

The injection of synthetic opioids such as buprenorphine or methadone raises a general issue about the formulation of drugs used in substitution treatment (the composition of tablets, syrup, gel, etc.) and how to reduce the likelihood of them being injected, or at the very least how to reduce the risks if they are injected. For example, in the Czech Republic increasing number of doctors are asking for injectable buprenorphine, which they believe is better than injectable methadone because of a much lower risk of overdose, but at the same time they want to prevent disorders arising from particles that corrode the endothelium in blood vessels and heart (T. Zabransky, personal communication).

Heroin prescription therapy, which has existed in the United Kingdom since the early twentieth century (Bean, 1974), is becoming increasingly accepted in several European countries following clinical trials in different countries (EMCDDA, 2009c). For example, in recent years it has become an established treatment programme in Germany, the Netherlands and Switzerland. In clinical trials, heroin prescription has been shown to be highly effective among IDUs who are resistant to other forms of treatment, such as

methadone. Not only are there higher rates of treatment retention among heroin patients than among methadone clients, but they also have higher proportions of improved mental health, decreased use of illicit drugs, and reductions in criminality (Frick et al., 2006; Drucker, 2001; Rehm et al., 2001; Hartnoll et al., 1980).

Discussion: cross-cutting issues

Multiple drug use

Among problem drug users multiple drug use is the norm. While users may have a preferred or primary drug, 'pure' users of only one type of drug are relatively uncommon. Separating users into categories such as amphetamine-type stimulants, cocaine, opiates, is thus somewhat artificial. Common combinations include stimulant and opiate (e.g. 'speedball' — cocaine and heroin, 'Czech speedball' — methamphetamine and buprenorphine) or stimulant and sedative (cocaine and alcohol and benzodiazepines). Injection drug use raises particular concerns whatever drugs are involved. Some combinations are especially associated with elevated health risks, for example opiate and alcohol (overdose) or heroin and cocaine injecting (infectious diseases) (Best et al., 2000). Other patterns of problem drug use (not covered in this chapter) that are reported by some treatment centres and counselling services for young people include heavy use of various combinations of cannabis, ecstasy, amphetamines, alcohol and benzodiazepines.

While those working in drug services are aware that problem drug use often involves multiple substances, it is possible that this is not fully appreciated by policymakers, the media or the public who tend to focus on 'the drug of the moment', with the implicit accompanying assumption that previous drug use patterns are now less important. The diversity of multiple drug use patterns, including the role of legal drugs such as benzodiazepines and alcohol, reinforces the importance of ongoing information exchange between researchers, practitioners and the political level.

Individual and public health harms

As noted at the beginning of this chapter, harm reduction evolved as a reaction to harms arising from heroin injecting. The substantial expansion of harm reduction policies and responses observed in the EU since the mid-1980s, especially substitution treatment and needle and syringe programmes, has been a major pillar of policies to reduce risk behaviours and contain serious harms such as HIV infection and overdose deaths. At the end of the 2000s, where do harm reduction responses stand in relation to the diversity of problem drug use patterns described in this chapter?

The incidence of new cases of HIV among injecting drug users is low or declining in many countries, but still relatively high in some countries including Portugal, Estonia and Latvia, and very high in Russia and Ukraine. In central European countries HIV prevalence remains low or relatively low, despite high levels in some neighbouring countries. However, some as yet small increases in incidence are observed in a few countries (e.g. Bulgaria, Sweden), and

ongoing transmission among young injectors is reported in several localities, for example in France, Spain, Estonia, Lithuania and Poland. Risk behaviours too, though reduced, are still reported from many countries (EMCDDA, 2009a).

HCV prevalence among IDUs is high or relatively high in many European countries, even in some with low HIV levels. High rates of infection found among samples of new IDUs in several countries suggest that incidence also continues at significant levels (EMCDDA, 2010). Tuberculosis (including drug-resistant strains) is re-emerging as a potentially serious health threat (Deiss et al., 2009).

Drug overdose deaths in the EU as a whole decreased somewhat from a peak around 2000, though recent years show some increases (Vicente et al., 2008). However, trends, both long-term and short-term vary considerably between countries (EMCDDA, 2008).

That acute drug deaths have not continued to decrease overall in the EU might be thought puzzling in view of the trend of reduced injecting in many countries, and the introduction or expansion of substitution treatment and other harm reduction measures. Possible reasons include:

- The capacity and coverage of treatment and harm reduction services, including substitution treatment, have not yet reached a threshold in enough countries to maintain an observable impact (in terms of continued decreases) at population level.
- The high risk of overdose after release from prison (Seaman et al., 1998; Farrell and Marsden, 2008) or at the end of treatment (Davoli et al., 2007), which together could account for 15–25 % of all acute drug-related deaths, has not been adequately addressed.
- Increases in the use of high-risk drug combinations have counteracted the positive impact of other changes.
- Ageing and health deterioration of long-term users may increase the risk that opiate overdoses are fatal (Darke et al., 2006).
- Increased availability of heroin reflects increasing opium production in Afghanistan (following shortages in 2001–03) and has contributed to renewed rises in heroin use and more deaths.

It is also possible that without increased levels of substitution treatment and other interventions, overdose deaths would have been higher.

Apart from overdoses, other drug-related deaths continue to occur, for example among older users due to multiple morbidity, HCV and alcohol liver damage (McDonald et al., 2009). An increasing number of deaths due to AIDS among IDUs are reported from a few countries, for example Latvia and Estonia where a high proportion of IDUs are unaware of their HIV status, raising questions about policies regarding access to both testing and treatment (Abel-Ollo et al., 2009).

Thus, despite some success in containing and reducing individual and public health harms, harm reduction responses face a variety of challenges in terms of continuing risk behaviours and changing drug use patterns.

New drug injecting populations and local increases in HIV incidence underline the importance of continuing preventive and educational measures regarding HIV. In some newer Member States and countries bordering the EU this remains a major public health challenge.

It is recognised that HIV preventive measures are not adequate for HCV and that additional efforts are required. Examples given in this chapter reinforce the conclusion that not all risk behaviours regarding sharing of injecting equipment or other paraphernalia are dealt with adequately, for example specific practices such as syringe mediated drug sharing (Grund et al., 1996), syringe types (Gyarmathya et al., 2009a; Zule and Bobashev, 2009) straws or crack pipes (Haydon and Fischer, 2005).

Other health measures to reduce harms associated with infectious diseases include hepatitis B vaccination, hepatitis C treatment, and TB prevention (especially in high-risk environments, e.g. prisons).

Regarding deaths, a range of measures has been used in various countries, including pre-release counselling for prisoners, overdose prevention education for drug injectors or take-home naloxone (Strang et al, 2008; EMCDDA, 2009b). With all these measures, as with those seeking to prevent HIV/HCV, coverage of the relevant high-risk populations is critical, as is the need for evidence on the effectiveness of possible interventions.

Health harms such as vein and other tissue damage associated with injecting crushed tablets or home-made drugs, groin injection of crack/heroin, or smoking of crack in home-made metal pipes point to the continuing importance of delivering health and hygiene education in difficult contexts to often-marginalised populations.

Mental health harms associated with problem drug use present a further challenge to harm reduction responses in the future. It is well established that there is extensive psychiatric comorbidity among clients with diagnoses of drug dependency (EMCDDA, 2004). Harm reduction interventions have tended to focus on somatic health harms such as infectious diseases, but are increasingly confronted by mental health and behavioural disturbances, in some contexts including violence, accentuated by heavy stimulant use. Prisons are another setting where mental health and drug use problems are especially severe (e.g. Hannon et al., 2000). It is unrealistic to expect frontline services to offer more than prophylactic assistance regarding drug-related harms to clients with serious mental health problems. It makes more sense to establish links and procedures such as joint case management with specialised mental health services.

Injecting and transitions to or from other routes

The majority of serious drug-related health harms arise from injecting. The shift towards other routes of administration observed in some countries is not incompatible with continuing levels of high risk. Many factors affect the preferred route of administration, for example the form and purity of a drug on the market (Bravo et al., 2003), or cultural attitudes and taboos about injecting. These can change.

The implications are that it is important to avoid complacency because trends suggest decreasing injecting. It does not mean that current, younger non-injectors will not inject in the future. Prevention of transitions to injecting, and encouragement of transitions to other routes among injectors should be a priority for those unwilling or unable to cease drug use altogether.

Several examples of interventions to encourage transitions from injecting to less harmful routes of administration have been noted in this chapter, including the distribution of foil packs for heroin chasing, safer crack use kits for crack cocaine smoking, and hard gelatine capsules for oral or rectal use of pervitin. In all of these examples, non-injecting drug users were also attracted to the services, suggesting possibilities for an expanded role for interventions such as needle and syringe programmes. The design and development of harm reduction interventions would benefit from the inclusion of qualitative/anthropological methods that take account of the perspectives of users themselves.

Geography, persistence and change

Geographical differences and changes in drug use reflect many dimensions: long-standing historical and cultural patterns; recent developments in politics, economy and youth cultures; drug markets and trafficking routes; drug policies, enforcement policies, prescribing policies.

Changes can be rapid, for example the emergence of the use of fentanyl in Estonia following reduced opium production in Afghanistan and a subsequent heroin shortage in the early 2000s. However, the specific nature of such changes is hard to predict, for example the same shortage of heroin appears to have been associated with increased injection of buprenorphine tablets in nearby Finland. In other situations, for example in Australia, a heroin shortage was associated with increases in benzodiazepine use and injection of stimulants (cocaine in New South Wales where a cocaine market already existed, methamphetamine in other states) (Topp et al., 2003; Degenhardt et al., 2005). In the Australian example, heroin injection diminished, especially among younger users, and fatal and non-fatal heroin overdoses decreased by between 40–85 %, but incidents of psychosis and violence attributed to stimulant use increased, as did requests for treatment of stimulant-related problems (Degenhardt et al., 2004). It is also hard to anticipate where rapid change will occur, or not. Thus explosive HIV epidemics have been observed over the last decade in the Baltic States (Uusküla et al., 2008), Russia and other former Soviet Union countries (Rhodes et al., 2002; Grund, 2001), but not in other areas of central Europe, despite high levels of risk behaviour among injectors.

Diffusion to neighbouring areas can also occur. For example, since 2000 the use of pervitin (methamphetamine) spread from the Czech Republic to Slovakia, but otherwise evidence of the diffusion of pervitin is more limited. Some pervitin is reported in border areas in Germany (Pfeiffer-Gerschel et al., 2008), among some sub-populations in Hungary (Griffiths et al., 2008) and Austria (VWS, 2008). An increase in methamphetamine in Nordic and Baltic countries appears to be associated with trafficking from Lithuania, not with export from Slovakia or the Czech Republic (EMCDDA–Europol, 2009). The increase in imported heroin observed in many newer Member States could be seen as a logical concomitant of EU membership and the harmonisation of markets in general, of which the drug market is a special case.

At the same time there is also continuity in differences, for example methamphetamine in the Czech Republic and amphetamine in Nordic countries. The predominance of cocaine as the main stimulant in southern and western Europe compared to amphetamines in northern and central Europe is another example. Sustained differences are also found within countries or even within cities (personal experience of author).

While it is feasible to monitor long-term trends through instruments such as those used by the EMCDDA, it is more difficult to identify rapidly emerging problems in time to react appropriately. The French TREND scheme provides one model (OFDT, 2007). Ethnographic and quantitative data are collected through a network of local co-ordination groups in seven cities, focusing on population groups with high drug use prevalence.

Contexts: implications for harm reduction

Many of the studies cited in this monograph make clear that problem drug use and drug-related harms are often closely associated with social dislocation and social exclusion and with factors such as unemployment, unstable living conditions, minority status, imprisonment, sex work, migration. Social exclusion and stigma are key contextual factors that exert a powerful influence on patterns of problem drug use and often hinder attempts to implement effective harm reduction measures. Attitudes towards human rights and problem drug users are a key element influencing how far harm reduction policies can be implemented. It is possible that this situation is further exacerbated by recession and economic crisis. A further dimension related to implementation of harm reduction policies concerns the importance of understanding the contexts, priorities and needs of problem drug users themselves when designing interventions.

It may be difficult for those working at the local level in specific areas of drug policy or service provision to change the broader structural context referred to above. However, it may be more feasible to influence local situational factors and risk environments. Studies focusing on micro-environmental factors are starting to provide insight into how local injecting environments and risk behaviours can be highly sensitive to public health, law enforcement and policing policies (Rhodes, 2002). In particular, policing practices can have a considerable effect on injecting behaviours and health harms at both individual and group level as well as a detrimental impact on the coverage and effectiveness of interventions such as needle exchange (Maher and Dixon, 1999; Wood et al., 2002). For example, Rhodes and colleagues report that police practices in Russia can encourage a fear of arrest, fine or detention among drug users that leads to reluctance to carry needles and syringes and in turn to paraphernalia sharing at points of drug sale (Rhodes et al., 2003). The implications of these studies point clearly to the importance of including law enforcement agencies in local harm reduction policies.

Conclusion

The specific implications of the variety of drug use patterns and health harms described in this chapter depend on local circumstances, but the broader message, especially to policymakers and service managers, is that changing conditions on the illicit market as well as the form and conditions in which substitute drugs are prescribed can have considerable

impacts on local drug use patterns. Similarly, the balance within drug policies, especially in terms of policing approaches vis-à-vis treatment and harm reduction responses, can influence the risk environments in which drug use occurs. Local responses thus not only need to be flexible and adjust to changing needs, but also need to be based on consensus and cooperation between key actors. The rate at which risky drug use patterns can change suggests that brief rapid needs assessments and monitoring is needed to target information and health education at new user groups, and to identify new drug use patterns, risks and risk situations.

References

For EMCDDA annual reports and other publications, see www.emcdda.europa.eu. For national reports to the EMCDDA, see www.emcdda.europa.eu/publications/national-reports.

Aalto, M., Halme, J., Visapaa, J. P., and Salaspuro, M. (2007), 'Buprenorphine misuse in Finland', *Substance Use and Misuse* 42, pp. 1027–8.

Abdala, N., Grund, J-P., Tolstov, Y., Kozlov, A. and Heimer, R. (2006), 'Can home-made injectable opiates contribute to the HIV epidemic among injection drug users in the countries of the former Soviet Union?', *Addiction* 101, pp. 731–7.

Abel-Ollo, K., Rahu, M., Rajaleid, K., et al. (2009), 'Knowledge of HIV serostatus and risk behaviour among injecting drug users in Estonia', *AIDS Care*, 21, pp. 851–7.

Alho, H., Sinclair, D., Vuori, E. and Holopainen, A. (2007), 'Abuse liability of buprenorphine-naloxone tablets in untreated IV drug users', *Drug and Alcohol Dependence* 88, pp. 75–8.

Audit Commission (2002), *Changing habits: the commissioning and management of community drug treatment services for adults*, Audit Commission, London.

Bean, P. (1974), *The social control of drugs*, Martin Robertson, London.

Best, D., Man, L-H., Zador, D., et al. (2000), 'Overdosing on opiates. Part I: causes', *Drug and Alcohol Findings*, 4, pp. 4–21.

Booth, R., Kwiatkowski, C. and Chitwood, D. (2000), 'Sex-related HIV risk behaviors: differential risks among injection drug users, crack smokers, and injection drug users who smoke crack', *Drug and Alcohol Dependence* 58, pp. 219–26.

Booth, R., Corsi, K. and Mikulich, S. (2003), 'Improving entry to methadone maintenance among out-of-treatment injection drug users', *Journal of Substance Abuse Treatment* 24, pp. 305–11.

Booth, R., Lehman, W., Kwiatowski, C., et al. (2008), 'Stimulant injectors in Ukraine: the next wave of the epidemic', *AIDS and Behaviour* 12, pp. 652–61.

Boyd, S., Johnson, J. and Moffat, B. (2008), 'Opportunities to learn and barriers to change: crack cocaine use in the Downtown Eastside of Vancouver', *Harm Reduction Journal* 5, p. 34.

Braine, N., Des Jarlais, D., Gikdtkattm C., et al. (2005), 'HIV risk behaviour among amphetamine injectors at US syringe exchange programs', *AIDS Education and Prevention* 17, pp. 515–24.

Bravo, M., Barrio, G., de la Fuente, L., et al. (2003), 'Reasons for selecting an initial route of heroin administration and for subsequent transitions during a severe HIV epidemic', *Addiction* 98, pp. 749–60.

- Brugal, T., Pulido, J., Toro, C., et al. (2009), 'Injecting, sexual risk behaviours and HIV infection in young cocaine and heroin users in Spain', *European Addiction Research* 15, pp. 171–8.
- Cadef-Tairou, A., Gandilhon, M., Toufik, A. and Evrard, I. (2008), 'Eighth national report from the TREND system', *Tendances* 58, OFDT, Paris.
- Canarelli, T. and Coquelin, A. (2009), 'Données récentes relatives aux traitements de substitution aux opiacés', *Tendances* 65, OFDT, Paris.
- Carrieri, M., Amass, L., Lucas, G., et al. (2006), 'Buprenorphine use: the international experience', *Clinical Infectious Diseases* 43, pp. S197–S215.
- CEIP (Centre d'évaluation et d'information sur la pharmacodépendance) de Marseille (2006), *OPPIDUM, résultats de l'enquête 17 (octobre 2005)*, AFSSAPS, Saint-Denis.
- Chaisson, R., Bachetti, P., Osmond, D., et al. (1989), 'Cocaine use and HIV infection in IDUs in San Francisco', *Journal of the American Medical Association* 261, pp. 652–61.
- Chintalova-Dallas, R., Case, P., Kitsenko, N. and Lazzarini, Z. (2009), 'A home-made amphetamine-type stimulant and HIV risk in Odessa, Ukraine', *International Journal of Drug Policy* 20, pp. 347–51.
- Cohen, P. and Sas, A. (1993), *Ten years of cocaine: a follow-up study of 64 cocaine users in Amsterdam*, Department of Human Geography, University of Amsterdam, Amsterdam. Available at www.cedro-uva.org/lib/cohen.ten.pdf.
- Colfax, G. and Shoptow, S. (2005), 'The methamphetamine epidemic: implications for HIV prevention and treatment', *Current HIV/AIDS Reports* 2, pp. 194–9.
- Connolly, J., Foran, S., Donovan, A., Carew, A. and Long, J. (2008), *Crack cocaine in the Dublin region: an evidence base for a Dublin crack cocaine strategy*, HRB Research Series 6, Health Research Board, Dublin. Available at http://www.hrb.ie/uploads/tx_hrbpublications/HRB_Research_Series_6.pdf.
- Corski, K. and Booth, R. (2008), 'HIV sex risk behaviours among heterosexual methamphetamine users: literature review from 2000 to present', *Current Drug Abuse Reviews* 1, pp. 292–6.
- Cunningham, J. (2000), 'Remissions from drug dependence: is treatment a prerequisite?', *Drug and Alcohol Dependence*, 59, pp. 211–13.
- Darke, S., Degenhardt, L. and Mattick, R. (2006), *Mortality amongst illicit drug users: epidemiology, causes and intervention*, Cambridge University Press, Cambridge.
- Davoli, M., Bargagli, A., Perucci, C., et al. (2007), 'Risk of fatal overdose during and after specialised drug treatment: the VEdE TTE study, a national multi-site prospective cohort study', *Addiction* 102, pp. 1954–9.
- de Bie, R., Gladstone, R., Strafella, A., Ko, J. and Lang, A. (2007), 'Manganese-induced Parkinsonism associated with methcathinone (ephedrone) abuse', *Archives of Neurology*, 64, pp. 886–9.
- Decorte, T. (2000), *The taming of cocaine: cocaine use in European and American cities*, VUB University Press, Brussels.
- Degenhardt, L., Day, C. and Hall, W. (eds) (2004), *The causes, course and consequences of the heroin shortage in Australia*, NDLERF Monograph 3, National Drug Law Enforcement Research Fund, Commonwealth of Australia. Available at http://www.ndlerf.gov.au/pub/Monograph_03.pdf.
- Degenhardt, L., Day, C., Dieze, P., et al. (2005), 'Effects of a sustained heroin shortage in three Australian States', *Addiction*, 100, pp. 908–20.

- Deiss, R., Rodwell, T. and Garfein, R. (2009), 'Tuberculosis and illicit drug use: review and update', *Clinical Infectious Diseases* 48, pp. 72–82.
- Drucker, E. (2001), 'Injectable heroin substitution treatment for opioid dependency', *Lancet* 27 October, 358, p. 1385.
- Drug Policy Department (2008), *2008 national report to the EMCDDA on the drug situation in Italy*, Presidency of the Council of Ministers, Rome.
- Edlin, B., Irwin, K., Faruque, S., et al. (1994), 'Intersecting epidemics: crack cocaine use and HIV infection among inner-city young adults', *New England Journal of Medicine* 331, pp. 1422–7.
- Egred, M. and Davis, G. (2005), 'Cocaine and the heart', *Postgraduate Medical Journal* 81, pp. 568–71.
- Elkashef, A., Vocci, F., Hanson, G., et al. (2008), 'Pharmacotherapy of methamphetamine addiction: an update', *Substance Abuse* 29, pp. 31–49. See also EMCDDA Annual Report 2009.
- EMCDDA (European Monitoring Centre for Drugs and Drug Addiction) (2004), *Co-morbidity*, Selected issue, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.
- EMCDDA (2007), *Cocaine and crack cocaine: a growing public health issue*, Selected issue, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.
- EMCDDA (2008), *Annual Report 2008: the state of the drugs problem in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.
- EMCDDA (2009a), *Annual report 2009: the state of the drugs problem in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.
- EMCDDA (2009b), Tables HSR-7 and HSR-8, Statistical bulletin. Available at <http://www.emcdda.europa.eu/stats09/hsrtab7> and <http://www.emcdda.europa.eu/stats09/hsrtab8>.
- EMCDDA (2009c), Table HSR-1, Statistical bulletin. Available at <http://www.emcdda.europa.eu/stats09/hsrtab1>.
- EMCDDA (2009d), Table HSR-3, part ii, Statistical bulletin, Available at <http://www.emcdda.europa.eu/stats09/hsrtab3b>.
- EMCDDA (2010a), *Trends in injecting drug use in Europe*, Selected issue, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.
- EMCDDA (2010b), *Ageing drug users*, Selected issue, Publications Office of the European Union, Luxembourg, forthcoming.
- EMCDDA–Europol (2009), *Methamphetamine: a European Union perspective in the global context*, EMCDDA–Europol joint publications 1, Office for Official Publications of the European Communities, Luxembourg.
- Farrell, M. and Marsden, J. (2008), 'Acute risk of drug-related death among newly released prisoners in England and Wales', *Addiction* 103, pp. 256–7.
- Fischer, B., Rehm, J., Patra, J., et al. (2006), 'Crack across Canada: comparing crack users and crack non-users in a Canadian multi-city cohort of illicit opioid users', *Addiction* 101, pp. 1760–70.
- Fischer, B., Powis, J., Cruz, M., Rudzinski, K. and Rehm, J. (2008), 'Hepatitis C virus transmission among oral crack users: viral detection on crack paraphernalia', *European Journal of Gastroenterology and Hepatology* 20, pp. 29–32.
- Frick, U., Rehm, J., Kovacic, S., Ammann, J. and Uchtenhagen, A. (2006), 'A prospective cohort study on orally administered heroin substitution for severely addicted opioid users', *Addiction* 101, pp. 1631–9.

- GLADA (Greater London Alcohol and Drug Alliance) (2004), *An evidence base for the London crack cocaine strategy*, Greater London Authority, London.
- Goldstein, P. (1989), 'Drugs and violent crimes', in Weiner, N. and Wolfgang, M. (eds), *Pathways to criminal violence*, Sage Publications, Newbury Park, CA.
- Griffiths, P., Mravcik, V., Lopez, D. and Klempova, D. (2008), 'Quite a lot of smoke but very limited fire: the use of methamphetamine in Europe', *Drug and Alcohol Review* 27, pp. 236–42.
- Grund, J-P. (2001), 'A candle lit from both sides: the epidemic of HIV infection in central and eastern Europe', in McElrath, K. (ed.), *HIV and AIDS: a global view*, Greenwood Press, Westport, Ct.
- Grund, J-P. (2005), 'The eye of the needle: an ethno-epidemiological analysis of injecting drug use', in Pates, R., McBride, A. and Arnold, K. (eds), *Injecting illicit drugs*, Addiction Press, Blackwell, Oxford, pp. 11–32.
- Grund, J-P. and Stern, L. (1991), 'Residual blood in syringes: size and type of syringe are important', *AIDS* 5, pp. 1532–3.
- Grund, J-P., Friedman, S., Stern, L., et al. (1996), 'Syringe-mediated drug sharing among injecting drug users: patterns, social context, and implications for transmission of blood-borne pathogens', *Social Science and Medicine* 42, pp. 691–703.
- Grund, J-P., Zabransky, T., Irvin, K. and Heimer, R. (2009), 'Stimulant use in central and eastern Europe: how recent social history shaped current drug consumption patterns', in Pates, R. and Riley, D. (eds), *Interventions for amphetamine misuse*, Wiley Blackwell, Oxford.
- Grund, J-P., Coffin, P., Jauffret-Roustide, M., et al. (2010), 'The fast and furious: cocaine, amphetamines and harm reduction', in European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), *Harm reduction: evidence, impacts and challenges*, Rhodes, T. and Hedrich, D. (eds), Scientific Monograph Series No. 10, Publications Office of the European Union, Luxembourg.
- Gyarmathy, A., Neaigus, A., Mitchell, M. and Ujhelyi, E. (2009a), 'The association of syringe type and syringe cleaning with HCV infection among IDUs in Budapest, Hungary', *Drug and Alcohol Dependence* 100, pp. 240–7.
- Gyarmathy, A., Li, N., Tobin, K., et al. (2009b), 'Correlates of unsafe injecting among injecting drug users in St Petersburg, Russia', *European Addiction Research* 15, pp. 163–70.
- Hagan, H., Thiede, H., Weiss, N., et al. (2001), 'Sharing of drug preparation equipment as a risk factor for hepatitis C', *American Journal of Public Health* 91, pp. 42–6.
- Hakansson, A., Medvedeo, A., Andersson, M. and Berglund, M. (2007), 'Buprenorphine misuse among heroin and amphetamine users in Malmo, Sweden: purpose of misuse and route of administration', *European Addiction Research* 13, pp. 207–15.
- Hannon, F., Kelleher, C., Friel, S., et al. (2000), *General healthcare study of the Irish prison populations*, National University of Ireland, Galway.
- Hartnoll, R. (2003) 'Overview of the drugs situation in the CEECs: situation and responses', in EMCDDA, *The state of the drugs problem in the acceding and candidate countries to the European Union*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, pp. 13–33.
- Hartnoll, R., Mitcheson, M., Battersby, A., et al. (1980), 'Evaluation of heroin maintenance in a controlled trial', *Archives of General Psychiatry*, 37, pp. 877–84.
- Haydon, E. and Fischer, B. (2005), 'Crack use as a public health problem in Canada: call for an evaluation of "safer crack use kits"', *Canadian Journal of Public Health* 96, pp. 185–8.

Health Protection Agency, Health Protection Scotland, National Public Health Service for Wales and Centre for Research on Drugs and Health Behaviour (2006), *Shooting up: infections among injecting drug users in the United Kingdom 2005*, Health Protection Agency, London.

Hedrich, D., Pirona, A. and Wiessing, L. (2008), 'From margin to mainstream: the evolution of harm reduction responses to problem drug use in Europe', *Drugs: Education, Prevention and Policy* 15, pp. 503–17.

Hedrich, D., Kerr, T. and Dubois-Arber, F. (2010), 'Drug consumption facilities in Europe and beyond', in European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), *Harm reduction: evidence, impacts and challenges*, Rhodes, T. and Hedrich, D. (eds), Scientific Monograph Series No. 10, Publications Office of the European Union, Luxembourg.

Henderson, G. (1988), 'Designer drugs: past history and future prospects', *Journal of Forensic Science*, 33, pp. 569–75.

Hendrickson, R., Horowitz, Z., Norton, R. and Notenboom, H. (2006), "'Parachuting" meth: a novel delivery method for methamphetamine and delayed-onset toxicity from "body stuffing"', *Clinical Toxicology* 44, pp. 379–82.

Henskens, R., Garretsen, H., Bongers, I., Van Dijk, A. and Sturmans, F. (2008), 'Effectiveness of an outreach treatment program for inner city crack abusers: compliance, outcome and client satisfaction', *Substance Use and Misuse*, 43, pp. 1464–75.

Hickman, M., Hope, V., McDonald, T., et al. (2007), 'HCV prevalence and injecting risk behaviour in multiple sites in England in 2004', *Journal of Viral Hepatitis*, 14, pp. 645–52.

Horgan, J. (2007), *An overview of cocaine use in Ireland*, National Advisory Committee on Drugs and National Drugs Strategy Team, Dublin.

Join Together (2007), 'Oregon's tough meth laws may have unintended consequences', *In the News*. Available at <http://www.jointogether.org/news/headlines/inthenews/2007/oregons-tough-meth.html> (accessed 15 June 2009).

Jose, B., Friedman, S., Neaigus, A., et al. (1993), 'Syringe-mediated drug sharing (backloading): a new risk factor for HIV among injecting drug users', *AIDS* 7, pp. 1653–60.

Käll, K. and Nilsson, A. (1995), 'Preference for sex on amphetamine: a marker for HIV risk behaviour among male intravenous amphetamine users in Stockholm', *AIDS Care* 7, pp. 171–88.

Käll, K. and Olin, R. (1990), 'HIV status and changes in risk behaviour among intravenous drug users in Stockholm', *AIDS* 4, pp. 153–7.

Klee, H. (2006), 'HIV risks for women injectors: heroin and amphetamines compared', *Addiction* 88, pp. 1055–62.

Koslov, A., Shaboltas, A., Tousseva, O., et al. (2006), 'HIV incidence and factors associated with HIV acquisition among injection drug users in St. Petersburg, Russia', *AIDS* 20, pp. 901–06.

Kruse, G., Barbour, R., Heimer, R., et al. (2009), 'Drug choice, spatial distribution, HIV risk, and prevalence among injection drug users in St. Petersburg, Russia', *Harm Reduction Journal* 6 (22). Available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2731096/>.

Lelevich, V., Vintsykaya, A., Lelevich, S., et al. (2008), *Annual report: Republic of Belarus drug abuse and illicit drugs trafficking in 2007*, BUMAD Programme, Minsk.

Leonard, L., DeRubeis, E., Pelude, L., et al. (2008), "'I inject less as I have easier access to pipes": injecting, and sharing of crack-smoking materials, decline as safer crack-smoking resources are distributed', *International Journal of Drug Policy* 19, pp. 255–64.

- MacCoun, R. and Reuter, P. (2001), *Drug war heresies: learning from other vices, times, and places*, Cambridge University Press, Cambridge and New York.
- McCoy, C., Shenghan, L., Metsch, L., Messiah, S. and Zhao, W. (2004), 'Injection drug use and crack cocaine smoking: independent and dual risk behaviours for HIV infection', *Annals of Epidemiology* 14, pp. 535–42.
- McDonald, S., Hutchinson, S., Bird, S., et al. (2009), 'A population-based record linkage study of mortality in hepatitis C-diagnosed persons with or without HIV coinfection in Scotland', *Statistical Methods in Medical Research* 18, pp. 271–83.
- Maher, L. and Dixon, D. (1999), 'Policing and public health: law enforcement and harm minimisation in a street-level drug market', *British Journal of Criminology* 39, pp. 488–511.
- March, J., Oviedo-Joekes, E. and Romero, M. (2006), 'Drugs and social exclusion in ten European cities', *European Addiction Research* 12, pp. 33–41.
- Ministerio de Sanidad y Consumo (2007), *2007 National Report to the EMCDDA*, Ministerio de Sanidad y Consumo, Spain.
- Ministero della Salute (2007), *Proposta di Progetto Nazionale Cocaina, Dipartimento delle Dipendenze, Regione Lombardia, Italia*. Available at http://www.indipendenze.org/sx_canale/dettaglio.asp?sez=Cocaina&id_sezione=1&id_subSez=110&id_articolo=1397.
- Miovský, M. (2007), 'Changing patterns of drug use in the Czech Republic during the post-communist era: a qualitative study', *Journal of Drug Issues* 37, pp. 73–102.
- Molitor, F., Truax, S., Ruiz, J., et al. (1998), 'Association of methamphetamine use during sex with risky sexual behaviours and HIV injection among non-injection drug users', *Western Journal of Medicine* 168, pp. 93–7.
- Molitor, F., Ruiz, J., Flynn, N., et al. (1999), 'Methamphetamine use and sexual and injection risk behaviors among out-of-treatment injection drug users', *American Journal of Drug and Alcohol Abuse* 25, pp. 475–93.
- Mravčík, V., Chomynová, P., Orliková, B., et al. (2008), *Výroční zpráva o stavu ve věcech drog v České republice v roce 2007* [The Czech Republic: drug situation 2007], Úřad vlády ČR, Praha [Office of the Czech Government, Prague].
- Neaigus, A., Gyarmathy, A., Zhao, M., et al. (2007), 'Sexual and other noninjection risks for HBV and HCV seroconversions among noninjecting heroin users', *Journal of Infectious Diseases* 195 (7), pp. 1052–61.
- O'Byrne, P. and Holmes, D. (2008), 'Evaluating crack pipe distribution in Canada: a systems change case study', *Addiction Research and Theory* 16, pp. 181–92.
- O'Donovan, D., Cooke, R., Joce, R., et al. (2001), 'An outbreak of hepatitis A amongst injecting drug users', *Epidemiology and Infection* 127, pp. 469–73.
- OFDT (2003), *Substitution aux opiacés en France, synthèse des informations disponibles de 1996 à 2001 en France*, OFDT, Paris.
- OFDT (2007), *2007 national report to the EMCDDA on the drug situation in France*, OFDT, Paris.
- Ojanperä, I., Gergov, M., Liiv, M., Riijokoja, A. and Vuori, E. (2008), 'An epidemic of fatal 3-methylfentanyl poisoning in Estonia', *International Journal of Legal Medicine* 122, pp. 395–400.
- Otiashvili, D., Zabransky, T., Kirtadze, I., et al. (2009), 'Why do the clients of Georgian needle exchange programs inject buprenorphine?' *European Addiction Research* 16 (1), pp. 1–8.

- Partanen, T., Vikatmaa, P., Tukiainen, E., Lepantalo, M. and Vuola, J. (2009), 'Outcome after injections of crushed tablets in intravenous drug abusers in the Helsinki University Central Hospital', *European Journal of Vascular and Endovascular Surgery* 37, pp. 704–11.
- Pavlenko, V. (2008), 'Peculiarities of stimulant use in Ukraine: the example of Donetsk region', 1st global conference on methamphetamine: Science, Strategy and Response, 15 September, Prague.
- Perevoscikovs, J., Lucenko, I., Magone, S., et al. (2009), 'Community-wide outbreak of hepatitis A in Latvia in 2008: an update', *Eurosurveillance* 14 (3).
- Pfeiffer-Gerschel, T., Kipke, I., Lang, P., et al. (2008), *2008 national report to the EMCDDA on the drug situation in Germany*, DBDD, Munich.
- Pizzey, R. and Hunt, N. (2008), 'Distributing foil from needle and syringe programmes (NSPs) to promote transitions from heroin injecting to chasing: an evaluation', *Harm Reduction Journal* 5 (24). Available at <http://www.harmreductionjournal.com/content/5/1/24>.
- Porter, J., Drucker, E., Hammond, J. and Lax, L. (1994), 'Crack smoking methods as risk factors for HIV infection', *International Conference on AIDS* 7–11 August, 10 (1), p. 391 (abstract no. PD0170).
- Pozner, C., Levine, M. and Zane, R. (2005), 'The cardiovascular effects of cocaine', *Journal of Emergency Medicine* 29, pp. 173–8.
- Prinzleve, M., Haasen, C., Zurhold, H., et al. (2004), 'Cocaine use in Europe — a multicentre study: patterns of use in different groups', *European Addiction Research* 10, pp. 147–55.
- Rasmussen, D., and Benson, B. (1997), 'Reducing the harms of drug policy: an economic perspective', *Substance Use and Misuse* 3, pp. 49–68.
- Rasmussen, D., Benson, B. and Sollars, D. (1993), 'Spatial competition in illicit drug markets: the consequences of increased drug law enforcement', *Review of Regional Studies*, 123, pp. 219–36.
- Rehm, J., Gschwend, P., Steffen, T., et al. (2001), 'Feasibility, safety, and efficacy of injectable heroin prescription for refractory opioid addicts: a follow-up study', *Lancet*, 27 October, 358, pp. 1417–23.
- Rhodes, T. (2002), 'The "risk environment": a framework for understanding and reducing drug-related harm', *International Journal of Drug Policy* 13, pp. 85–94.
- Rhodes, T., Lowndes, C., Judd, A., et al. (2002), 'Explosive spread and high prevalence of HIV infection among injecting drug users in Togliatti City, Russia', *AIDS* 16, pp. F25–31.
- Rhodes, T., Mikhailova, L., Sarang, A., et al. (2003), 'Situational factors influencing drug injecting, risk reduction and syringe exchange in Togliatti City, Russian Federation: a qualitative study of micro risk environment', *Social Science and Medicine* 57, pp. 39–54.
- Rhodes, T., Stoneman, A., Hope, V., Hunt, N. and Judd, A. (2006), 'Groin injecting in the context of crack cocaine and homelessness: from "risk boundary" to "acceptable risk"?' *International Journal of Drug Policy* 17, pp. 164–70.
- Rhodes, T., Briggs, D., Kimber, J., Jones, S. and Holloway, G. (2007), 'Crack–heroin speedball injection and its implications for vein care: qualitative study', *Addiction* 102, pp. 1782–90.
- Roux, P., Villes, V., Bry, D., et al. (2008), 'Buprenorphine sniffing as a response to inadequate care in substituted patients: results from the Subazur survey in south-eastern France', *Addictive Behaviors* 33, pp. 1625–9.
- Sánchez-Niubò, A., Fortiana, J., Barrio, G., et al. (2009), 'Problematic heroin incidence trends in Spain', *Addiction* 104, pp. 248–55.

- Seaman, S., Brettle, R. and Bied, S. (1998), 'Mortality from overdose among injecting drug users recently released from prison', *BMJ* 316, pp. 426–8.
- Shabolts, A., Toussova, O., Hoffman, I., et al. (2006), 'HIV prevalence, sociodemographic and behavioural correlates and recruitment methods among injection drug users in St. Petersburg, Russia', *Journal of Acquired Immune Deficiency Syndrome* 41, pp. 657–63.
- Škařupová, K., Mravčík, V., and Orlíková, B. (2009), 'Hard gelatine capsules as a harm reduction drug delivery alternative to injecting' (in press).
- Smith, J., Kacker, A. and Anand, V. (2002), 'Midline nasal and hard palate destruction in cocaine abusers and cocaine's role in rhinologic practice', *Ear, Nose and Throat Journal* 81, pp. 172–4, 176–7.
- SIRUS (Norwegian Institute for Alcohol and Drug Research) (2008), *2008 national report to the EMCDDA on the drug situation in Norway*, SIRUS, Oslo.
- Sozialdepartement der Stadt Zürich (2008), *Ein Ort wo man sein kann. Dir Zukunft der „Harm Reduction“ am Beispiel der Kontakt- und Anlaufstellen der Stadt Zürich*, Edition Sozialpraxis Nr. 3, Zürich: Stadt Zürich.
- Stakes (2008), *2008 national report to the EMCDDA on the drug situation in Finland*, Stakes, Helsinki.
- Strang, J., Sheridan, J. and Barber, N. (1996), 'Prescribing injectable and oral methadone to opiate addicts: results from the 1995 national postal survey of community pharmacies in England and Wales', *BMJ* 3 August, 313, pp. 270–2.
- Strang, J., Manning, V., Mayet, S., et al. (2008), 'Overdose training and take-home naloxone for opiate users: prospective cohort study of impact on knowledge and attitudes and subsequent management of overdoses', *Addiction* 103, pp. 1648–57.
- Talu, A., Abel-Ollo, K., Vals, K. and Ahven, K. (2008), *2008 national report to the EMCDDA on the drug situation in Estonia*, National Institute for Health Development, Tallinn.
- Talu, A., Rajaleid, K., Abel-Ollo, K., et al. (2010), 'HIV infection and risk behaviour of primary fentanyl and amphetamine injectors in Tallinn, Estonia: implications for intervention', *International Journal of Drug Policy* 21, pp. 56–63.
- Topp, L., Day, C. and Degenhardt, L. (2003), 'Changes in patterns of drug injection concurrent with a sustained reduction in the availability of heroin in Australia', *Drug and Alcohol Dependence* 70, pp. 275–86.
- Tortu, S., McMahon, J., Pouget, E. and Hamid, R. (2004), 'Sharing of noninjection drug-use implements as a risk factor for hepatitis C', *Substance Use and Misuse*, 39, pp. 211–24.
- Tyndall, M., Currie, S., Spittal, P., et al. (2003), 'Intensive injection cocaine use as the primary risk factor in the Vancouver HIV-1 epidemic', *AIDS* 17, pp. 887–93.
- Uusküla, A., Kals, M., Rajaleid, K., et al. (2008), 'High-prevalence and high-estimated incidence of HIV infection among new injecting drug users in Estonia: need for large scale prevention programs', *Journal of Public Health* 30, pp. 119–25.
- Vallejo, R., de Leon-Casasola, O. and Benjamin, R. (2004), 'Opioid therapy and immuno-suppression: a review', *American Journal of Therapeutics* 11, pp. 354–65.
- van Beek, I., Buckley, R., Stewart, M., MacDonald, M. and Kaldor J. (1994), 'Risk factors for hepatitis C virus infection among injecting drug users in Sydney', *Genitourin Med* 70, pp. 321–4.
- van Beek, I., Dwyer, R. and Malcom, A. (2001), 'Cocaine injecting: the sharp end of drug-related harm', *Drug and Alcohol Review* 20, pp. 333–42.

Vicente, J., Giraudon, I., Matias, J., Hedrich, D. and Wiessing, L. (2009), 'Rebound of overdose mortality in the European Union 2003–2005: findings from the 2008 EMCDDA Annual Report', *Eurosurveillance* Edition, 14 (2). Available at <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19088>.

VWS (2008), *Tätigkeitsbericht 2007*, ChEckiTI, Verein Wiener Sozialprojekte, Vienna. See ÖBIG (2008), 2008 national report to the EMCDDA on the drug situation in Austria, Österreichisches Bundesinstitut für Gesundheitswesen, Vienna, Table A20.

Williamson, A., Darke, S., Ross, J. and Teesson, M. (2006), 'The association between cocaine use and short-term outcomes for the treatment of heroin dependence: findings from the Australian Treatment Outcome Study (ATOS)', *Drug and Alcohol Review* 25, pp. 141–8.

Wood, E., Tyndall, M., Spittal, P., et al. (2002), 'Needle exchange and difficulty with needle access during an ongoing HIV epidemic', *International Journal of Drug Policy*, 13, pp. 95–102.

Zabransky, T. (2009), unpublished qualitative research on drug producers and police officers.

Zeziulin, O., Dumchev, K. and Schumacher, J. (2008), 'Injection stimulant use and HIV risk in Ukraine', 1st Global Conference On Methamphetamine: Science, Strategy And Response, 15 September, Prague.

Zule, W. and Bobashev, G. (2009), 'High dead-space syringes and the risk of HIV and HCV infection among injecting drug users', *Drug and Alcohol Dependence* 100, pp. 204–13.

Zule, W., Ticknor-Stellato, K., Desmond, D. and Vogtsberger, K. (1997), 'Evaluation of needle and syringe combinations', *Journal of Acquired Immune Deficiency Syndrome and Human Retrovirology* 14, pp. 294–5.

Zule, W., Desmond, D. and Neff, J. (2002), 'Syringe type and drug injector risk for HIV infection: a case study in Texas', *Social Science and Medicine* 55, pp. 1103–13.