



## EMCDDA PAPERS

# Developing drug supply monitoring in Europe: current concepts

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**Abstract:** Recently, there has been an increased focus on improving the quality of drug supply data at EU level, underpinned by a number of policy developments, notably the Council of the European Union's conclusions of 15 November 2013 regarding supply and supply reduction within the implementation of the EU Drug Action Plan (2013–16). Mindful of the uncertainties and challenges of measuring an increasingly dynamic illicit drug market, while building on the positive work in the EU Member States, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) has been a driving force for improving supply metrics and indicators.

This paper presents a snapshot of the evolution of the EMCDDA's conceptual framework for supply monitoring. It describes a dynamic system based upon three linked thematic areas: drug markets, drivers and facilitators; drug-related crime, harms and other consequences; and reduction of and responses to drug supply. Each area is

served by a set of (overlapping) indicators. The framework was developed to logically organise the multifaceted aspects of illicit drug markets and supply, going beyond the EMCDDA's current core monitoring by integrating new data sources and novel measurement methodologies.

The present work contributes to the concerted effort in the EU to establish a coherent drug supply monitoring framework, including identifying new sources of information. While work to further enhance the existing supply indicators should remain a priority, baselines should also be established in new priority areas to allow enhanced monitoring of the supply side of the drugs phenomenon, thus providing a balanced set of drug policy tools.

**Keywords** drug supply  
drug-related crime | supply reduction  
conceptual framework  
measurement strategies

## Background and aims

The EMCDDA, the European Commission and Europol have been working on the development of indicators of drug supply and drug supply reduction for a number of years. The work was informed by two European conferences, the first in Brussels in 2010 and the second in Lisbon in 2012. As a result of these conferences, a framework was developed for collecting data to support the aims of providing a sound understanding of the situation, identifying new threats, targeting activities and considering the impact of policy measures. The foregoing work proposed three key indicators — drug markets, drug supply reduction and drug-related crime — supported by a data collection and contextual component that contributes to one or more of the key indicators. The impetus for the development of these was provided by the Council conclusions of 15 November 2013 (Council of the European Union, 2013), which called upon Member States, the EMCDDA and Europol to improve the monitoring of the drug supply in the EU. Many of the aspirations raised and improvements called for in those conferences and documents have since been adopted.

The Council conclusions of 2013 (Council of the European Union, 2013) defined the priorities for the EMCDDA's efforts. By the end of 2016, significant progress had been made, including revision and adoption by the Member States of indicators on drug seizures, drug law offences, prices, purity and production facilities, as well as the methodology for estimating market size. The EU Policy Cycle on serious and organised international crime has radically changed the way that the EMCDDA interacts with Europol and the Member States, giving it access to highly relevant contextual information by interacting with key players in the field, most notably law enforcement officers. As a result, the data collected are more amenable to credible analysis. The EU Drug Markets Reports of 2013 and 2016 have been key to understanding our strengths and highlighting important gaps in our knowledge and areas for further development in this field. This paper sets out to document the recent evolution of the conceptual framework for supply monitoring and identifies and describes further improvements in existing EMCDDA supply data, additional data sources, novel measurement methodologies and new analyses.

## Method

The process for developing the supply framework involved (1) a review of the relevant published literature, (2) an internal consultation, and (3) expert engagement:

1. A review was undertaken from November 2015 to April 2016 (reported elsewhere) of policy documents and published international research in relation to drug markets and drug-related crime.
2. An internal consultation process, informed by the literature review, took place between July 2016 and February 2017, resulting in an expanded framework.
3. A critical review was carried out of the overall framework and individual thematic areas by a network of stakeholders supporting supply indicators that was drawn from the drug research, policy and law enforcement communities; the EMCDDA hosted an expert meeting on the topic in Lisbon, 2–3 March 2017.

## Conceptual framework for monitoring drug supply

The framework comprises three linked thematic areas. These were initially conceptualised as covering drug markets, drug-related crime and drug supply reduction. In the light of developments in drug markets and supply activities and their wider impacts and in tackling the drivers and enablers of drug supply, the conceptual framework has been developed further and the three thematic areas broadened (Figure 1).

Each area is served by sets of (overlapping) indicators, informing each other. The first part of this section outlines six general criteria that supply indicators need to satisfy; it then takes each area in turn – focusing on key issues around data, methods and analysis. The proposed developments are outlined in Figure 2, structured by thematic area, although it is recognised that there are multiple overlaps and no indication of hierarchical significance.

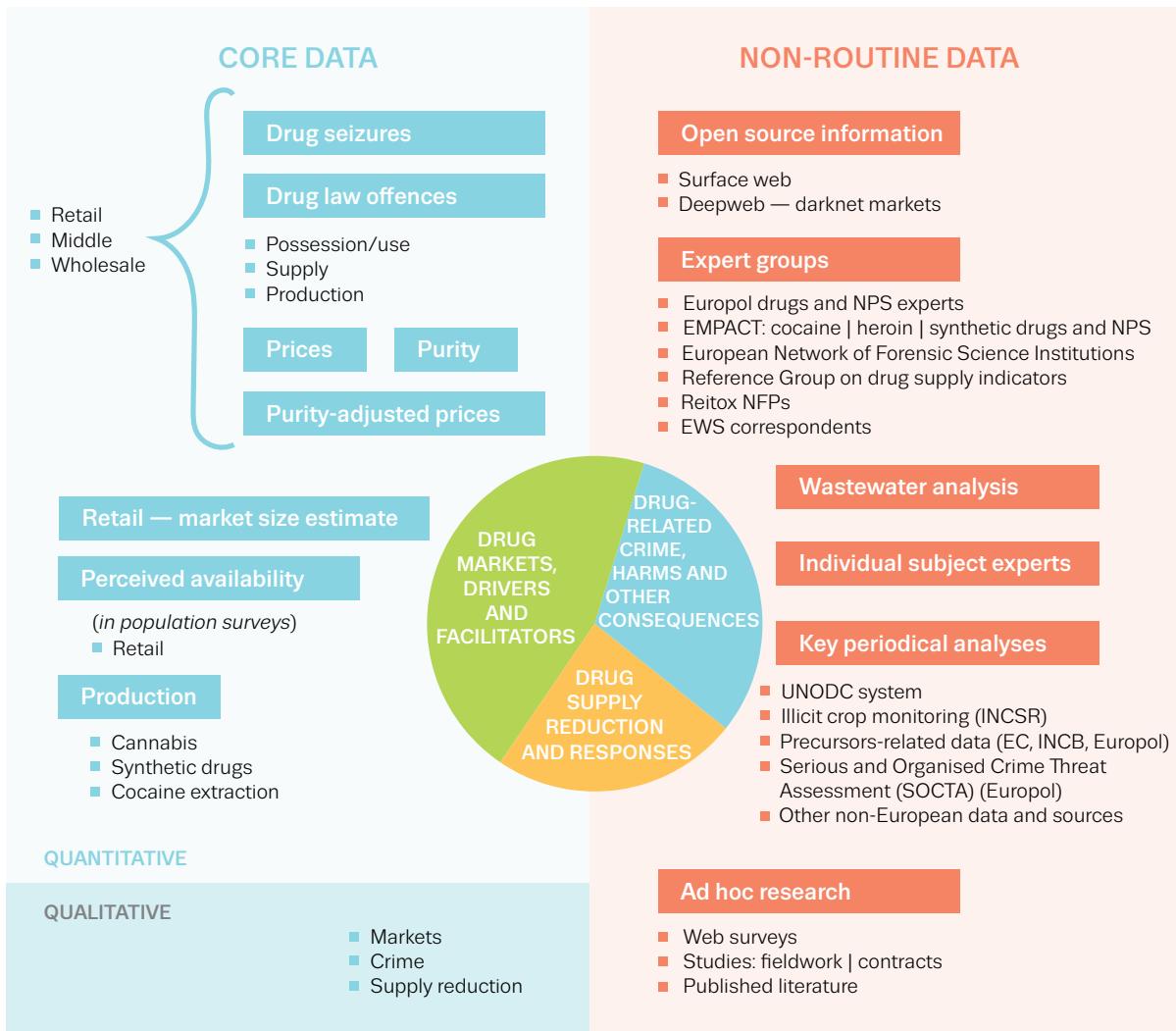
### General criteria

The following criteria have been identified as necessary features of supply monitoring (adapted from OECD, 2008):

1. the ability of the overarching conceptual framework for supply to address knowledge gaps and thereby inform evidence-based policy and practice;
2. the accuracy of the data and credibility of the sources;
3. the timeliness of making data and information available (to ensure relevance);

FIGURE 1

## The EMCDDA drug supply monitoring system



- accessibility in terms of overcoming restrictions (and/or cost);
- ease of interpretation in terms of documentation and metadata; and
- coherence in terms of definition and format across jurisdictions and time.

### | Drug markets, drivers and facilitators

#### Current situation

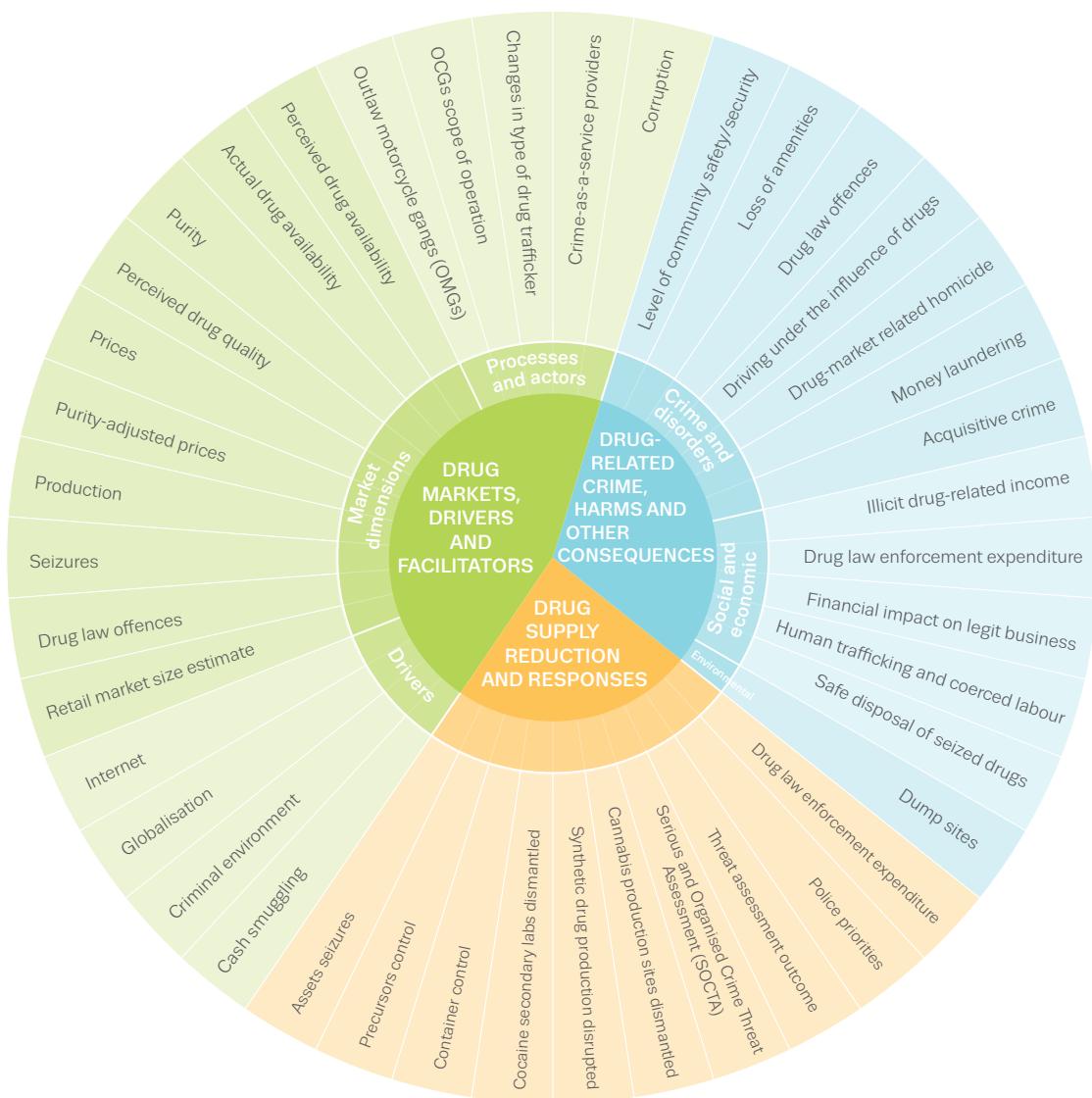
The starting point for developing a supply side data infrastructure is an understanding of how drug markets operate. Supply refers to the production and distribution capacity of the market for drugs such as heroin, cocaine and cannabis. Producers, traffickers and sellers are seen as

responding to price and risk. Increases in the risks of arrest, drug seizure or asset confiscation will result in a downwards shift in the supply curve, i.e. at any given price a smaller quantity of drugs will be offered. The price itself will be determined by the interaction of the supply curve and the demand curve, as captured in the standard economic market diagram, showing the result of a shift in the supply curve (Figure 3). The supply curve can shift for reasons other than policy interventions; for example, a drought in Afghanistan may raise the farm-gate price of opium and hence the retail price of heroin. Technological changes, such as improved methods of growing cannabis, can also lead to a supply-induced decline in prices.

A major challenge then is to separate the effects of supply side shifts from those that are the result of changes in demand, for which a rich set of indicators is already available.

FIGURE 2

**Thematic areas, domains and potential indicators for developing the EMCDDA drug supply monitoring system**



For example, price may rise because of a shift upwards in the supply curve or as a result of a shift in consumer tastes that shifts the demand side upwards.

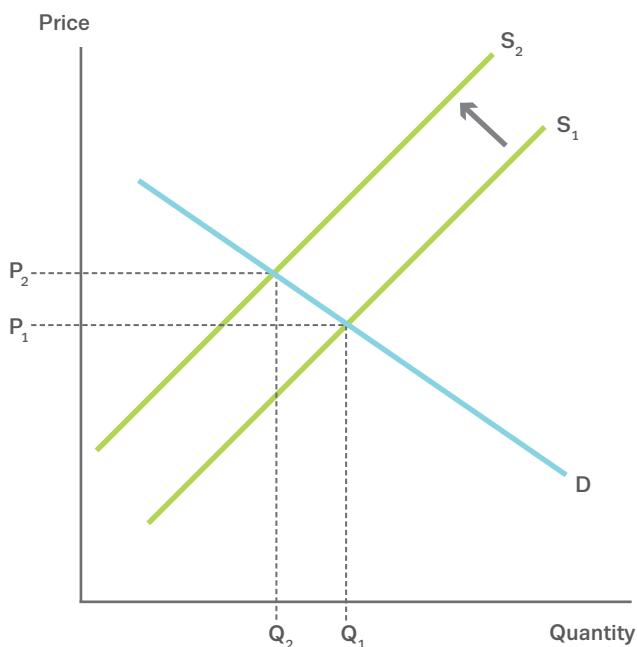
This thematic area encompasses the whole supply chain, from illicit production/cultivation to trafficking and sale. As part of the most recent developmental work, the focus is broadened to:

- traditional measures of enforcement (drug seizures and arrests for drug law offences other than possession) alongside measures to dismantle production/cultivation facilities (synthetic drugs, cocaine secondary extraction and cannabis); these provide numerators for measures of the risks faced by producers and traffickers;

- estimates of retail market size (from population surveys); these provide the denominator for calculation of those risks;
- perceived availability, which supplements price as a measure of market tightness; this is also generated by population surveys;
- price and purity data at three market levels (retail, middle level and wholesale); supply side measures are specific to different market levels; for policymakers it is important to be able to assess separately the impacts of interdiction, enforcement against trafficking and enforcement against low-level dealers; while prices are fundamental to assessing supply-side reduction measures, they can be interpreted only along with the other supply side and demand side indicators.

FIGURE 3

The effect of a shift in the drug supply curve for developing the EMCDDA drug supply monitoring system



A demand (D) curve maps the relationship between price (P) and the quantity (Q) consumers are willing to purchase. The supply (S) curve maps the relationship between price and the quantity that producers (distributors) are willing to provide. After Caulkins and Reuter, 2010.

A brief description of the core measures is provided below, along with reference to details of current data collection methods:

- Drug seizures: annual collection in a standardised table from each Member State, including numbers and quantities at the three market levels for all drugs. Member States may opt to report on precursor and on country of production, transit and destination (EMCDDA standard table 13 and protocol for reporting drug seizures, 2016).
- Drug purity and tablet content: annual collection in a standardised table from each Member State, including purity, potency and tablet content for all drugs and at the three market levels (for powdered drugs) (EMCDDA standard tables 14 and 15 and protocol for reporting purity data, 2016).
- Drug prices: annual collection in a standardised table from each Member State, including average drug prices at the three market levels for all drugs (EMCDDA standard table 16 and protocol for reporting price data, 2016).
- Drug law offences: annual collection in a standardised table from each Member State, including number of offences by Institute for Conflict, Cooperation and Security—United Nations Office on Drugs and Crime category and drug type

(EMCDDA standard table 11 and protocol for reporting drug law offences, 2016).

- Perceived availability: annual collection through the European Web Survey on Drugs.

### Challenges

Both seizures and drug law offences statistics have been criticised for being inaccurate measures of drug markets, as they are influenced by both law enforcement tactics and priorities and the scale of the market and drug-related crime. Nevertheless, it is recognised that these data are available at near zero cost as by-products of administrative record systems across Member States. Therefore, the challenge is their correct interpretation.

Furthermore, while the above indicators can be an important aid to understanding the nature of the drug market, and can help to provide a map of the sources, range and quality of available drugs, they convey no information about the range of actors, technologies and other factors that contribute to making drugs available to users.

Finally, an overall challenge to plans for core data collection relates to the limited timeliness. Relying solely on annual figures flattens changes that might have occurred in the meantime and hampers timely response (e.g. in terms of a shift in the focus of data collection, research priorities or wider alerts).

### Areas for improvement

Interpretational challenges can be addressed by using contextual information. Qualitative information should also be embedded in the quantitative framework to inform areas such as law enforcement priorities, funding cycles and allocation. This will give an indication of the extent to which these data can be considered an accurate representation of the markets. This contextual approach will provide confidence for cross-country comparisons of seizures and drug law offences.

In addition, qualitative contextual information regarding seizures (e.g. method of concealment, trafficking modus operandi) need to be emphasised in the data collection framework. More effective enforcement should lead to the use of more expensive models of trafficking.

Utilising information from demand indicators can help answer questions on the supply side in relation to the market composition (i.e. products and availability), changes occurring in this composition, the ratio of demand–supply). Demand side information should be used in conjunction with supply indicators to give a fuller picture of drug markets and to

allow methodological tools to be developed. For example, an increase in seizures at the same time as a decline in demand side indicators for the drug and an increase in price suggests that law enforcement is indeed seizing a higher percentage of the total drug supply.

Supplementing routine data collections with ad hoc research or access to external parallel data collections will improve timeliness. Opportunities need to be identified and exploited for timely access to data and information to describe, for instance, market changes and emerging trends — an early warning system that is not necessarily systematic but can give a first indication of change — to allow further investigation and follow up. It is conceivable that such an approach can be taken to monitor changes in the type of drug trafficker, emerging drug dealing locations, selling/trafficking methods, production processes and precursors. Possible sources here include intelligence information and networks of experts; surveys may also need to be developed to address these information needs. The new internet surveys of experienced users are potentially a rich and very cheap method for developing data on emerging methods of retailing.

A further benefit of parallel data collections is the flexibility they offer, potentially highlighting fluctuations that might have been missed in routine annual figures. In relation to the price and purity indicators, core monitoring can integrate high-frequency data collection in select localities (regions/cities with strategic importance for trafficking/importation) to allow identification of the detail in the broader price, purity and purity-adjusted price patterns.

Finally, in areas where quantification is not feasible at present, access to information that might not be considered statistically rigorous should be explored, including constructing and using rating scales among a broad network of respondents — for example, assessment by law enforcement of the level of drug-related crime, akin to the work undertaken in the Czech Republic (<sup>1</sup>).

To facilitate and improve cross-indicator analyses, continued work needs to explore and validate (or otherwise) existing choices around grouping seizures by size across different drug types. The use of prices to study the markets can be improved by categorising and access to data in relation to drug source (production/cultivation), importation and domestic retail levels. This offers greater precision than the current ambiguity arising from attempting to attribute prices to fluctuating boundaries around the middle market level.

In relation to the last point, more work is required on understanding the intermediate level between retail and wholesale markets. Existing work (Caulkins et al., 2016;

Tzvetkova et al., 2016), based on qualitative methods, can be supplemented by studying the relations between different actors using social network analysis. The latter approach can be applied to all markets levels to study the range of actors involved in the drug markets as well as organised crime groups involved in drug production and distribution. The monitoring of online drug sales through user forums and the darknet can provide further insights in this area.

## Drug-related crime, harms and other consequences

### Current situation

This thematic area represents a complex category, with many possible definitions of 'drug-related crime'. To date, it has been informed by drug law offences data available at European level — measures of arrests for possession or use and supply by drug type.

The European security agenda explicitly highlights a need to understand the interactions that exist between drug-related crime and the operation of the drug market, on the one hand, and other areas of criminality, the activities of organised criminal groups and other sources of security threats, on the other. Such overlaps were also highlighted in the 2016 European Drug Markets Report, which clearly suggested that threats in this area were increasing due, in part, to the changing business models used by transnational organised crime groups. In addition to these major security threats, it is also important to support the development of a broader understanding of the ramifications of the drug market, as these can represent important hidden costs to society.

### Challenges

Broadening the scope of this area is necessary, so that it begins to reflect the wider set of crime types that are associated with the operation of illicit drug markets, i.e. violent offences, intimidation, loss of amenities, to provide an understanding of the harmful effect of drug markets on the security of individuals, communities and institutions. Beyond security, other dimensions of market-related consequences should be considered, including social, economic and environmental impacts.

This is a challenging area and, although some core monitoring tools exist, overall this area remains to be developed. There will continue to be high demand for quantitative measures of drug-related burden and harm. Mapping the sources of harms and beginning to quantify them could be improved by introducing improved coding or 'tagging' procedures in statistical recording systems (e.g. corruption cases tagged with a drug marker).

(<sup>1</sup>) Since 2003, in the Czech Republic, this has been referred to as 'secondary drug crime'.

## Areas for improvement

The current focus should be expanded from the offence types recorded in drug law offences data to include other drug-related offences, as conceptualised by Goldstein (1985): psychopharmacological, for example, driving under the influence of drugs; economic-compulsive offences or acquisitive offences, such as theft, extortion and street crime (Farabee et al., 2001; Hutchinson et al., 2000); and systemic offences, such as drug market-related homicide and money laundering.

Establishing a baseline for future comparisons of drug-related activity in relation to harms will need to consider prioritising which data collections are to have a drug ‘tag’ introduced and incrementally improving data availability and quality. While data on drug-related predicate offences in relation to other crimes (e.g. corruption, money laundering) are not available at present, pushing for data to be collected and developing the methodologies to access these data would increase awareness about the problems and simultaneously attempt to provide the tools and metrics to aid police management and evidence-based policy formulation.

With regard to drug-related homicide, work is under way mapping EU-wide data and sources and exploring the feasibility of long-term EU-level monitoring, incorporating publicly available data. Building on that, a feasible model for data collection, which integrates open source information, will be developed.

In the area of anti-money laundering in the EU, macro-quantification approaches have been documented, which is a good starting point (e.g. Project ECOLEF, funded by the European Commission Directorate-General for Migration and Home Affairs, LS/2009/ISEC/AG/087). Taking a case-level approach can be more productive than only considering macro-perspectives. One possible approach could be to screen and identify relevant (closed) case files at Europol’s disposal, producing a comprehensive case study compendium — which can then be coupled with a macro-level quantification exercise. Further potential data sources should be explored, including a Directorate-General for Justice and Consumers pilot data collection on money laundering in Member States, which includes illicit drug trafficking, among other predicate offences. Comparing case data with media reports using content analysis could be an interesting additional element to exploit.

Access to data should be sought in the area of corruption, where drugs would feature as ‘red flags’, particularly in

public sector categories such as transport, customs, maritime. The European Commission receives data from most Member States on the treatment of corruption cases in the criminal justice system. In addition, the United Nations Office on Drugs and Crime is carrying out pilot studies and experiments at country level to develop guidelines for sample surveys of experience of bribery. Finally, the Organisation for Economic Cooperation and Development (OECD) has a pilot project looking at bribery cases based on information from court judgments. Building on these pilot exercises, a number of follow-up measures could be explored to support access to drug-related information within these crime areas.

In addition to direct quantitative measures of drug-related crimes, surveys of expert and public perception in a number of areas can be developed, focusing on perceived safety and security at community level and perceived drug-related burden across different types of offence and among a range of respondents (e.g. judges, prosecutors, lawyers).

The frequency of data access, along with other research procedures, such as giving incentives to respondents to share their experiences, will need to be addressed. An area that may be worth exploring is access to airport incident and high-risk information in relation to drugs (e.g. deaths of body packers).

A key element in addressing data gaps in the area of drug-related crime, harms and consequences will be to look more broadly for data (i.e. research findings, open source information) as well as statistics. Existing measures and datasets should be accessed — exploratory analyses may then look at how these correlate with our best measures in the given area. Examples include, but are not limited to, the Corruption Perception Index of Transparency International; the European Criminal Records Information System, which has recently been piloted for analytical purposes; and the Risk Information Form exchange (European Commission).

In the coming years, the potential of wastewater analysis will be further explored to establish a baseline for the assessment of drug-related environmental impact, in particular in relation to events in which raw drug production waste or even finished product is dumped in the municipal sewerage system.

## Drug supply reduction and responses

### Current situation

At present measures in this area are limited to drug seizures, numbers of dealers and traffickers arrested and production/cultivation facilities dismantled (synthetic drugs, cocaine secondary extraction and cannabis). In addition, indicators, such as drug affordability, are being developed that utilise existing market data for more sophisticated analyses.

### Challenges

Supply reduction and responses are linked to the broader concept of reducing the overall scale of the market. Accordingly, more effective measures for estimating the availability and accessibility of illicit drugs should be considered.

A key part in developing this thematic area — including data access and analyses — would be to achieve clarity about the reason (and there may be multiple reasons) we do it, which is also linked to the EMCDDA's strategy in terms of contributing to a healthier and more secure Europe. For the purposes of monitoring, the emphasis would be on describing and analysing markets and supply; for outcome evaluation, it would be on detecting market changes and supply shifts; and for planning, it would be on informing policy emphasis and/or resource distribution and priority setting.

One of the main challenges would be to separate changes occurring as a result of supply influences from those that are demand driven. As noted above, progress in this area will come from analysing both supply and demand measures together. Nevertheless, linking back to the purposes of data and information, it will be important to be able to make that distinction — for policy and police resource management purposes.

On certain topics, particularly around confidential information that may hamper law enforcement efforts or prejudice ongoing investigations related to priority setting for Member States' police forces (at national or regional levels), it is understandable that data may not be readily shared with international organisations and alternative sources may need to be identified.

Finally, based on current discussions at expert level and the EMCDDA's own past methodological work and experience in collecting public expenditure data, there would appear to be a common point throughout relating to a range of methodological and other problems. Given the limitations, we

need to consider how these data can be used in a meaningful way in the proposed framework.

### Areas for improvement

One approach, based on the prices and risk framework (Caulkins and Reuter, 2010; Reuter and Kleiman, 1986), would be to access and analyse drug prices at export, import and retail levels. With regard, for instance, to heroin and cocaine, information can be gathered on:

- shifts in supply from producer countries — reflected in changes in export prices;
- changes in trafficking processes — reflected in the difference between export and import prices;
- shifts in domestic supply — reflected in retail prices.

Attention needs to be given to certain conceptual and data issues at the analytical stage to account for alternative sources of impact (e.g. the appearance on the market of new drugs as replacements) and volume discounting on prices, particularly at source. Furthermore, different models would be needed for different drug types, particularly for synthetic drugs, as production takes place in Europe. Finally, there may not always be a tangible outcome from law enforcement activity, such as arrests, seizures or asset confiscation, although criminal operations may be disrupted.

The wider determinants of supply would need to be considered, including, among others, the willingness of domestic labour to incur risks from the criminal justice system, other market participants and the availability of technology and materials for production.

As well as looking at supply reduction, this thematic area should also recognise the contribution of law enforcement agencies in reducing harms and the wider consequences of markets and supply, and therefore aim to develop measures of (perceived) drug-related violence, nuisance and corruption.

The feasibility of developing a framework for law enforcement activity prioritisation or evaluation could be explored — a framework featuring modules focusing on concepts, data and quality. This has the potential to increase interest and capacity at Member State level to generate evidence and good practice. In addition, providing and recommending standardised tools (and guidance or assistance with implementation) indicating key areas for assessment may introduce a certain level of objectivity and comparability across units (e.g. Member State, city) that choose to apply it, either to aid resource planning and prioritisation or for evaluating effectiveness.

## Discussion and conclusions

Following a detailed focus on each thematic area within the new framework, this final section summarises key overarching points and offers an outlook.

The present work contributes to the incremental, concerted effort in an EU context to establish a coherent supply monitoring framework, including identifying new sources of information.

Building on discussions with supply indicators experts, new data sources are being explored and tested. Examples include monitoring open source information, drug sales on darknet markets, and excreted drugs and metabolites in wastewater. In addition, ad hoc research, access to expert groups and existing European (including those outside the EU) data collections will need to be explored.

There will continue to be a high demand for quantitative measures in these different areas. Enhancing those measures should include organising the contextual information around them in a systematic way.

The proposed concept framework is key and will have embedded in it further (cross-indicator) analyses, akin to the comparison of drug prevalence and market data reported recently (Groshkova et al., 2017). In future it will be increasingly important to demonstrate the uses to which data is being put — to generate further interest in data and quality in this area.

Finally, an openness to new measurement methodologies and sources is reflected in shifting the focus away from routine data collection from all Member States all the time to include staggered data collections and/or selective or targeted collection plans.

The group of experts engaged in the work around the drug supply indicators will have a key role in future serving as a forum for further data quality improvement as well as a way of accessing research findings, intelligence and contextual information to inform analysis. Feedback mechanisms for the analysis and findings will be sought through other EMCDDA networks including Reitox and the reference group.

Future efforts will need to focus on further improving and formalising the quality or ‘fitness for use’ of the framework to suitably reflect the OECD criteria identified in this paper.

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## About the EMCDDA

The European Monitoring Centre for Drugs and Drug Addiction is the hub of drug-related information in Europe. Its mission is to provide the European Union and its Member States with 'factual, objective, reliable and comparable information' on drugs and drug addiction and their consequences. Established in 1993, it opened its doors in Lisbon in 1995, and is one of the European Union's decentralised agencies. The Centre offers policymakers the evidence base they need for drawing up drug laws and strategies. It also helps professionals and researchers pinpoint best practice and new areas for analysis.

## Related publications

### EMCDDA

- | [Health and social responses to drug problems: a European guide](#), 2017
- | [European drug report 2017: trends and developments](#)

### EMCDDA and Europol

- | [EU drug markets report 2016](#)
- | [Drugs and the darknet: perspectives for enforcement, research and policy](#), 2017

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EMCDDA, Praça Europa 1, Cais do Sodré, 1249-289 Lisbon, Portugal  
Tel. (351) 211 21 02 00 | [info@emcdda.europa.eu](mailto:info@emcdda.europa.eu)  
[emcdda.europa.eu](http://emcdda.europa.eu) | [twitter.com/emcdda](https://twitter.com/emcdda) | [facebook.com/emcdda](https://facebook.com/emcdda)