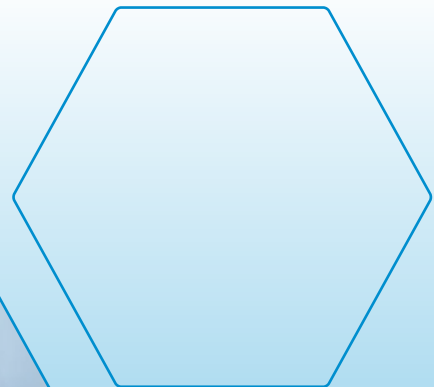
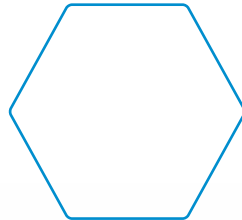




UNODC

United Nations Office on Drugs and Crime

The role of drug analysis laboratories in Early Warning Systems





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Abbreviations

OAS CICAD	Organization of American States (OAS) Inter-American Drug Abuse Control Commission (Comisión Interamericana para el Control del Abuso de Drogas)
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
EWA	UNODC Early Warning Advisory on New Psychoactive Substances
EU EWS	European Union Early Warning System
EWS	Early Warning System
NDO	National Drug Observatory
RM	Reference Material
UNODC	United Nations Office of Drugs and Crime
WHO	World Health Organization

1. Introduction

Under the conditions of a globalised drug market, there is an increasing risk that new and potentially harmful psychoactive substances may spread to more countries and regions. Recently, the opioid crisis in North America, which has resulted in significant loss of lives, called for a coordinated, comprehensive and multidisciplinary global response.¹ At the same time, the synthetic drugs market is increasingly diverse. This poses challenges for detecting, identifying and monitoring as well as controlling these substances. Experts working at drug analysis laboratories are in a unique position to detect and identify both known and new chemical substances and changes in the drug markets.

Pursuant to the Outcome Document of the 2016 United Nations General Assembly Special Session on the World Drug Problem (UNGASS) entitled “Our joint commitment to effectively addressing and countering the world drug problem”, governments have recognised the importance of reinforcing national and international efforts and increasing global cooperation to respond to the challenges and threats of emerging drugs, such as new psychoactive substances (NPS), inter alia by strengthening information exchange through early warning systems.² UNODC defines NPS as “substances of abuse, either in a pure form or a preparation, that are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, but which may pose a public health threat”.

UNODC developed the first international monitoring system on NPS under the umbrella of its Global Synthetics Monitoring: Analyses, Reporting and Trends (SMART) Programme. The UNODC Early Warning Advisory (EWA) on NPS is a voluntary online data submission system and serves as a platform for sharing relevant information on NPS (available at: www.unodc.org/nps). Registered users can access specific information on NPS, including trend data, chemical and pharmacological data on individual substances, supporting documentation on laboratory analysis and on legislative responses. In 2018, the EWA was enhanced to incorporate toxicological data, including information on adverse health consequences from the use of NPS (available at: www.unodc.org/tox). UNODC strongly encourages national laboratories to actively use the UNODC EWA. The EWA also contributes to the identification of the most harmful, prevalent and persis-

tent NPS, globally. This prioritization is an important input to the review of substances by the World Health Organization (WHO) in the context of the international drug control conventions.

Many governments have started establishing Early Warning Systems (EWS) at a national level. National systems thereafter benefit in being part of wider regional mechanisms. The most advanced example of a regional early warning mechanism is the European Union EWS (EU EWS)³ which includes the national EWS of 30 European countries (i.e. the EU Member States, Norway and Turkey) that collect, appraise and rapidly disseminate information on emerging new psychoactive substances and products that contain them. The EU EWS on NPS is designed to support the EU to rapidly detect, assess and respond to health and social threats caused by new psychoactive substances. The system is operated by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and has been functioning for more than 20 years.^(4,5,6,7) The UNODC Global SMART Programme, the Inter-American Drug Abuse Control Commission (CICAD), the European Union through its Cooperation Programme on Drug Policies with EU (COPOLAD) and the EMCDDA support the establishment and development of national EWS in Latin American and the Caribbean.⁸ Several countries in the Americas have already established EWS and CICAD is working on an early warning mechanism for the region.⁹

2. Objectives

Drug analysis laboratories are key to a functioning national, regional or international EWS due to the specific expertise, information and data they can generate. This publication focuses on information available from the laboratories analysing drug seizures and/or responsible for toxicological analysis. It aims to provide drug analysis laboratories and other stakeholders with practical information and examples on how to participate in an EWS.

The following topics will be addressed:

1. The crucial role of drug analysis laboratories in an EWS and how to promote and strengthen their ability to contribute to such systems
2. The importance of information and data obtained in routine work of the drug analysis laboratories to an EWS

3. The value of analytical information from laboratories for effective responses to emerging drug threats
4. The strengths and limitations of the information supplied by laboratories
5. The benefit of laboratories participating in an EWS

2.1 What is an Early Warning System?

An Early Warning System on drugs is a multidisciplinary, inter-institutional network which enables information exchange among key actors, which are directly or indirectly involved in the field of drugs. An EWS aims to identify early on events of emerging drugs that pose a potential threat to public health. It assesses the risks such drugs may pose and provides information to enable the design of effective responses. An EWS can help identify the emergence of new drug threats and changes on the drug market, such as new use patterns, unusual concentrations or contents such as toxic adulterants. Such events provide valuable information to an EWS network.

EWS are established in order to be able to address the rapidly changing availability and use of emerging drug threats. An EWS does not only support early detection of new substances but helps to disseminate information on new drugs, new drug use patterns and availability or market trends. Scientific evidence-based information of the changing drug market is essential in making informed policy decisions to address any changes and protect public health from possible health threats and drug related criminality. While some EWS may have a wider scope, this publication is limited to the purpose defined above.

2.2 Structure and legal framework of an Early Warning System

The EWS structure differs between countries and should be designed to suit local needs in terms of institutional structure, social characteristics and national drug use patterns. The participation of forensic laboratories in early warning mechanisms can take many forms and may range from informal calls or email exchanges to official communication sent in a standardised format. Although some EWS may function without having a formal framework, many national EWS operate under a legal framework^{10, 11} (see also Box 1). The legal framework defines the role of the EWS, determines the different tasks of the stake-

holders involved and provides the legal basis for information sharing among them. Often, the forensic information to be shared may be part of a criminal investigation or be classified in some way. Thus, it is important that laboratories participating in early warning mechanisms know what kind of information can be shared and under which circumstances. To facilitate this, some countries have chosen to formalise the early warning mechanism as part of the government structure, which defines the information of interest, that institutions can share this information and the procedures in place to enable this process. Examples of national early warning mechanisms embedded in a legal framework are accessible at the UNODC EWA under legal responses (<https://www.unodc.org/nps>).

BOX 1.

Argentina - The role of forensic laboratories in a legal framework of national EWS

The Government of Argentina issued a decree¹² which defines the roles and functions of stakeholders involved in the EWS. The decree empowers the National Drug Observatory - the entity operating the EWS - to establish information sharing agreements with public agencies such as forensic laboratories but also with non-governmental organizations (NGOs). The agreements define protocols to protect the confidentiality of the information as appropriate. The role of laboratories in the chemical identification of newly emerging substances is mentioned explicitly in the decree as well as the importance of characterizing its toxicological profile and potential health risks.

Often the national EWS is hosted by an institution such as the National Drug Observatory (NDO) which acts as the focal point or clearing house for collecting, analysing and enriching information and data provided by the stakeholders of the EWS.¹³ Information from one stakeholder of the EWS sometimes needs to be enriched and transformed into a format which allows its sharing among the wide range of diverse stakeholders. This may also be true for forensic information, which, because of its technical nature, may not be readily understood by all stakeholders unless it is given some context or explanation.

Guidelines on the structure and functions of national or regional EWS are available, such as the EMCDDA and COPOLAD EU EWS guidelines.¹⁴ National EWS are encouraged to further contribute to feeding a regional (e.g. EMCDDA) and/or the international (UNODC) EWS.

3. What is the role of drug analysis laboratories in Early Warning?

This publication focusses on the role of drug analysis laboratories in EWS, since analytically confirmed data is one of the most powerful ways to learn what is available on drug markets. Laboratories analysing drug seizures can contribute information relating to detecting, identifying and reporting NPS from the analyses of seized material. Toxicological laboratories can provide confirmatory data on medical events that occurred from the use of substances and ultimately the harms of such. In general, any drug analysis laboratories could be involved in the *ad hoc* reporting of the analytical characterization of seized or collected samples. Some of the main functions of drug analysis laboratories in a national EWS are illustrated in Table 1.

TABLE 1.

Main functions of drug analysis laboratories in Early Warning Systems

Detect and identify new and known substances, as well as combinations of these, which pose a potential threat

Cooperate in improving analytical characterisation of NPS and other drugs

Systematise and validate the information collected in the system

Provide drug analysis data and intelligence information (when relevant) for the preparation of reports and products to different recipients

Support national, regional and international data collection

Identify adulterants

Determine purity

3.1 The importance of drug analysis data

The routine work of a drug analysis expert includes the interpretation of scientifically robust analytical data, for use in the judicial system. This is demanding and time-consuming with all the elements of the chain of custody, certainty, validity, quality and reporting. In addition, it often requires the use of a number of analytical methods and reference materials to ensure an unambiguous identification of the substance which is certain and reliable. For example, in some cases, positional isomers of a controlled substance may not be controlled. The resulting report on the other hand is often simple: a substance is identified and its control status under national law is given. However, looking at the same data with a different set of questions in mind, according to the objectives of an EWS, the routine chemical analysis of drug seizures can provide much more information, for example, additional information on non-controlled substances, adulterants, precursors or, in the case of toxicological analysis, combinations of substances consumed.^{15 16}

The changes in trends in the drug market are an important background information for an EWS. However, individual events may precede a trend long before the change becomes visible in drugs statistics and early warning should capture these events. A growing part of the drug analysis work today is the detection and identification of harmful substances, including both pharmacologically active substances and adulterants. This has resulted in a situation where more is required of drug analysis laboratories in addition to their routine scientific function as part of the judicial system. While time-consuming and complex, these efforts provide valuable data for EWS.

3.2. Reporting Drug Analysis Data

The analytical data and background information of the sample analysed should be reported in a structured format so the information can be disseminated in a simple way. The EWS should contain an electronic reporting form.¹⁷ This reporting form could contain mandatory and optional fields. The reporting form of the UNODC EWA is an example of a form which requires the minimum data necessary for the purpose of early warning. It includes the name of the substance, time of incidence, means of identification (analytical techniques and other means), sample description and sample amount (see Figure 1.).

[Figure 1.] Example of the reporting template for an NPS finding in seized material (UNODC EWA on NPS)

In general, it should be noted that not all available pieces of investigative or intelligence information need to be recorded in the EWS, also considering the confidential classification of the information used. However, it is considered good practice that the analytical techniques used to identify a new substance, the use of reference standards or reference material, the use of spectral libraries, and the analytical conditions under which the analysis has been conducted, are reported. This helps to understand the level of certainty of the identified substance and make the identification traceable. At the same time, it must be considered that when new substances are identified, the level of certainty might be lower compared to the identification of controlled and/or traditional substances.

Due to the high number of NPS and traditional drugs, it is recommended to use internationally accepted, unequivocal chemical identifiers and nomenclature (e.g. IUPAC chemical name, CAS Number, InChi Key, etc.) for each substance so that the collected data is comparable. The distinction between different substances is extremely important. Such a list of identifiers for NPS can be found in the UNODC EWA (see Figure 2).

The information from a drug analysis laboratory on the detection, identification or any unusual changes of a new or monitored substance, should be reported *ad hoc*. This event-based reporting is most effective for early warning purposes and can be done without analytical confirmation. An example for event-based reporting would be the occurrence of new, possibly toxic combinations of substances, new forms of con-

sumption (e.g. injecting use of cocaine as opposed to insufflation) or a drug sample not containing the substance users would typically expect (e.g. NBOME compounds sold as LSD or tablets containing PMMA sold as “ecstasy”). Another example of event-based reporting is the first identification of a substance by a laboratory. Such information is vital to be shared with the relevant stakeholders of the EWS network, including, for example, street level health-care workers, as soon as possible. In addition, such information should also be shared with international data collection mechanisms like the UNODC EWA.

[Figure 2.] Typical coverage of chemical data on NPS in the UNODC EWA

New substances, which have become nationally or internationally controlled, are commonly monitored and analytical results are reported. This means that, depending on the scope of the EWS mechanism, traditional drugs as well as new substances are part of routine analytical screenings. These analytical results could then be aggregated and reported to the EWS for further analyses. Analytical results can easily be aggregated

through an electronic Laboratory Information Management System (LIMS), which, ideally, should be compatible with the data handling system of the corresponding EWS. The event-based reporting of analytical data and information can result in further action by the EWS. However, each piece of information must be processed in the EWS before it can result in an effective outcome.

BOX 2.

Identification of a new substance marketed like a traditional drug, resulting in a scheduling decision

In July 2016, an unknown substance was submitted to the Brazilian Federal Police Chemistry Forensic Laboratory (SEPLAB/PF). The characteristics of the material (LSD type blotter paper) indicated that it could be an NPS. After screening and testing for LSD, no conclusive results could be achieved. The SEPLAB/PF has invested in a diversified technology park covering a wide range of techniques (GC/MS, LC/MS/MS, FTIR, LC/QTOF) but the lack of chemical standards for result comparison poses a serious challenge to the identification of emerging substances. To address these limitations and use synergies

with other institutions in the country, the SEPLAB/PF entered into a partnership with University of Brasilia (UnB) to use their NMR for structure elucidation when needed. By joining forces with UnB since 2013, several emerging drugs have been identified and were brought to the attention of relevant authorities. In this case, the unknown substance was found to be 25I-NBOH, a phenethylamine with hallucinogenic properties. The SEPLAB/PF developed a reporting format containing all the technical data and interpretation of identification results, which are shared with CGPRE, the Federal Police's Drug Enforcement Branch, and Anvisa, the Brazilian Health Regulatory Agency, responsible for scheduling drugs in Brazil. This first identification of 25I-NBOH in Brazil eventually resulted in its placement under national control in October 2016.



TABLE 2.

Examples of events from drug analysis laboratories and the resulting actions of an Early Warning System

Finding	Examples
New substance identified for the first time in the country, region or the laboratory	Such information could lead to risk assessment and fast scheduling process, particularly if the substance has already shown serious harms in other regions. (Boxes 2 and 3)
Unusually high concentration	Such information at user level can result in an alert to users as well as to (law) enforcement officers and healthcare personnel (see Box 4).
New, different or harmful adulterants	High concentration of levamisole, found in cocaine in a country and reported to the EWS, resulted in an alert to stakeholders ¹⁸
Changes in or unusual drug use patterns, new modes of administration	Illicitly manufactured fentanyl sold in the form of a nasal spray (Sweden), injecting drug use of previously orally consumed or inhaled drug, emergence of “chemsex” practices.
Unusual or new form of presentation of a substance	Other, possibly more harmful substances being sold in forms more typical to something else, e.g. MDMA sold in crystalline form rather than the usual tablets (see Box 5).
Substances sold under the name of another drug	This could be fake tablets, e.g. fentanyl sold as heroin or NBOME compounds sold as LSD. The information could be available from the preceding intelligence work or the package of the sample (Box 2 and 5).
Particularly large seizures	The relevance of such events for early warning could be that they indicate changes in trafficking flow and/or could create market disruptions if the shipments were intended for the local market.
Serious fatal and non-fatal events or clusters of adverse health events	Such information can be obtained from toxicological laboratories ¹⁹ , the drug seizure data can often support such findings if the two information streams are combined in the EWS. (Box 3 and ref. ²⁰)
Substances posing health risks to law enforcement and border control personnel	The emergence of highly toxic substances such as fentanyl can expose officers to health risks. Early warning can contribute to officers taking appropriate measures to protect themselves and minimise risks.

3.3. Managing information in an Early Warning System

The systematic and timely collection of analytical data from samples is in the core of the EWS. Sharing this information within the EWS is strongly encouraged. The list of examples in Table 2 illustrates the importance of the functions of the drug analysis laboratories, specifically the analytical data obtained in the daily work of the forensic expert. Often, forensic experts working in laboratories must take a decision on whether analytical results produced in the course of their normal work are relevant in the context of early warning. Actively participating in an EWS will help forensic experts in developing expertise in making such decisions. Any information that may be relevant should be reported and the assessment and validation of the reliability and adequacy of information reported should be an integral part of any system.

The information flow should not only consist of information being pushed in a single direction but rather be part of a constant multilateral communication between participating laboratories. At a first stage, the information flow in an EWS can consist of the dissemination of information and data among drug analysis

laboratories (see Box 3), for example to assist each other in addressing analytical questions, in validating unusual results, or to add a newly emerging substance to routine screenings to monitor its persistence. Assessing this flow of information is an important responsibility of the institution managing the EWS, for example the National Drug Observatory or a similar entity, which will decide if further action is needed. Examples for resulting action include public or restricted circulation alerts, advisories, further data requests, requests for enhanced monitoring as well as different risk assessments to allow for possible changes in the control status of a new substance or simply awareness raising within the national or regional network to prepare the stakeholders for potentially upcoming challenges.

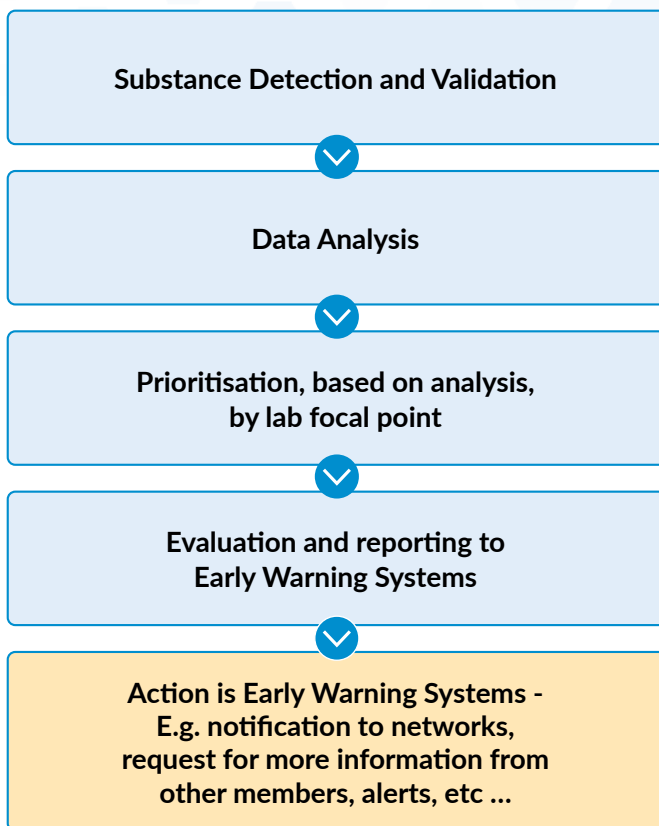
Figure 3 shows an example of the information management process from a laboratorial drug analysis to the resulting action in the EWS. First, the drug analysis laboratory detects, e.g. an unexpected substance in a blotter paper sold as LSD. After validation of the analytical results, the focal point for the EWS in the laboratory reports this event to the EWS because the inadvertent use of the substance wrongly sold as LSD could lead to serious negative health consequences. This information is then further assessed for its rele-

BOX 3.

United States – Identification of methoxyacetylfentanyl by sharing information helped mitigating health threats internationally

In June 2017, the DEA Southeast Laboratory received an email from DEA Intelligence that their laboratory had just analysed the second case of methoxyacetylfentanyl in the United States. When staff working at the DEA Southeast Laboratory realised how quickly a piece of information can gain importance much beyond the geographic area they serve, they decided to set up a communication tool among DEA laboratories which allows to share information on the emergence of NPS quickly and easily. On August 12, 2017, the DEA Real Time Communication Network (Synth-Opioids@usdoj.gov) went online to address analytical challenges in the forensic community for the detection and identification of novel synthetic compounds. Through this network on August 12, 2017, DEA communicated the emergence

of methoxyacetylfentanyl in the United States, along with the emergence of tetrahydrofuran fentanyl and cyclopropyl fentanyl. In this communication, DEA shared a document from the European Project Response detailing analytical information regarding methoxyacetylfentanyl. Other laboratories in the network also started to identify and report cases of methoxyacetylfentanyl and cyclopropyl fentanyl including an increasing number of fatalities. Eventually, the evidence-base built by forensic laboratories participating in the Network contributed to placing of methoxyacetylfentanyl under temporary scheduling later in 2017²¹ in the USA and furthered the bilateral discussion between the USA and China on scheduling of synthetic opioids. The information generated in the USA was also used in Europe for a risk assessment²² in the process to introduce EU-wide controls. All this information and data was also used in the international framework when this substance was recommended for international control by the WHO, illustrating the benefits of information sharing.²³



[Figure 3.] Schematic dataflow from a laboratorial drug analysis to the resulting action in the Early Warning system

BOX 4.

Emergence of high potency MDMA products

The public alert issued in July 2018 in Uruguay through the national EWS about the presence of potentially high potency MDMA in crystalline and powder form, which could imply a higher risk of overdose, is a good example of triangulation of information from different sources in the context of early warning. The alert was based on information of an unusually large seizure of a multi-kilogram shipment of “ecstasy” (MDMA) in powder form, clinical case reports of young people suffering from an “ecstasy” overdose from hospitals, and analytical results from drug analysis laboratories, which identified and quantified the seized samples. The public alert made sure the information reached all relevant people and institutions and helped minimise the risk of further overdoses.²⁴

vance by expert members of the EWS. If the initial assessment determines that further studies are required, more data and information have to be gathered, assessed and reported before an action can be taken. Once enough information has been collected, the necessary action can be taken, e.g. to issue alerts to the individual members and participating institutions of the EWS such as social and health care personnel and law enforcement officers, informing them of the potentially harmful content of the “LSD” blotter paper stamps (see also Box 5).

3.3.1. The importance of timely reporting

The aim of an early warning is to protect the public from harm. In order to mitigate further risks to the public, detections of particularly harmful substances by drug laboratories should be reported in a timely way to the EWS. Waiting for the finalisation of investigative and judicial work of a case would delay sharing of highly relevant information in an EWS. Therefore, information reported to an EWS does not have to be of the same quality as when reporting to the judicial system. Every potentially relevant analytical result should be assessed and reported to the EWS in a timely manner. Such *ad hoc* reporting of events to the EWS does not require the dissemination of sensitive case information such as names, addresses or photos of persons involved. This is for reasons of data protection and confidentiality and this information is usually not relevant for the risk assessment of a substance by the EWS. Nevertheless, an EWS may decide to put in place mechanisms that take care of data protection and confidentiality requirements and allow sharing such information among (selected) members of the system.

3.3.2. Dealing with uncertainty in the context of early warning

In their normal course of work, drug analysis laboratories will follow the rules and procedures set within their national legal framework to ensure that the required quality standards are met and to deal with uncertainty. This will typically involve the use of reference standards and/or data.²⁵ However, the current illicit drug market is very dynamic and dozens of new substances emerge every year. Drug analysis laboratories will be the first ones to notice such events and report them to an EWS. In this context, drug laboratories will encounter situations where they cannot follow their

usual procedures and they may have to deal with a higher than usual degree of uncertainty in their results. This will be the case when, for example, substances are identified for which no reference standards are available, or a substance is identified for the very first time in the laboratory.

In general, when reference standards are not available, the use of reference data from external sources or user generated libraries may be considered, depending on the purpose at hand and national legal requirements. Reference data must be properly validated, e.g. through a validation study of the external reference

data, by testing comparability with different analytical conditions or through peer review. The use of reference data must be documented and, where applicable, their impact and limitations should be clearly stated (see also SWGDRUG recommendations).²⁶ Additionally, when a completely new substance is detected for which even external reference data is unavailable, a complete structure elucidation is essential. To assist with the use of reliable external reference data (spectral libraries) and tools (databases), a non-exhaustive collection of analytical repositories is given in the annex of this document.

1. Sample	<ul style="list-style-type: none"> ◆ Sample description (Powder, tablet, liquid, plants, blotter, others) ◆ Sample amount (Weight or volume)
2. Initial screening	<ul style="list-style-type: none"> ◆ Analytical techniques used ◆ Labelling, packaging etc.
3. Unknown	<ul style="list-style-type: none"> ◆ Comparison to the latest spectral libraries ◆ or structural elucidation (techniques used) ◆ or obtaining the reference standard
4. Identification as NPS	<ul style="list-style-type: none"> ◆ IUPAC name, alternate names, abbreviations, CAS numbers (if available mw, InChi, Smiles) ◆ Techniques used ◆ Search for information (e.g. EWA, monographs, ChemAgora)
5. Identification as NPS	<ul style="list-style-type: none"> ◆ Structured notification containing the above mentioned and possibly other available information (casework, related cases) ◆ Focal Point (commonly National Drug Observatory) further elaborates the information ◆ Search for information (e.g. EWA, monographs, ChemAgora)
6. Dissemination of the information	<ul style="list-style-type: none"> ◆ Within the EWS network (and international data collection) in order to raise awareness ◆ Also for further monitoring ie. adding to screenings ◆ Possibly for risk assessment and scheduling decision ◆ Other outcomes (advice, alert, etc.) depending on the evaluation of the situation as a whole

[Figure 4.] Work-flow in detection, identification and reporting of a substance in an EWS.

Note: At any given point of the work-flow the substance can be identified either as a controlled substance or as not psychoactive or not relevant in the context of the EWS, and the process will be discontinued.

However, even if the identification of a substance does not fulfil the requirements for judicial purposes, the information may be very useful for the purpose of early warning, particularly when dealing with a substance with potentially severe health risks. Drug analysis laboratories participating in an EWS are encouraged to share such information even if the degree of certainty is lower than usual, while making the uncertainty transparent to the recipients of the information, e.g. uncertainty arising from the existence of compounds with similar fragmentation patterns. An example of the process of identifying substances and reporting them for early warning purposes is given in Figure 4.

BOX 5.

Uruguay - Identification of substances sold as "LSD"

Whenever there is information on substances sold under the name of another drug, it can be important to share this in an EWS. Examples are fake tablets, fentanyl sold as or mixed with heroin or NBOMe compounds sold as LSD. This information can come from the preceding intelligence or from discrepancy between labeling and analytical information. In Uruguay, in 2017, blotter paper stamps commonly used for LSD and with a logo used in the past for LSD stamps was found to contain fentanyl, a highly potent opioid, instead of LSD, very likely unknown to users buying it as "LSD". This information was shared among the stakeholders of the national early warning system in Uruguay and resulted also in a public alert.

Informe a SAT 6/2017 Montevideo, 22 de julio de 2017

ANÁLISIS SELLOS INCAUTADOS EN MAYO-2017 Y REMITIDOS AL LABORATORIO DE SUSTANCIAS INCAUTADAS POR [REDACTED]

• FENTANILO



- 23 PLANCHAS CON 25 SELLOS CADA UNA
- Logo "Bicycle day"
- Cantidad incautada: 575 SELLOS

3.4. Monitoring the drug market

Aggregated data on drug supply and demand can be used to identify unusual events on the drug market and facilitate the monitoring of drug market trends. There is increasing evidence that emerging psychoactive substances have a significant impact on drug use patterns.²⁷ The market can also be monitored by analysing adulterants in seized drug samples and changes in their amounts. Additionally, the distribution levels (wholesale, street level) and patterns of drug seizures can be further analysed with regard to the quantities seized (by weight) and the number of seizure cases. Changes in the quantities seized and number of seizure cases, if considered together, and taking into account changes in purity-adjusted prices, can help in identifying trends and patterns of drug supply, as well as the impact of law enforcement activity and changes in drug trafficking patterns.²⁸ An important precondition for this type of market analysis is the existence of drug purity information from drug analysis laboratories. While some countries require quantitation of controlled substances in seized drug samples, and laboratories will thus be able to provide purity information, other countries do not. Laboratories in countries which do not require quantitation may consider discussing the information needs of the national early warning system and develop a routine to perform quantitation occasionally or regularly.

The analysis of the levels of illicit drugs and their metabolites in wastewater is an additional potential real-time source that provides a snapshot of drugs consumed in a specific area. Such analyses have been performed at city level in close collaboration with laboratories in many continents and provide an indication for drug consumption.^{29,30,31} A pioneer study on the assessment of illicit drugs in wastewater was published by the EMCDDA in 2008. Since then, the methodology has been further developed, with, e.g. the analysis in wastewater treatment plants in several European cities being conducted periodically.³² However, such studies have limitations, for example the risk of overestimation when a large volume of drugs is disposed of by traffickers through the sewage system, limitations of the analytical methods used and challenges related to the detection of metabolites. Other sources of information and analytical data which an EWS can exploit in collaboration with laboratories are samples obtained in treatment centres, the analysis of pooled urine samples from selected locations such as

festival toilets or the analysis of residues in syringes. In addition, information available in the scientific literature, in drug user forums and the information available from international networks is valuable.

The UNODC EWA is a global example of data collection, monitoring and reporting based on regular data submissions as well as *ad hoc* reports of individual events in the context of global early warning. In support of this work, the EU EWS, operated by the EMCDDA, shares data on the NPS detected in its member states with UNODC and the WHO, in line with the Commission on Narcotic Drugs resolution 55/1 of 2012 on 'Promoting international cooperation in responding to the challenges posed by new psychoactive substances'. Reporting aggregated data of new substance findings to the EWA is important for trend analyses and for identifying the most harmful, prevalent and persistent substances. This further feeds into the decision on how to prioritise work and legislative responses on a national and/or international level.

Based on an analysis of the data in the EWA, UNODC regularly informs the WHO of the most harmful, prevalent and persistent NPS identified to support the review of substances for possible international control. The screening and aggregated data provided by drug analysis and toxicology laboratories are key sources of information for this work.³³

3.5. Providing information to different audiences

The outputs of an EWS, such as a report, target experts from different disciplines who make up the EWS network. Subsequently, choosing the right information for the right audience is an integral part of the action taken in prioritising the information which is evaluated and reported. For example, the information about identification of a new substance should be provided having different audiences in mind. While chemical experts in the EWS would benefit from learning about the analytical methodology used, law enforcement officers or drug treatment providers might benefit from a comparison with a known substance to better understand the class of substance(s) and its possible symptoms. The following audiences might be part of an EWS and receive information produced by drug analysis laboratories:

- ◆ Other forensic experts, for the purposes of being able to further monitor, discuss and investigate the situation observed.
- ◆ Health care professionals, to assist in addressing the potential harms i.e. for protection of public health.
- ◆ Other institutions or stakeholders, to further risk assess the observation leading possibly to, e.g. scheduling decisions.
- ◆ Law enforcement officials (police and customs), to be able to reduce the supply and tackle possible criminal activities, as well as to be aware of the possible occupational exposure related risks.
- ◆ General public, including specifically the people who use drugs, in order to raise public awareness, e.g. of the observed specifically harmful use patterns, trends or substances for protection of public health.
- ◆ Policy makers, for better understanding the dynamics of the market and for making evidence-based policies.



4. Benefits of early warning system for drug analysis laboratories

In the last decade drug analysis laboratories have been increasingly confronted with the challenge of identifying a large number of new substances. This challenge as well as the important role of drug analysis laboratories to respond to it has been recognised at the international level.³⁴ The establishment of, and participation in, a national, regional and/or international EWS complements, enhances and brings certainty to the analytical work of drug analysis laboratories. Some of the benefits of strengthening such systems for drug analysis laboratories are listed in Table 3.

TABLE 3.

Benefits of an EWS to drug analysis laboratories

New or existing multi-disciplinary and inter-institutional networks, including drug analysis laboratories, are created or strengthened.

The quality, reliability and transparency of the work is improved, e.g. more targeted screening

Both informal and formal collaboration is encouraged.

The communication and understanding between various stakeholders are enhanced.

Public health protection is better served as the flow of information is systematised (resulting in alerts, awareness, guidance).

The strengthening of existing networks and the creation of new networks between drug analysis laboratories improves the quality, reliability and transparency of their work.

BOX 6.

Network of forensic experts contributes to solving a complex analytical challenge

On August 26, 2017, the DEA Southeast Laboratory shared analytical data for both cyclopropyl fentanyl and crotonyl fentanyl) with the DEA Real Time Communication Network (Synth-Opioids@usdoj.gov) participants. On November 10, 2018, the director of a private laboratory in the state of Michigan wrote into the network to ask about a port mortem case, for which they had obtained positive results for a fentanyl analogue but were unsure if the compound was cyclopropyl fentanyl or crotonyl fentanyl. Their request for assistance, on how to analyse the substance and how to distinguish between the two, was answered the same day. Within two days, three different network participants had responded with recommendations on how to overcome this analytical challenge. The responses represented a spectrum of forensic chemists, forensic toxicologists from crime laboratories and medical examiners; and offered advice and information regarding methods for various scientific instrumental techniques for both seized drug and toxicology samples. Through this communication network participants representing multiple jurisdictions and stakeholders all work together to use collective knowledge to address and overcome analytical challenges for new emerging substances.



5. Communication

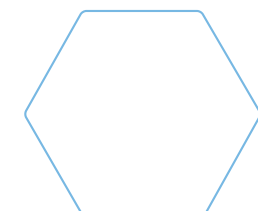
There can be several means of exchanging information, expressing ideas and asking questions, either formally or informally, within an EWS. Possible communication channels are telephone, email, instant messaging or dedicated virtual platforms for registered EWS members. Real time communication is a sign of a well-functioning EWS network. Usually this also facilitates sharing of information on specific issues and ideally cooperation on annual reporting. Examples of restricted access platforms and electronic reporting formats for event-based information already exist, for example, the UNODC EWA (restricted), European Database on New Drugs (restricted) managed by the EMCDDA, as well as other platforms established by national EWS for reporting, exchanging and storing information on NPS. Communication requires close collaboration and trust among stakeholders and the establishment of protocols to deal with sensitive, confidential and classified information. Therefore, in addition to institutional contact via e-mail or electronic platforms, maintaining active network communication may also require regular face-to-face meetings and/or other personal communications.

Although all members in an EWS network are experts in their own field, the dialogue and discussions between stakeholders of different areas should be encouraged and enhanced. Sharing knowledge between the various experts enhances the professional skills of each member. In addition, a multidisciplinary approach

has proven invaluable in analysing the information obtained, making decisions, and sharing the information for further action. The effective and timely collaboration between organisations working with people who use drugs, law enforcement officers, first responders and health care professionals is key for the success of an EWS.

6. Final Remarks

Drug analysis laboratories are the key source of reliable and sound scientific information and data, which are indispensable in the judicial system to address drug related crime and for supply reduction activities. However, the scientific understanding of drug analysis experts has become increasingly relevant and important to a much wider audience. To be able to continue providing the accurate evidence base that is essential in designing effective policy interventions, forensic science will need to evolve and adapt to the highly dynamic drug market of today, characterised by the global emergence of NPS and an unprecedented number of substances present on these markets.³⁵ In the context of such a dynamic situation, the information generated by drug analysis laboratories is more important than ever for supporting evidence-based policy and decision making and for protecting public health. Early warning systems are practical solutions to ensure that such information is generated continuously and shared in a timely manner.



Annex: Selected references of analytical repositories

United Nations Office on Drugs and Crime

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- ◆ https://www.unodc.org/documents/scientific/Recommended_methods_for_the_identification_and_analysis_of_Fentanyl.pdf, (accessed 25.7.2018)
- ◆ https://www.unodc.org/documents/scientific/STNAR49_Synthetic_Cathinones_E.pdf, (accessed 25.7.2018)
- ◆ https://www.unodc.org/documents/scientific/STNAR48_Synthetic_Cannabinoids_ENG.pdf, (accessed 25.7.2018)
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- ◆ https://www.unodc.org/documents/scientific/validation_E.pdf, (accessed 25.7.2018)
- ◆ https://www.unodc.org/documents/scientific/Guidelines_Raman_Handheld_Field_identification_Devices.pdf, (accessed 25.7.2018)

European Customs Laboratories Network (CLEN)

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- ◆ https://www.policija.si/eng/images/stories/GPUNFL/PDF/PresumptiveColorTests-booklet_ENG.pdf, (accessed 25.7.2018)
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National Institute of Standards and Technology (NIST)

- ◆ National Institute of Standards and Technology (NIST), Chemistry WebBook at <https://webbook.nist.gov/chemistry/> (accessed 12.8.2018)
- ◆ National Institute of Standards and Technology (NIST), News. Data-Sharing Website May Speed Response to New Illegal Drugs - The 'NPS Data Hub' will help forensic chemists identify new types of fentanyl and other narcotics more quickly. 5 July 2018. <https://www.nist.gov/news-events/news/2018/07/data-sharing-website-may-speed-response-new-illegal-drugs> (accessed 11.7.2018)
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European Network of Forensic Science Institutes (ENFSI)

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Others

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- 4 Global SMART Bulletin for LAC No. 2: Early Warning Systems, <https://www.unodc.org/LSS/Attachment/Download/2fd89ea3-e39a-437c-9984-2427daa46da4>, (accessed 15.10.2019)
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- ◆ Resolution 54/3, Ensuring the availability of reference and test samples of controlled substances at drug testing laboratories for scientific purposes
 - ◆ Resolution 56/4, Enhancing international cooperation in the identification and reporting of new psychoactive substances
 - ◆ Resolution 57/9, Enhancing international cooperation in the identification and reporting of new psychoactive substances and incidents involving such substances
 - ◆ Resolution 58/9, Promoting the role of drug analysis laboratories worldwide and reaffirming the importance of the quality of the analysis and results of such laboratories
 - ◆ Resolution 59/3, Promoting informal networking within the scientific community and the sharing of scientific evidence-based findings that may inform policies and practices to address the world drug problem
 - ◆ Res. 61/3 Laboratory support for the implementation of the scheduling decisions of the CND.
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