European Monitoring Centre
for Drugs and Drug Addiction

TECHNICAL REPORT

An analysis of drugs in used syringes from sentinel European cities

Results from the ESCAPE project, 2018 and 2019

February 2021

Legal notice

PDF ISBN 978-92-9497-567-6 doi: 10.2810/100354 TD-04-21-057-EN-N

Luxembourg: Publications Office of the European Union, 2021

Recommended citation: European Monitoring Centre for Drugs and Drug Addiction (2021), *An analysis of drugs in used syringes from sentinel European cities: Results from the ESCAPE project, 2018 and 2019*, Technical report, Publications Office of the European Union, Luxembourg.

About this report

This report presents new findings from the ESCAPE network, based on the chemical analysis of the contents of used syringes across sentinel sites in Europe. Syringes were collected in 2018 and 2019 from the bins of street automatic injection-kit dispensers and at harm reduction services in eight European cities: Amsterdam, Budapest, Cologne, Helsinki, Lausanne, Oslo, Paris and Vilnius.

About the EMCDDA

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) is the central source and confirmed authority on drug-related issues in Europe. For over 25 years, it has been collecting, analysing and disseminating scientifically sound information on drugs and drug addiction and their consequences, providing its audiences with an evidence-based picture of the drug phenomenon at European level.

The EMCDDA's publications are a prime source of information for a wide range of audiences including: policymakers and their advisors; professionals and researchers working in the drugs field; and, more broadly, the media and general public. Based in Lisbon, the EMCDDA is one of the decentralised agencies of the European Union.

European Monitoring Centre for Drugs and Drug Addiction

Praça Europa 1, Cais do Sodré, 1249-289 Lisbon, Portugal
Tel. +351 211210200
info@emcdda.europa.eu | www.emcdda.europa.eu
twitter.com/emcdda | facebook.com/emcdda

Contents

Authors: The ESCAPE network (full list of names and institutions can be found on page 25).

ESCAPE at a glance

Objectives of the project

ESCAPE — the European Syringe Collection and Analysis Project Enterprise — aims to identify the range of substances being used by people who inject drugs in a small number of cities in Europe and to monitor changes in patterns of use over time. It is intended that this will provide timely, city-level data that can complement other information and indicators on drug consumption and potential emerging health threats in the region.

A growing network

A group of European researchers developed an innovative method to obtain information on injected substances by chemically analysing the residual content of used syringes and initiated a first round of data collection, conducted in six cities, in 2017. This report presents results from the second and third rounds of data collection, which took place in 2018 and 2019, respectively. Syringes were collected from the bins of street automatic injection-kit dispensers and at harm reduction services in eight European cities: Amsterdam (2019), Budapest (2018-19), Cologne (2018-19), Helsinki (2018-19), Lausanne (2018-19), Oslo (2019), Paris (2018-19) and Vilnius (2019). The contents of 988 (2018) and 1 330 (2019) used syringes were analysed in seven laboratories using chromatographic and spectroscopic methods.

Main results

Injected substances vary between and within cities. With the exception of Vilnius (2019), traces of stimulants (cocaine, amphetamines and synthetic cathinones) were found in a high proportion of the syringes tested in each of the cities. The proportion of syringes containing heroin was high and stable over time in half of the participating cities. Injection of opioid substitution medications, namely buprenorphine and methadone, as well as benzodiazepines, is common in Helsinki, Vilnius and Lausanne. In 2019, carfentanil, a very potent opioid, was detected in a third of syringes from Vilnius. Overall, a third of the syringes tested contained residues of two or more substances from different drug categories in 2018 and 2019, which confirms that people who inject drugs often inject more than one psychoactive substance. The most frequent combination was a mix of a stimulant and an opioid; benzodiazepines were often found in syringes that also contained traces of opioids.

Main limitations

The high proportion of syringes containing residues of stimulants could reflect a higher frequency of injecting among stimulant users than among non-stimulant users, rather than a higher prevalence of stimulant use than other drug use among people who inject drugs. Drugs found in syringes may originate from blood drawn into the syringe during an injection, that is, from drugs consumed prior to the injection, possibly through other modes of administration. It was not possible to distinguish a syringe containing residues of multiple drugs that had been used once from a syringe that had been reused by one or several users.

Key messages

The study provides local and timely information that can be used for city-level monitoring and interventions. The injection of stimulants has implications for the risk of blood-borne and sexually transmitted infections such

as HIV and hepatitis B and C viruses. The injection of potent opioids such as carfentanil, as well as the injection of multiple substances, elevates the risks of adverse health consequences and overdose deaths.

What's next?

The 2020 syringe collection campaign will include more sites and reach a total of 10 sentinel cities throughout Europe. It will also assess the impact, if any, that the coronavirus disease (COVID-19) pandemic has had on injecting drug use in these cities.

Study rationale

While evidence from drug treatment centres suggests that injecting drug use is declining among heroin clients in the European Union (EMCDDA, 2020b), the burden of disease associated with injecting remains high (Degenhardt et al., 2017). The risk of overdose death and infectious diseases associated with this mode of administration is also high. The injection of stimulants — including amphetamines, cocaine and synthetic cathinones — has been linked to increased risk of HIV and hepatitis C virus (HCV) transmission, through increased frequency of use and sharing of injecting paraphernalia (Arendt et al., 2019). Knowledge of what substances are being injected in a city or country is important to guide prevention strategies and plan the provision of treatment, as well as to inform law enforcement agencies. Furthermore, identifying associated risk factors, such as the use of multiple substances and/or the reuse of injecting material, is useful to assess and improve harm reduction interventions.

Available data on the substances injected by users are largely based on self-reports collected in drug treatment registries or ad hoc surveys. Data from drug treatment centres collated at the national level show that the majority of people entering treatment who report injection as their main mode of administration identify an opioid (usually heroin) as their primary problem drug. While these data are useful, they are generally available only after some delay. Moreover, people who inject drugs may not wish to disclose which substances they inject or may not be aware of the actual composition of the substances they inject. Little is known about people who inject drugs who are not reached by drug services. To address such gaps in the data, a group of European researchers developed an innovative method to obtain information on injected substances by analysing the residual content of discarded syringes collected from the bins of street automatic injection-kit dispensers or at harm reduction services (Néfau et al., 2015; Lefrançois et al., 2016).

The European Syringe Collection and Analysis Project Enterprise (ESCAPE) was established in 2017 by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), starting with a network of six sentinel European cities: Amsterdam, Budapest, Glasgow, Helsinki, Lausanne and Paris. It aimed to identify which drugs were injected in the participating cities by analysing the content of used syringes. A report on the first campaign was published by the EMCDDA (EMCDDA, 2019a). Since the first campaign, the network has been extended to include three additional cities: Cologne, Oslo and Vilnius. This report provides an overview of the main findings of the 2018 and 2019 campaigns, presenting persisting patterns and new trends at the city level.

Methods

Syringe collection, preparation and analysis

In each of the participating cities, a local research team was responsible for the sampling, collection and preparation of the syringes. The contents of the syringes were analysed locally, except in Amsterdam where syringes were sent to the Lausanne research team for analysis. Depending on the availability of potential sampling locations and the local context, between one and six collection sites were selected in each city to maximise geographical coverage.

The social and demographic characteristics of the people who inject drugs served by each site broadly reflected the heterogeneity found between and within European cities. The collection sites are described in Table 1. They included low-threshold facilities offering face-to-face needle and syringe programmes (NSPs), drug consumption rooms and street bins of automatic injection-kit dispensers.

Syringes were collected between March and April 2018 (second campaign) and May and August 2019 (third campaign). The research teams aimed to collect 150 syringes per city per campaign, equally distributed across sites, which were considered feasible yet sufficiently representative samples. The number of syringes collected per site depended on the number of sites selected in each city; the minimum required sample size per site per year was set at 30 syringes. Where possible, syringes were collected from different containers to minimise the risk of collecting too many syringes from the same person who injects drugs. When collecting used syringes from automatic injection-kit dispenser bins, the syringes in the bins were shuffled before sampling. Syringes with damaged barrels were excluded. Standard 1-ml syringes were collected at all sites. Large volume syringes (> 1 ml) were collected in Amsterdam, Helsinki, Oslo and Vilnius. In Oslo, the research team mainly collected and tested detachable needles (Gjerde et al., 2020). In Helsinki and Paris, needleless syringes were excluded, while, in Amsterdam, syringes with a crooked needle were excluded. In Helsinki, Lausanne and Paris, syringes were visually assessed to identify broken needles and erased graduation marks, which were considered proxies for attrition and possible indications of reuse.

To reduce the risks associated with handling used injection material, a number of safety precautions were taken, such as wearing personal protective equipment (including safety goggles, gowns and anti-scratch gloves), having access to a bleach basin and using sharps containers to recover syringes.

Syringes were transported from the collection sites to the laboratory within 48 hours of being deposited, to limit degradation of the content. Once in the laboratory, syringes were stored at 4 °C (for analysis within 48 hours) or at –20 °C (for analysis beyond 48 hours). Syringe contents were extracted with 1 ml of methanol: the syringe was filled and emptied five times and the contents were collected in a clean test tube (Figure 1). The recovered methanol solution was then filtered before analysis to eliminate solid particles, which could damage the analytical instruments.

FIGURE 1
Extraction of syringe contents for chemical analysis, ESCAPE, 2017-19

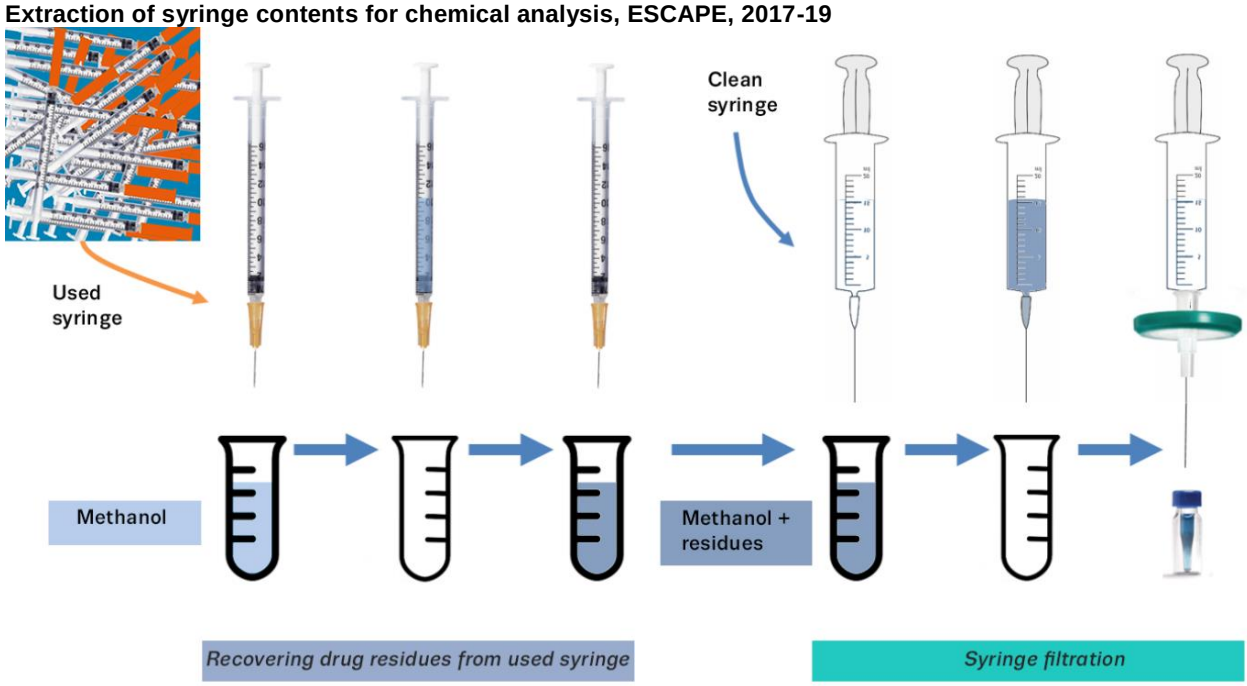


TABLE 1
Sociodemographic characteristics of populations living in the study sites and details of syringes analysed, 2017-19, ESCAPE network

City	Population	Estimated number of people who inject drugs	Number of sterile syringes distributed	Syringe collection sites	Number of syringes analysed			Type of syringes collected or restrictions (e.g. > 1-ml syringes excluded)
					2017	2018	2019	
Amsterdam	860 000 (density of 5 042/km²)	150-200	Not available	**2017:** three NSPs and two drug consumption rooms. One of the drug consumption rooms is located in the red-light district and also provides sterile syringes. It is the only drop-in centre with a shelter for women. The drug consumption room is located near the city centre and also aims to serve clients that are homeless and often economic refugees from other countries in the EU. Clients of these services are aged between 22 and 71 years and are socially vulnerable. Self-reported substance use includes use of heroin, cocaine, methadone, amphetamines, cannabis and alcohol. **2019:** the same three NSPs and two drug consumption rooms were used. In addition, five chemsex services near or in the city centre with needle dispensers on-site were sampled. Two of these are located in the red-light district and the other three are located within 500 metres of the city centre. Clients are men who have sex with men, aged 25-55.	112	n/a	150	Only 1-ml syringes
Budapest	2 000 000 (density of 3 314/km²)	6 000	2017: an estimated 115 500 syringes were distributed	**2017-18:** one face-to-face NSP. This low-threshold service is located in a neighbourhood with low socioeconomic conditions, where there is a concentration of homeless people and sex workers. The area is also popular among tourists. **2019:** two sites were added in 2019, both located in the west of the city. One service provides drug counselling and a face-to-face NSP. The other provides anonymous HIV and HCV screening and counselling, as well as a face-to-face NSP.	300	150	185	1-ml syringes

City	Population	Estimated number of	Number of sterile	Syringe collection sites	Number of syringes analysed			Type of syringes collected or
Cologne	1 081 701 (density of 2 700/km²)	6 600		**2018:** five NSPs. Two are in the city centre where there is an open drug scene; clients are mostly homeless people. Another one is located in a mixed business/residential area and clients are people who inject drugs with more stable socioeconomic situations. The other two NSPs are located in two different residential areas characterised by high rates of unemployment. **2019:** one of the five NSPs had been replaced by the 2019 campaign by a drug consumption room located in the city centre where there is an open drug scene and where clients are mostly homeless people.	n/a	167	146	No restrictions
Helsinki	643 272 (density of 3 002/km²)	8 500	2017: three of the five NSPs provided a total of 1 732 462 needles and syringes	**2017:** five NSPs. One site is in the eastern part of city centre, an area with social and health services for people who inject drugs, known for drug trade and drug users. A second site is in the northern part of the city centre, in a housing unit with 100 residents who suffer from substance abuse and/or mental health problems. A third site is located close to the city centre, near a similar housing unit. The two remaining sites are located further east, one in a business and residential area with an open drug scene and open drug trade, and the other in a residential area with a higher than average concentration of government tenant housing complexes. **2018-19:** same sites as in 2017, with one additional NSP site located in north-eastern Helsinki.	307	425	201	No restrictions
Lausanne	144 597 (density of 3 395/km²)	Not available	2015: 100 000 syringes were distributed	**2017-19:** there is only one automatic injection-kit dispenser bin in Lausanne. It is located in the central neighbourhood served by two metro stations. During daytime, people from diverse socioeconomic backgrounds use this area. In the evening, it has significant nightlife activity and hosts marginalised groups.	297	150	150	Only 1mL syringes
Oslo	681 000 (density of 1	1 550	2019: ~1.4 million needles	**2019:** three services, namely one NSP, one supervised injection room and one low-threshold service for people who	n/a	n/a	163	55 syringes and 108 needles (without

City	Population	Estimated number of	Number of sterile	Syringe collection sites	Number of syringes analysed			Type of syringes collected or
	532/ km²)		were distributed	inject drugs that is open 24 hours a day, offering medical services, help with social services, food and shelter.				syringe) were collected. No restrictions
Paris	2 220 445 (density 21 067/km²)	26 328 for the whole Paris region (Ile-de-France)	2015: 656 000 syringes were distributed	**2017-19:** five automatic injection-kit dispenser bins. Three sites are located next to train stations. In one of these sites, users of automatic injection-kit dispensers include low-income and homeless people who inject drugs. The other two stations are busy public transport hubs frequented by people from diverse socioeconomic backgrounds. The remaining two sites are located near metro stations in neighbourhoods with well-integrated populations. One of the latter is famous for its nightlife.	360	96	185	Only 1-ml syringes
Vilnius	541 212 (density 1 351/km^2)	~4 000 (3 239-4 572)	2019: 240 000 syringes were distributed	**2019**: three collection sites across Vilnius at low-threshold facilities where NSPs are implemented. These are the only facilities in Vilnius where syringes are collected.	n/a	n/a	150	No restrictions

Target substances

Syringes were tested for more than 120 drugs, depending on the analytical method used (see Appendix 1). In addition, syringes were screened for the presence of some metabolites, degradation products and adulterants (see the box 'Definitions used in the study'). Any syringe testing positive for 6-MAM (6-monoacetylmorphine, a metabolite of heroin) in the presence of morphine or codeine or meconin (degradation products of heroin) was assumed to have once contained heroin and was reclassified as a 'heroin syringe'. Inactive diluents and binders were not considered in this study. The list of substances tested for is provided in Appendix 1, which also details which cities performed each test.

The analytical methods employed in this project have been used previously in similar studies: gas chromatography (GC), ultra-high- or high-performance liquid chromatography (UHPLC or HPLC) coupled with mono or tandem mass spectrometry (MS or MS/MS) (Néfau et al., 2015; Lefrançois et al., 2016) (Table 2). In Cologne, Oslo and Paris, chemists used a target-compounds method, allowing them to detect only the compounds listed in Appendix 1. In Helsinki, the laboratory analysed each syringe with both targeted and non-targeted screening methods for the sensitive detection of over 1 200 compounds. Samples from Amsterdam, Budapest, Lausanne and Vilnius were analysed using a screening method that could potentially detect any compound, including all those listed in Appendix 1.

TABLE 2
Participating laboratories and laboratory methods, 2018 and 19, ESCAPE network

City	Laboratory	Analytical method	Laboratory techniques
Amsterdam	Unit of Forensic Toxicology and Chemistry, University Centre of Legal Medicine, Lausanne-Geneva	Screening method	**GC-MS**
Budapest	Toxicology Laboratory of the Institute of Forensic Medicine of the University of Debrecen	Screening method	**GC-MS**
Cologne	Institute of Forensic Medicine, Medical Centre, University of Freiburg	Targeted screening method	**HPLC-MS^n**
Helsinki	Forensic Toxicology Unit of the National Institute for Health and Welfare	Targeted and non-targeted screening methods (~1 200 drugs in database and possibility to detect unknown compounds)	**UHPLC-MS/MS UHPLC-QTOF/MS**
Lausanne	University Institutes at the University Centre of Legal Medicine, Lausanne-Geneva	Screening method	**GC-MS**
Oslo	Department of Forensic Sciences, Oslo University Hospital	Targeted screening method	**UHPLC-MS/MS**
Paris	Laboratory of Public health and Environment, Paris-Sud University	Targeted screening method	**HPLC-MS/MS**
Vilnius	Lithuanian Police Forensic Science Centre and Forensic Science Centre of Lithuania	Screening method	**GC-MS**

Note: QTOF/MS, quadrupole time-of-flight mass spectrometry; MS^n sequential mass spectrometry

All drugs were grouped according to their public health relevance and on the basis of their shared characteristics into 18 drug categories: cocaine, heroin, morphine, buprenorphine, naloxone, methadone, ketamine, amphetamines, fentanyl and derivatives, other opioids, synthetic cathinones, synthetic cannabinoids, benzodiazepines, piperidines, MDMA, other medications, other amphetamines and other drugs (see Appendix 1). Some drug categories (e.g. cocaine) include a single drug, while others (e.g. synthetic cathinones) include several drugs. The results of the 2018 and 2019 campaigns are presented by drug category. Only syringes that were positive for at least one psychoactive substance (excluding metabolites and adulterants) were included in the denominator for the computation of the proportions (main results shown in Figures 2 and 3). In the analysis, any syringe testing positive for 6-MAM in the presence of morphine or codeine or meconin was assumed to have once contained heroin and was reclassified as a 'heroin syringe' (see Definitions used in the study').

Definitions used in the study

Adulterant: a pharmacologically active compound that dealers mix with drugs to increase the volume of the product to maximise profits. For instance, levamisole — originally an anthelmintic medication, which has some antidepressant properties — is a common adulterant of cocaine. Pharmacologically inert diluents (such as sugar) were not screened for in this study.

By-product of production: drugs that are the result of the production process of another drug. For instance, codeine traces might be found in heroin.

Degradation product: a compound resulting from the natural breakdown of a drug over time. The degradation of a drug can occur in the syringe. For instance, heroin will naturally degrade into 6-MAM and morphine. In the analysis, any syringe testing positive for 6-MAM in the presence of morphine or codeine or meconin was assumed to have once contained heroin and was reclassified as a 'heroin syringe'.

Drug: a psychoactive substance consumed with the aim of altering the user's mood and perception, through its effect on the central nervous system.

Drug category: to simplify the presentation of results for the large number of substances covered in this study, drugs were grouped into 17 drug categories according to their public health relevance and on the basis of their shared characteristics. The categories may thus be based on a combination of chemical, pharmacological and use characteristics. For example, heroin and methadone are reported separately from 'other opioids' and 'other medications', respectively. Some drug categories (e.g. cocaine) include a single drug, while others (e.g. synthetic cathinones) include several drugs.

Metabolite: a residue of a drug after it is broken down in the body. Metabolites can be found in the blood, urine or faeces of users after consumption of the drug regardless of the route of administration. Blood containing metabolites can enter a syringe during injection. In this study, tests were carried out for metabolites of heroin (6-MAM), cocaine (benzoylecgonine) and benzodiazepines (7-aminoclonazepam). Some metabolites, for instance 6-MAM, can also result from degradation. Syringes testing positive for only metabolites were excluded from the analysis.

Results

Detected drugs

The 2018 campaign

In 2018, the research teams analysed a total of 988 syringes from five cities (Budapest, Cologne, Helsinki, Lausanne and Paris). At least one drug was found in 899 syringes (91 %), while 90 syringes (9 %) did not test positive for any drug; of these, 70 did not test positive for any substance screened for and 30 tested positive for only metabolites or adulterants. There are four possible explanations for none of the tested substances being detected in a syringe: the syringe had not been used; it had been used and then thoroughly washed; it had been used but any substance(s) had degraded to undetectable levels; or it had been used to inject substances such as pharmacologically inactive compounds or drugs not included in the screening protocol.

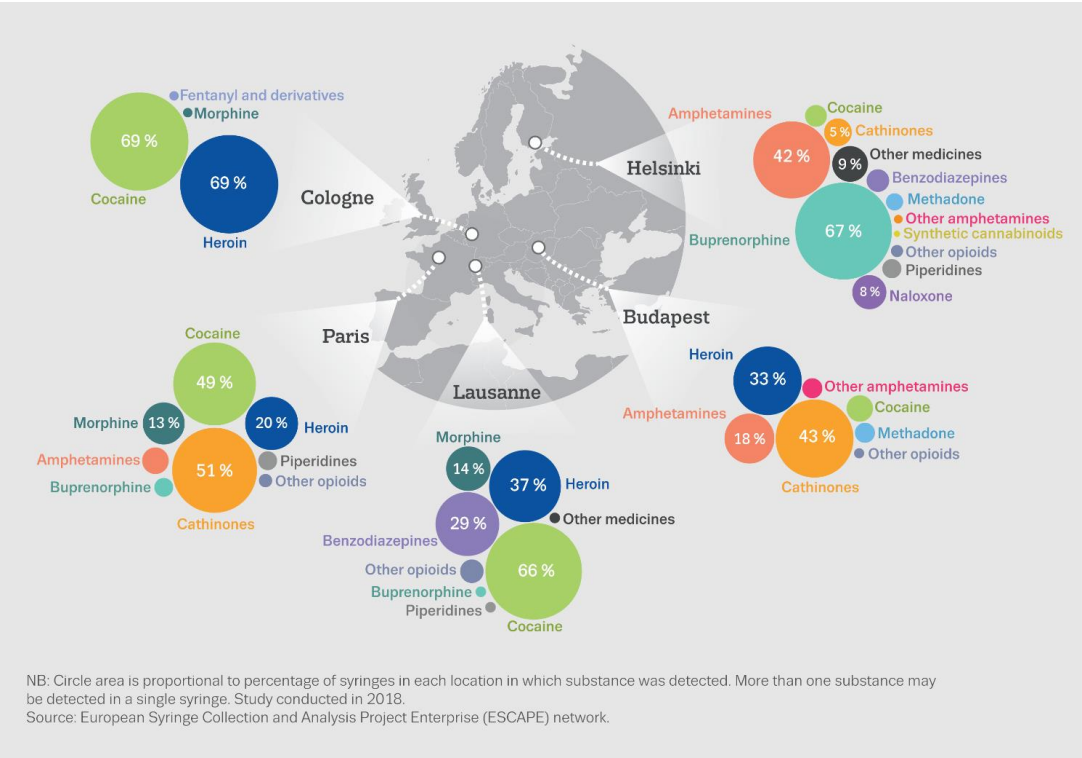
Traces of 48 different drugs were identified in the syringes analysed in the 2018 study. Overall, the drug categories most often found in the syringes were cocaine, heroin, cathinones, buprenorphine and amphetamines, with differences across cities (Figure 2). Cocaine was the most commonly detected drug in Cologne and Lausanne and was found in almost half of the syringes from Paris. Synthetic cathinones were found in half of the syringes from Paris and 43 % of the syringes from Budapest. In Helsinki, more than half of the samples tested positive for buprenorphine and 42 % for amphetamines. Heroin was found in half of the syringes from Cologne, 41 % of the syringes from Lausanne, 33 % of the syringes from Budapest and 20 % of the syringes from Paris. Benzodiazepines were found in a third of the syringes from Lausanne (Figure 2). Out of 899 syringes, 282 (31 %) contained multiple drugs (more than one) belonging to different drug categories.

The 2019 campaign

In 2019, the research teams analysed a total of 1 330 syringes from eight cities (Amsterdam, Budapest, Cologne, Helsinki, Lausanne, Oslo, Paris and Vilnius). At least one drug was found in 1 131 syringes (85 %), while 199 syringes (14 %) did not test positive for any drug; of these, 165 did not test positive for any substance screened for and 34 tested positive for only metabolites or adulterants.

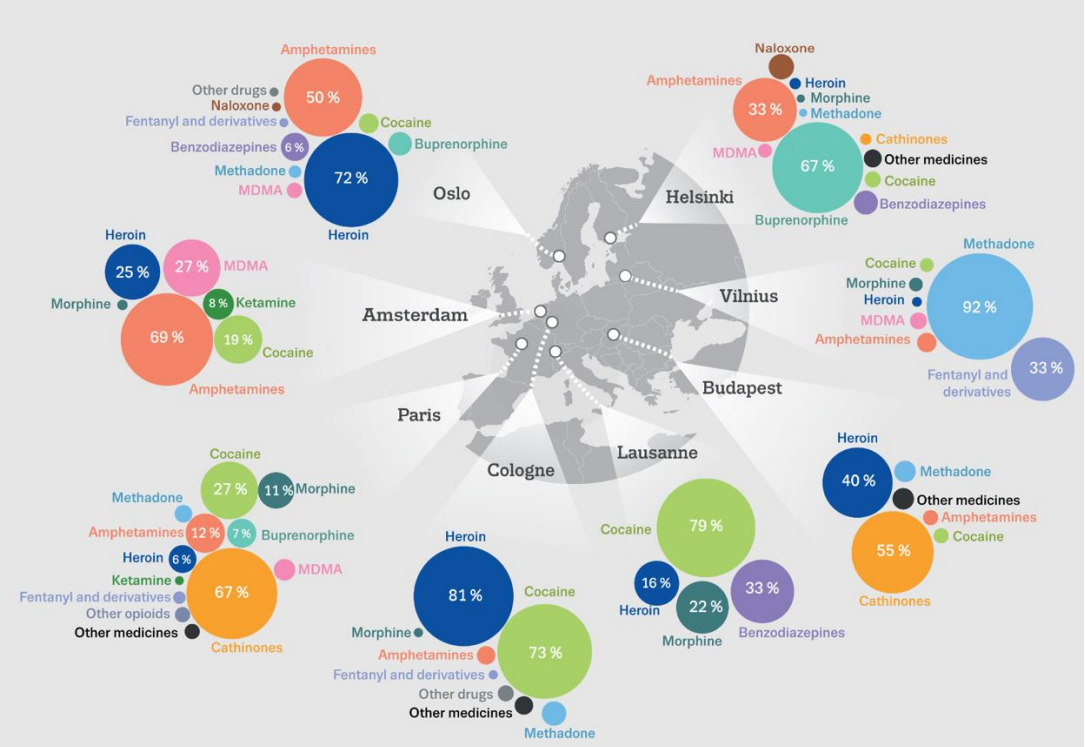
Traces of 41 different drugs were identified in the syringes analysed in the 2019 study. Overall, stimulants were found in the majority of syringes from Amsterdam (amphetamines), Budapest (synthetic cathinones), Cologne (cocaine), Paris (synthetic cathinones) and Lausanne (cocaine) (Figure 3). Opioids were found in the majority of syringes from Cologne (heroin), Helsinki (buprenorphine), Oslo (heroin) and Vilnius (methadone and carfentanil) (Figure 3). Out of 1 131 syringes, 358 (32 %) contained multiple drugs (more than one) belonging to different drug categories.

FIGURE 2
Percentage of syringes by detected drug category, by city, ESCAPE, 2018



NB: Circle area is proportional to percentage of syringes in each location in which substance was detected. More than one substance may be detected in a single syringe. Study conducted in 2018.
Source: European Syringe Collection and Analysis Project Enterprise (ESCAPE) network.

FIGURE 3
Percentage of syringes by detected drug category, by city, ESCAPE, 2019



NB: Circle area is proportional to percentage of syringes in each location in which substance was detected. More than one substance may be detected in a single syringe. Study conducted in 2019.
Source: European Syringe Collection and Analysis Project Enterprise (ESCAPE) network.

Some patterns confirmed

Although the number of syringes collected does not directly reflect the number of drug users injecting drugs and the collection sites might not be representative of all people who inject drugs in the participating cities, some of the overall patterns and regional specificities identified in the first ESCAPE campaign, in 2017 (European Monitoring Centre for Drugs and Drug Addiction, 2019), were confirmed by the 2018 and 2019 campaigns.

Regional specificities persist

Despite global and European markets for drugs, strong regional specificities in terms of injected drugs persisted throughout the ESCAPE campaigns. This can be seen in cities that participated in at least two campaigns. High proportions of both buprenorphine and amphetamine syringes were a stable feature across all collection campaigns in Helsinki. The proportions of syringes testing positive for cocaine in Lausanne (72 % in 2017, 66 % in 2018, 79 % in 2019) and Cologne (69 % in 2018, 72.6 % in 2019) were remarkably high and stable over time. Similarly, the presence of benzodiazepines in syringes from Lausanne (23 % in 2017, 29 % in 2018, 33 % in 2019) has been a recurrent local characteristic of the Swiss site. Many different drugs were detected in syringes from Paris (where all syringes were collected from automatic injection-kit dispenser bins), and the proportions of syringes testing positive for synthetic cathinones, cocaine, morphine and heroin were similar across campaigns. In Budapest, synthetic cathinones were the most commonly detected drug type in all three campaigns.

Stimulant injecting is found in most sites

The high proportion of syringes testing positive for stimulants was confirmed in 2018 and 2019 in all participating cities except for Vilnius. Commonly found stimulants in syringes included cocaine (Lausanne, Paris), synthetic cathinones (Budapest, Paris) and amphetamines (Helsinki). A high proportion of syringes containing stimulants was also observed in the two newly participating cities, joining in 2018 or 2019, with high proportions of syringes testing positive for cocaine in Cologne and for amphetamines in Oslo. These results suggest that injecting stimulants is a widespread practice among people who inject drugs in these European cities. Globally, injection of stimulants has recently been reported as a growing phenomenon and presents a major public health challenge (Farrell et al., 2019). The high prevalence of stimulants in syringes could be associated with a higher injecting frequency typical of stimulant use and with an increased level of HIV transmission (Giese et al., 2015; Arendt et al., 2019; McAuley et al., 2019).

In some cases, the presence of stimulants could also be the result of traces of blood containing stimulants being drawn into the syringe during injection but having been consumed prior to injection, possibly through other modes of administration. However, data from low-threshold services (NSPs, drug consumption rooms) and surveys also point to high levels of stimulant injection among people who inject drugs (EMCDDA, 2018a; Kapitány-Fövény and Rácz, 2018). The exception to this pattern is in Vilnius where amphetamines were the most commonly found stimulant in 2019, detected in only four out of 132 syringes (3 %) (see section below ‘Vilnius: carfentanil mixed with methadone’).

Opioid substitution medications and benzodiazepines are injected in some cities

Evidence shows that opioid substitution treatment reduces illicit opioid use, risk behaviour and mortality (EMCDDA, 2017). The main opioid substitution medications prescribed in Europe are methadone (63 % of

substitution treatment clients) and buprenorphine (35 %); slow-release oral morphine and diacetylmorphine (medical grade heroin) are used to a much lesser extent (3 %) (EMCDDA, 2019b). The diversion and misuse of opioid substitution medications have been reported (EMCDDA and Europol, 2019) and the presence of these substances in syringes may be an indication of such misuse.

As in 2017, buprenorphine was commonly found in syringes in the 2018 and 2019 campaigns in Helsinki (57 % in 2017, 67 % in 2018, 67 % in 2019) and to a lesser extent in Paris (8 % in 2017, 3 % in 2018, 7 % in 2019). In 2019, buprenorphine was also detected in seven syringes (4 %) from Oslo. While the rate of buprenorphine detection remains high in Helsinki, buprenorphine mixed with naloxone was lower in 2019 than in previous campaigns. The proportion of syringes containing naloxone dropped from 11 % in 2017 to 8 % in 2018 and 5 % in 2019. The main opioid substitution medication used in Finland is Suboxone®, which contains buprenorphine and naloxone (Kankaanpää et al., 2016). The 2019 results confirm that most of the buprenorphine that is injected in Helsinki is not diverted from locally prescribed medication, but seems to be smuggled from France via Sweden, as suggested by the evidence from drug seizures (EMCDDA and Europol, 2016).

Overall, few syringes containing methadone were found in 2017 and 2018, and the same picture emerged from the 2019 campaign, except in Vilnius. The injection of methadone syrup is difficult but has been documented; it requires dilution in water and also often requires the use of large-volume syringes (sometimes larger than 20 ml), which were not sampled in most of the study cities. The fact that buprenorphine is more commonly prescribed in France and that more than half of methadone clients in France receive the medication in the form of capsules designed to prevent injection (Roux et al., 2011) could explain why methadone was detected in only 2.5 % (4/161) of the syringes analysed in Paris. Methadone was detected for the first time in 2019 in seven syringes from Cologne (5 %). However, the most striking result for methadone comes from the 2019 campaign in Vilnius, where methadone was found in 92 % of syringes testing positive for any drug (see section below ‘Vilnius: carfentanil mixed with methadone’).

Evidence suggests that co-consumption of benzodiazepines increases the risk of overdose among high-risk opioid users; furthermore, injecting crushed and dissolved medications that are intended for oral administration puts users at higher risk of vascular complications and infections (Reynaud et al., 2002). While in Helsinki the detection of benzodiazepines was lower in 2018 (4 %) and 2019 (5 %) than in 2017 (11 %), it was higher and increased year on year in Lausanne (23 % in 2017, 29 % in 2018, 33 % in 2019). In Lausanne, all syringes testing positive for benzodiazepines in 2018 and 2019 contained midazolam. In Helsinki, there was greater variety, with midazolam, alprazolam, diazepam and temazepam being detected. In the 2019 campaign, benzodiazepines (clonazepam and alprazolam) were also detected in 10 needles (6 %) from Oslo.

Combination of substances: opioids with stimulants

Polydrug use can refer to the consumption of more than one drug by an individual over a certain period of time. It is associated with increased psychopathology, more risk behaviours, lower treatment adherence and worse health outcomes (Connor et al., 2014). Polydrug use is common among high-risk drug users. It includes simultaneous use (or co-use) of different drugs, such as the simultaneous injection of heroin and cocaine, known as ‘speedballing’. This pattern of use is difficult to assess with standard monitoring tools. The presence of multiple drugs in a syringe can be an indication of co-use and may help to identify commonly used combinations.

Overall, in 2018, 32 % (285/899) of syringes containing drugs had traces of drugs from two or more drug categories (not taking into account adulterants and metabolites): 26 % of the syringes contained traces of drugs from two categories, 5 % from three categories and 1 % from four or more categories. A very similar pattern was observed during the 2019 campaign: 32 % (358/1 131) of syringes testing positive contained traces of drugs from two or more drug groups, 26 % contained traces of drugs from two categories, 5 % from three categories and 1 % from four or more categories. In 2019, the proportions of syringes containing drugs from two or more drug categories were highest in Cologne (57 %) and lowest in Budapest (6 %).

The most frequently detected drug category combinations by city and year are shown in Table 3. Note that only the most frequently detected combinations are presented here; for example, in Cologne in 2019, a total of 65 syringes contained a mix of only cocaine and heroin; this does not include the four syringes analysed containing cocaine, heroin and methadone. For a more detailed description of combinations, see Appendix 3.

TABLE 3
Most frequently detected drug category combinations found in syringes, by city and year, ESCAPE network

City	Year	Most commonly detected drug combination	Number of syringes with most common combination	Total number of syringes	Percentage
Amsterdam	2018	n/a			
	2019	Amphetamines, MDMA	17	117	15 %
Budapest	2018	Amphetamines, other amphetamines	4	141	3 %
	2019	Cathinones, other medicines	3	108	3 %
Cologne	2018	Cocaine, heroin	60	163	37 %
	2019	Cocaine, heroin	65	146	45 %
Helsinki	2018	Amphetamines, buprenorphine	31	387	8 %
	2019	Amphetamines, buprenorphine	6	194	3 %
Lausanne	2018	Cocaine, heroin	14	128	11 %
	2019	Benzodiazepines, morphine	22	116	19 %
Oslo	2018	n/a			
	2019	Amphetamines, heroin	33	157	21 %
Paris	2018	Cathinones, cocaine	10	80	13 %
	2019	Amphetamines, cathinones	12	161	7 %
Vilnius	2018	n/a			
	2019	Fentanyl and derivatives, methadone	36	132	27 %

Combinations of opioids and stimulants were most common in Cologne (cocaine and heroin), Helsinki (amphetamines, buprenorphine), Lausanne (cocaine and heroin in 2018) and Oslo (amphetamines and heroin). Combinations of different stimulants were most common in Amsterdam (amphetamines and MDMA), Paris (cathinones with either cocaine or amphetamines) and to a lesser extent Budapest (amphetamines and other amphetamines (N-acetylamphetamine) in 2018). A mixture of opioids (fentanyl and methadone) was the most common combination found in Vilnius, while combinations involving benzodiazepines were common in Lausanne (benzodiazepines and morphine in 2019).

Changing patterns

In addition to the relatively stable patterns and regional specificities described above, the ESCAPE network has identified a number of potentially new patterns of use in the course of the campaigns. These findings must be interpreted with caution, as sites might not be representative, the sample size is small and in some cities collection sites have changed over time, meaning that any new patterns may reflect a different source population rather than an actual change in drug use. However, these changes are worth describing and interpreting.

Decline in cathinones and re-emergence of heroin in Budapest

In Budapest, synthetic cathinones were found in the majority (80 %) of syringes collected and analysed in 2017 (N-ethylhexedrone, 76 %; 4-chloro-alpha-PVP, 45 %). That same year, heroin was detected in only 6 % of syringes. Synthetic cathinones first appeared on the local drug market after the heroin shortage in 2011 and have since presented a substantial challenge for harm reduction services. For instance, the shift towards cathinones was linked to an increased frequency of injecting, the reuse and sharing of syringes and a higher HCV prevalence among stimulant users. The main cathinones injected in 2015 were pentedrone and MDPV (methylenedioxypyrovalerone) (Tarján et al., 2015). In the subsequent campaigns, however, the detection of synthetic cathinones declined along with the parallel re-emergence of heroin. Drugs of the synthetic cathinones group were still the most frequently detected but detection decreased from 80 % in 2017 to 43 % in 2018 and 55 % in 2019. In parallel, the proportion of syringes testing positive for heroin increased from 6 % in 2017 to 33 % in 2018 and 31 % in 2019. While N-ethylhexedrone and 4-chloro-alpha-PVP were the most frequently detected cathinones in the Hungarian capital in 2017 and 2018, 4-chloromethcathinone and mephedrone (4-MMC) topped the list in 2019. The relative decline in synthetic cathinones and the re-emergence of heroin during the three campaigns concur with the decrease in the proportion of syringes containing drugs from two or more drug categories (from 13 % in 2017 to 6 % in 2019).

Synthetic stimulants detected at new Amsterdam study sites

The results from the 2017 campaign in Amsterdam contrasted sharply with the 2019 results. In 2017, almost all syringes (95 %) collected from four low-threshold services contained heroin, with cocaine identified in 43 %. Two years later, amphetamines (69 %) and MDMA (26%) were the most frequently detected drug categories from syringes collected in the city. Ketamine was also detected in 8 % of syringes. The 2019 collection sites included five additional automatic injection-kit dispenser sites near services for men who have sex with men. Amphetamines and ketamine are drugs commonly associated with chemsex among men who have sex with men (Achterbergh et al., 2020). The results of the 2019 campaign therefore reflect a change in the source population, rather than a change in drug use patterns over time. In accordance with this, the four sites where the sampling of syringes had occurred in 2017 (three low-threshold services providing NSPs and one drug consumption room) showed a stable trend in heroin and cocaine detection between 2017 and 2019.

Injection of morphine replacing heroin in Lausanne

The only observed emerging trend in Switzerland was the decrease in heroin use (from 36 % in 2017 to 16 % in 2019), with heroin use seemingly having been replaced by morphine consumption (the proportion of syringes containing morphine without heroin metabolites or heroin by-products went up from 6 % in 2017 to 22 % in 2019). Opioid substitution treatment prescription practices have changed in Switzerland, with a relative decline in methadone prescriptions in favour of morphine prescriptions between 2015 and 2017 (2015: 85 % methadone, 6 % morphine; 2017: 68 % methadone, 19 % morphine) (Stadelmann et al., 2019). While the injection of morphine sulphate has already been reported in Paris (Cadet-Taïrou and Gandilhon, 2014; Lermenier-Jeannet et al., 2017), this pattern of use has not commonly been reported by low-threshold facility surveys conducted in Switzerland (Lociciro and Casalini, 2018). In the 2019 ESCAPE study, morphine was commonly found with midazolam (19 % of all syringes tested positive for this combination).

New sites

Vilnius: carfentanil mixed with methadone

The first collection campaign in Vilnius was conducted between June and July 2019. A total of 150 syringes were collected from three collection sites at low-threshold facilities where NSPs are implemented in the Lithuanian capital. At least one substance (including adulterants and metabolites) was found in 145 syringes; and 132 syringes contained at least one drug (excluding adulterants and metabolites). Methadone was detected in 92 % of syringes containing at least one drug (121/132), carfentanil (classified in the ‘fentanyl and derivatives’ drug category) was found in 33 % (43/132), methamphetamine (classified in the ‘amphetamines’ drug category) in 3 % (4/132), MDMA in 2 % (3/132), morphine in 2 % (2/132) and cocaine in 2 % (2/132). Diphenhydramine — classified in this study as an adulterant — was detected in 139 syringes. The combination of carfentanil and methadone was found in 36 syringes and was commonly mixed with diphenhydramine. This pattern was common to all three sites.

Fentanyl and derivatives, such as carfentanil, are highly potent synthetic opioids that are present on the European illicit drug market and have been linked to several fatal drug poisonings (EMCDDA, 2018b). The combination of carfentanil and methadone adulterated with diphenhydramine is known to the police in Vilnius. Forensic evidence suggests the carfentanil-methadone mixture is purchased by users from the same supplier. While heroin used to be the most commonly injected drug among people who inject drugs in Vilnius, it has been replaced in the last five years by synthetic opioids. Police seizures first indicated that heroin was being mixed with carfentanil in 2016. In 2017, police data showed that methadone was replacing heroin in the carfentanil mix. It is possible that syringes in which methadone was detected without fentanyl had contained a carfentanil-methadone mixture, but that the carfentanil was present at such low levels that it was not detectable by the laboratory methods used. While field workers in Vilnius have noted that some users inject medicines such as benzodiazepines while consuming alcohol (known among users as ‘fool’s cocktail’), no benzodiazepines were detected in syringes collected during the 2019 campaign.

Note that the other sites detecting fentanyl or derivatives were Cologne (one syringe containing fentanyl in 2018 (1 %) and one in 2019 (1 %)), Oslo (one needle containing fentanyl in 2019 (1 %)) and Paris (two syringes containing fentanyl in 2019 (1 %)).

Oslo: heroin and amphetamines

In Oslo, injecting material was collected for the first time in 2019 from three drug services: one NSP, one supervised injection room and one low-threshold service for people who inject drugs that is open 24 hours a day, offering medical services, help with social services, food and shelter. In Oslo, people who inject drugs usually bring only their needles back to the NSP site ('needle puck') rather than entire syringes. Therefore, the research team in the Norwegian capital collected and analysed 108 needles (without a syringe) and 55 syringes.

In total, heroin was detected in 72 % (n = 113) of injecting devices, amphetamines in 50 % (n = 78), benzodiazepines (clonazepam) in 6 % (n = 10) and buprenorphine in 4 % (n = 7). Needles or syringes containing a mixture of heroin and amphetamine were common (21 %, n = 33). Other drug combinations found in Oslo included mixtures of heroin, amphetamine and benzodiazepines (3 %, n = 5), and heroin and benzodiazepines (3 %, n = 5). Overall, these results confirmed the results from surveys conducted in Oslo (Gjersing, 2017) linking high-risk drug use to injecting mainly amphetamines and opioids, primarily heroin. These results also confirm the trend of amphetamine replacing methamphetamine in the country, reflecting changes in the illicit drug market. Police data have shown that, during 2010-2013, methamphetamine was more often seized than amphetamine. This was reversed in later years, with seizure activity in the first half of 2019 showing that 2 % of the total number of seizures were of methamphetamine, whereas 14 % were of amphetamine (Kripos, 2019).

One of the collection sites (the drug consumption room) showed a higher proportion of needles/syringes testing positive for heroin and a lower proportion of syringes testing positive for amphetamines than the other two sites. This can be explained by the fact that, until April 2019 (only 2 months before the collection), clients of the drug consumption room were allowed to inject only heroin. One needle tested positive for fentanyl mixed with heroin and one needle tested positive for tetrahydrocannabinol (THC), the principal psychoactive constituent of cannabis, most likely originating from traces of blood in the needle or from external contamination.

Cologne: heroin and cocaine

The team from Cologne joined the network in 2018. In the 2018 campaign, 163 out of the 167 syringes analysed tested positive for a drug. Cocaine (112 syringes, 69 %) and heroin (112 syringes, 69 %) were detected in an equal proportion of syringes, and were found together ('speedball') in 60 syringes (37 % of syringes containing at least one drug). Fentanyl was detected in one of the syringes containing cocaine and heroin. A similar picture emerged in 2019, when cocaine (106 syringes, 73 %) and heroin (118, 81 %) still dominated, with 78 syringes containing both drugs. The only syringe containing fentanyl also contained heroin, cocaine and doxepin. As in Oslo, one syringe tested positive for THC.

These results are broadly in line with data from a survey conducted in Cologne in 2013, five years before the first ESCAPE campaign, among 322 people who inject drugs recruited through respondent-driven sampling in the city (Wenz et al., 2016). At the time of the survey, 85 % of respondents reported using heroin in the last 30 days, 47 % cocaine, 2 % crack cocaine and 1 % methamphetamine. Cologne was also the city where German health authorities detected an increase in HIV infections among people who inject drugs occurring in 2018 (EMCDDA, 2020a). A total of 12 new HIV diagnoses were reported based on the analysis of laboratory data, which constituted an increase from previous years. The injection of stimulants has been associated with higher HIV risk as a result of higher levels of unsafe sex and unsafe injecting practices (Cavazos-Rehg et al.,

2009). The documented HIV outbreak among people who inject drugs in Cologne adds to the list of other recent HIV outbreaks potentially linked to an increase in stimulant injection: Dublin in 2014-15 (synthetic cathinones, alpha-PVP; Giese et al., 2015), Luxembourg in 2014-17 (cocaine; Arendt et al., 2019), Glasgow in 2015 (cocaine; McAuley et al., 2019) and Munich in 2016 (synthetic cathinones; EMCDDA, 2020a).

Limitations

The limitations described in the first ESCAPE report also apply to the 2018 and 2019 campaigns (EMCDDA, 2019a). The number of syringes collected and tested cannot be translated into a number of individual users. A small number of users could have contributed a disproportionately large number of syringes, for example users who had returned syringes to collection facilities in bulk. In addition, some syringes may have been used by several people. The method therefore does not measure prevalence of injecting nor does it necessarily provide the relative prevalence of use for different substances among people who inject drugs. For example, the high proportion of syringes containing residues of stimulants could reflect a higher frequency of injecting among stimulant users than among non-stimulant users, rather than a higher prevalence of stimulant use than other drug use among people who inject drugs. However, information obtained from other sources (surveys among people who inject drugs) tends to confirm the relative importance of stimulant injecting.

Drugs in syringes may degrade over time and might become undetectable. The time lag between injection and collection was unknown for syringes collected from street bins and low-threshold services. In drug consumption rooms, however, syringes were collected immediately after injection. In the case of heroin, metabolites and degradation products can indicate the presence of the drug in the syringes even after it has degraded, and it was possible to account for that in these studies. This does not apply to other substances, however, and therefore the presence of some drugs in syringes may have been underestimated.

There were several potential selection biases. First, the collection sites within a city were not necessarily representative of the city as a whole or of its population of people who inject drugs. Most locations were chosen because they hosted harm reduction services or automatic injection-kit dispensers. They were therefore representative of only the people who inject drugs using these services or automatic injection-kit dispensers. The studies described basic characteristics of the most likely source populations in each city, but it could not be ruled out that the syringes collected came from very specific subgroups of people who inject drugs, leading to different selection biases across collection sites. Likewise, the ESCAPE network is not necessarily representative of all European cities. Second, the exclusion criteria for syringes at collection and analysis varied slightly across sites. This might also have introduced a selection bias. Large-volume syringes (> 1 ml) were collected in Amsterdam, Helsinki, Oslo and Vilnius, but not in other cities. Some field reports suggest that larger syringes (2 ml) are the preferred choice for the injection of diverted opioid substitution medications. The study might therefore have underestimated the injection of opioid substitution medications in Budapest, Cologne, Lausanne and Paris.

The detection of a drug in a syringe indicates that the syringe may have been used to inject the drug. An alternative explanation is that the drug (or its metabolite) has come from traces of blood drawn into the syringe during an injection. In such a case, the user would have consumed the drug prior to the injection, possibly through other modes of administration (e.g. smoking, snorting). This study did not test for the presence of blood in syringes and it was therefore difficult to identify the exact source of the drug or metabolite. While this might have led to an overestimation of the prevalence of injected substances that are commonly smoked by

people who inject drugs, some elements suggest that this measurement bias is minimal. First, the sensitivity of the laboratory methods is expected to be higher for substances directly introduced by the syringe than for substances coming from traces of blood (personal communication from laboratory experts). Second, while cannabis is the most prevalent smoked drug in Europe (and assuming it is also common among people who inject drugs), the ESCAPE study sites that tested for THC found that very few syringes tested positive for it.

Within the scope of this study, it was not possible to distinguish a syringe containing multiple drugs that had been used once (simultaneous or co-use) from a syringe that had been reused by one user (polydrug use) or from a syringe that had been used by several users (sharing of syringes).

In terms of analysis, the main results presented are crude proportions based on relatively small sample sizes. No statistical tests for comparisons across cities or over time were applied. However, changes in collection sites over time were documented to assess whether changes in patterns over time were more likely to have been due to changes in the source population or to changes in the injecting practices of a given population.

Conclusions

The 2018 and 2019 campaigns have confirmed some major findings of the 2017 campaign and highlighted some new patterns of injecting drug use across a sample of European cities.

Overall, a wide range of substances are injected by people who inject drugs and strong differences between cities reflect the diversity and complexity of the European drug situation. This diversity is both geographical and temporal (changes over time). The geographical diversity means that tailored local public health responses are required to tackle local issues. The temporal diversity means that it is important to be aware of what is happening in other European cities to ensure adequate levels of preparedness (as changes in one city might occur in another city in the future).

While all injecting practices are associated with excess morbidity and mortality, two injecting patterns observed in the latest ESCAPE campaigns associated with specific health risks deserve particular attention. First, the high prevalence of stimulants (cocaine, synthetic cathinones) in syringes observed in most cities across all campaigns should alert public health professionals to the increased risk of acquiring blood-borne and sexually transmitted infections among users. This risk has already materialised in Glasgow (a participating city in 2017) and Cologne, where recent HIV outbreaks among people who inject drugs have been documented. Injecting stimulants typically requires increased provision of harm reduction interventions such as NSPs and an adaptation of services to deal with more unstable clients.

Second, carfentanil, a potent opioid, was detected in a large proportion of syringes from Vilnius, which joined the network in 2019. While the detection of fentanyl and its derivatives remains rare in other participating cities, the very high overdose risk associated with these substances, the dynamic nature of the European drug market and the US opioid crisis driven in part by fentanyl and its derivatives are sufficient reasons to be vigilant. Moreover, being a sentinel network with a limited number of collection sites, the ESCAPE network might not capture the full extent of the use of fentanyl and its derivatives for injecting. Public health responses to limit mortality related to the injection of fentanyl and its derivates include access to take-home naloxone (to prevent overdoses) and greater access to substitution treatment (to reduce injecting and harmful use).

The timely, laboratory-confirmed local data on injected substances and patterns of injection provided by the ESCAPE approach can help guide local responses. The results of the campaigns were disseminated locally in a number of ways. Summaries of the results were shared with participating low-threshold agencies, providing laboratory-confirmed information on substances injected to health and social workers, who can then adapt their prevention messages and interventions for drug users accordingly. Local reports were shared with the national focal points to triangulate the information obtained with other data sources at the local and national levels (treatment data, forensic analysis, wastewater data), providing additional analytical capacity to monitor drug use.

The ESCAPE approach complements existing monitoring tools but does not replace them. Well-designed observational studies, collecting behavioural data and qualitative information from interviews with drug users in low-threshold services, and using respondent-driven sampling are still the best tools to obtain information on many aspects of injecting, including the reuse and sharing of injecting equipment.

The 2020 ESCAPE campaign will include more sites and reach a total of 10 sentinel cities throughout Europe. It will assess the impact, if any, that the COVID-19 pandemic has had on injecting drug use. The network is also actively looking to broaden its geographical scope with new collaborations with EU neighbouring countries, from the Mediterranean region and eastern Europe, which are also facing evolving public health challenges linked to injecting drug use.

The ESCAPE network

City	Names	Institutions	Logo
Amsterdam	Tibor Brunt Toon Broeks	MAINline	
Cologne	Daniel Deimel	Catholic University of Applied Sciences, German Institute for Addiction and Prevention Research, Aachen	
	Jürgen Kempf	Institute of Forensic Medicine, Medical Centre, University of Freiburg	
Budapest	Klára Keveházi	Hungarian Interchurch Aid	
	József Csorba		
	Tamás Figeczki		
Helsinki	Teemu Gunnar Anne Arponen Anna Pelander Sanna Kyllönen	Finnish Institute for Health and Welfare	
Lausanne	Elodie Lefrançois Pierre Esseiva	University of Lausanne	
	Marc Augsburger	Lausanne University Hospital (CHUV)	
Oslo	Hallvard Gjerde Håvard Furuhaugen Lihn Bache-Andreassen Gerd-Wenche Brochmann	Oslo University Hospital	
	Anne Line Bretteville-Jensen Kristin Hanoa	Norwegian Institute of Public Health	

City	Names	Institutions	Logo
Paris	Sara Karolak Aziz Kinani Maya Bimbot Yves Levi	Paris-Sud University	
	Catherine Duplessy Julien Van der Elst Bienvenue Mbadu Kambu Thierry Grandidier	Association SAFE	
Vilnius	Jurgita Žilinskaitė	Drug, Tobacco and Alcohol Control Department	
	Aušra Širvinskienė	Republican Centre for Addictive Disorders	
	Kęstutis Rudaitis	Association Demetra	
Paris (Scientific coordination)	Victor Detrez	Observatoire Français des drogues et des toxicomanies	
Lisbon (Coordination)	Thomas Seyler Thomas Néfau Bruno Guarita	European Monitoring Centre for Drugs and Drug Addiction	

References

Achterbergh, R. C. A., Vries, H. J. C., Boyd, A., Davidovich, U., Drückler, S., Hoornenborg, E., Prins, M., et al. (2020), 'Identification and characterization of latent classes based on drug use among men who have sex with men at risk of sexually transmitted infections in Amsterdam, the Netherlands', *Addiction* 115(1), pp. 121-133.

Arendt, V., Guillorit, L., Origer, A., Sauvageot, N., Vaillant, M., Fischer, A., Goedertz, H., et al. (2019), 'Injection of cocaine is associated with a recent HIV outbreak in people who inject drugs in Luxembourg', *PLOS One* 14(5), pp. e0215570.

Cadet-Taïrou, A. and Gandilhon, M. (2014), *L'usage de sulfate de morphine par les usagers de drogues en France: tendances récentes 2012-2013*, Observatoire Français des Drogues et des Toxicomanies (OFDT), Paris (https://www.ofdt.fr/publications/collections/notes/lusage-de-sulfate-de-morphine-par-les-usagers-de-drogues-en-france-tendances-recentes-2012-2013/).

Cavazos-Rehg, P. A., Spitznagel, E. L., Schootman, M., Strickland, J. R., Afful, S. E., Cottler, L. B. and Bierut, L. J. (2009), 'Risky sexual behaviors and sexually transmitted diseases: a comparison study of cocaine-dependent individuals in treatment versus a community-matched sample', *AIDS Patient Care and STDs* 23(9), pp. 727-734.

Connor, J. P., Gullo, M. J., White, A. and Kelly, A. B. (2014), 'Polysubstance use: diagnostic challenges, patterns of use and health', *Current Opinion in Psychiatry* 27(4), doi:10.1097/YCO.0000000000000069

Degenhardt, L., Peacock, A., Colledge, S., Leung, J., Grebely, J., Vickerman, P., Stone, J., et al. (2017), 'Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: a multistage systematic review', *The Lancet Global Health* 5(12), pp. e1192-e1207.

EMCDDA (European Monitoring Centre for Drugs and Drug Addiction) (2017), *Health and social responses to drug problems: a European guide*, EMCDDA Manuals, Publications Office of the European Union, Luxembourg (http://www.emcdda.europa.eu/publications/manuals/health-and-social-responses-to-drug-problems-a-european-guide_en).

EMCDDA (2018a), *Recent changes in Europe's cocaine market: results from an EMCDDA trendspotter study*, Rapid Communications, Publications Office of the European Union, Luxembourg (http://www.emcdda.europa.eu/system/files/publications/10225/2018-cocaine-trendspotter-rapid-communication.pdf).

EMCDDA (2018b), *Carfentanil: report on the risk assessment of methyl 1-(2-phenylethyl)-4-[phenyl(propanoyl)amino]piperidine-4-carboxylate in the framework of the Council Decision on new psychoactive substances*, EMCDDA Risk Assessments 28, Publications Office of the European Union, Luxembourg (https://www.emcdda.europa.eu/publications/risk-assessments/carfentanil_en).

EMCDDA (2019a), *Drugs in syringes from six European cities: results from the ESCAPE project 2017*, Rapid Communications, Publications Office of the European Union, Luxembourg (https://www.emcdda.europa.eu/publications/rapid-communications/drugs-in-syringes-from-six-european-cities).

EMCDDA (2019b), *European drug report 2019: trends and developments*, Publications Office of the European Union, Luxembourg (https://www.emcdda.europa.eu/publications/edr/trends-developments/2019).

EMCDDA (2020a), *Drug-related infectious diseases in Europe: update from the EMCDDA expert network, 2020*, Technical Reports, Publications Office of the European Union, Luxembourg (https://www.emcdda.europa.eu/publications/technical-reports/drug-related-infectious-diseases-in-europe-update-from-emcdda-expert-network).

EMCDDA (2020b), *European drug report 2020: trends and developments*, Publications Office of the European Union, Luxembourg (https://www.emcdda.europa.eu/publications/edr/trends-developments/2020_en).

EMCDDA and Europol (2016), *EU drug markets report 2016: in-depth analysis*, Publications Office of the European Union, Luxembourg (https://www.emcdda.europa.eu/publications/joint-publications/eu-drug-markets-2016-in-depth-analysis_en).

EMCDDA and Europol (2019), *EU drug markets report 2019*, Publications Office of the European Union, Luxembourg (https://www.emcdda.europa.eu/publications/joint-publications/eu-drug-markets-report-2019).

Farrell, M., Martin, N. K., Stockings, E., Bórquez, A., Cepeda, J. A., Degenhardt, L., Ali, R., et al. (2019), 'Responding to global stimulant use: challenges and opportunities', *The Lancet* 394(10209), pp. 1652-1667.

Giese, C., Igoe, D., Gibbons, Z., Hurley, C., Stokes, S., McNamara, S., Ennis, O., et al. (2015), 'Injection of new psychoactive substance snow blow associated with recently acquired HIV infections among homeless people who inject drugs in Dublin, Ireland, 2015', *Eurosurveillance* 20(40), 30036.

Gjerde, H., Bretteville-Jensen, A. L., Furuhaugen, H., Bache-Andreassen, L., Bergh, M. S. and Vindenes, V. (2020), 'Determination of drug residues in used syringe needles', *Drug Testing and Analysis* 12(3), pp. 410-416.

Gjersing, L. (2017), 'Narkotikabruk på gateplan i syv norske byer 2017 [Street level substance use in seven Norwegian cities 2017]' (https://www.fhi.no/ml/rusmidler-og-avhengighet/narkotikabruk-pa-gateplan-i-syv-norske-byer-2017/).

Kankaanpää, A., Ariniemi, K., Heinonen, M., Kuoppasalmi, K. and Gunnar, T. (2016), 'Current trends in Finnish drug abuse: Wastewater based epidemiology combined with other national indicators', *Science of the Total Environment* 568, pp. 864-874.

Kapitány-Fövény, M. and Rácz, J. (2018), 'Synthetic cannabinoid and synthetic cathinone use in Hungary: a literature review', *Developments in Health Sciences* 1(3), pp. 63-69.

Kripos (2019), *Narkotikastatistikk 1. halvår 2019* [*Drug statistics for first half of 2019*], National Criminal Investigation Service, Oslo (https://www.politiet.no/globalassets/04-aktuelt-tall-og-fakta/narkotika/narkotikastatistikk_kripos_1_halvar-2019.pdf).

Lefrançois, E., Esseiva, P., Gervasoni, J.-P., Lucia, S., Zobel, F. and Augsburger, M. (2016), 'Analysis of residual content of used syringes collected from low threshold facilities in Lausanne, Switzerland', *Forensic Science International* 266, pp. 534-540.

Lermenier-Jeannet, A., Cadet-Taïrou, A. and Gautier, S. (2017), 'CAARUD client profiles and practices in 2015', *Tendance 120, OFDT, p.6*.

Lociciro, S. and Casalini, E. (2018), *Pointage annuel du profil des usagères et usagers des centres à bas seuil d'accès du canton de Vaud : PAPU 2017*, Institut universitaire de médecine sociale et préventive (IUMSP), Lausanne (https://www.iumsp.ch/fr/rds/289).

McAuley, A., Palmateer, N. E., Goldberg, D. J., Trayner, K. M. A., Shepherd, S. J., Gunson, R. N., Metcalfe, R., et al. (2019), 'Re-emergence of HIV related to injecting drug use despite a comprehensive harm reduction environment: a cross-sectional analysis', *The Lancet HIV* 6(5), pp. e315-e324.

Néfau, T., Charpentier, E., Elyasmino, N., Duplessy-Garson, C., Levi, Y. and Karolak, S. (2015), 'Drug analysis of residual content of used syringes: A new approach for improving knowledge of injected drugs and drug user practices', *International Journal of Drug Policy* 26(4), pp. 412-419.

Reynaud, M., Petit, G., Potard, D. and Courty, P. (2002), 'Six deaths linked to concomitant use of buprenorphine and benzodiazepines', *Addiction* 93(9), pp. 1385-1392.

Roux, P., Carrieri, M. P., Keijzer, L. and Dasgupta, N. (2011), 'Reducing harm from injecting pharmaceutical tablet or capsule material by injecting drug users', *Drug and Alcohol Review* 30(3), pp. 287-290.

Stadelmann, S., Amiguet, M., Lociciro, S. and Samitca, S. (2019), *Traitements agonistes opioïdes dans le canton de Vaud : Suivi épidémiologique entre 2015 et 2017*, Unisanté, Lausanne (https://www.unisante.ch/fr/formation-recherche/recherche/publications/raisons-sante/raisons-sante-301).

Tarján, A., Dudás, M., Gyarmathy, V. A., Rusvai, E., Tresó, B. and Csohán, Á. (2015), 'Emerging risks due to new injecting patterns in Hungary during austerity times', *Substance Use & Misuse* 50(7), pp. 848-858.

Wenz, B., Nielsen, S., Gassowski, M., Santos-Hövener, C., Cai, W., Ross, R. S., Bock, C. T. et al. (2016), 'High variability of HIV and HCV seroprevalence and risk behaviours among people who inject drugs: results from a cross-sectional study using respondent-driven sampling in eight German cities (2011-14)', *BMC Public Health* 16(1), pp. 927.

Appendices

APPENDIX 1

List of drugs, adulterants and metabolites tested for, by city, ESCAPE 2018-19

Drug category, metabolite or adulterant	Drug/substance ([1])	Amsterdam	Budapest	Cologne	Helsinki	Lausanne	Oslo	Paris	Vilnius
Amphetamines	**Amphetamine**	x	x	x	x	x	x	x	x
	Methamphetamine	x	x	x	x	x	x	x	x
Cocaine	**Cocaine**	x	x	x	x	x	x	x	x
Heroin	**Heroin**	x	x	x	x	x	x	x	x
Morphine	**Morphine**	x	x	x	x	x	x	x	x
Buprenorphine	**Buprenorphine**	x	x	x	x	x	x	x	x
Naloxone	Naloxone	x	x	x	x	x	x	x	x
Methadone	**Methadone**	x	x	x	x	x	x	x	x
Fentanyl and derivatives	3-Methylfentanyl	x	x	x	x	x			x
	4-Chloro-isobutyrfentanyl	x	x	x	x	x	x		x
	4-Fluoro-isobutyryl fentanyl	x	x	x	x	x	x		x
	4-Methoxy-butyryl fentanyl	x	x	x	x	x	x		x
	Acetylfentanyl	x	x	x	x	x	x	x	x
	Acrylfentanyl	x	x	x	x	x	x		x
	Alfentanil	x	x	x	x	x	x		x
	Butyrylfentanyl	x	x	x	x	x	x		x
	Carfentanil	x	x	x	x	x	x	x	x
	Cyclopentylfentanyl	x	x	x	x	x			x
	Cyclopropylfentanyl	x	x		x	x	x		x
	Despropionylfentanyl	x	x		x	x			x
	Fentanyl	x	x	x	x	x	x	x	x
	Furanyl fentanyl	x	x	x	x	x	x	x	x
	Ocfentanyl	x	x	x	x	x	x	x	x
	ortho-Fluorofentanyl	x	x	x	x	x			x
	Valerylfentanyl	x	x	x	x	x	x		x
Other opioids	AH-7921	x	x	x	x	x			x
	Codeine	x	x	x	x	x	x	x	x
	Dihydrocodeine	x	x	x	x	x			x
	Hydrocodone	x	x	x	x	x			x
	Isotonitazene		x		x				x
	Oxycodone	x	x	x	x	x			x
	Tramadol	x	x	x	x	x	x	x	x
	U-47700	x	x	x	x	x		x	x
Cathinones	**3-MMC**	x	x	x	x	x	x	x	x
	3,4-DMMC	x	x	x	x	x			x
	4-Chloro-alpha-PVP	x	x	x	x	x			x
	4-Chloroethcathinone	x	x	x	x	x			x
	4-Chloromethcathinone	x	x	x	x	x			x
	4-Chloro-alpha-PPP		x	x	x				x
	4-Chloro-Pentedrone		x		x				x
	4-Fluoro-alpha-PVP	x	x	x	x	x			x
	4-MEC	x	x	x	x	x	x	x	x
	Alpha-PBP		x		x				x
	alpha-PEP (PV8)	x	x	x	x	x			x
	alpha-PHP	x	x	x	x	x			x
	alpha-PHPp	x	x	x	x	x			x
	alpha-PVP	x	x	x	x	x	x	x	x
	Alpha-PVT		x	x	x				x
	bk-MDDMA	x	x	x	x	x			x
	Buphedrone (MABP)	x	x	x	x	x			x
	Butylone (bk-MDMB)	x	x	x	x	x			x
	Dipentylone		x		x				x

Drug category, metabolite or adulterant	Drug/substance ([1])	Amsterdam	Budapest	Cologne	Helsinki	Lausanne	Oslo	Paris	Vilnius
	Ephylone (bk-EBDB)		x	x	x				x
	Ethylone (bk-MDEA)	x	x	x	x	x			x
	F-alpha-PHP	x	x		x	x			x
	MDPBP	x	x	x	x	x			x
	MDPPP		x	x	x				x
	MDPV	x	x	x	x	x	x	x	x
	Mephedrone (4-MMC)	x	x	x	x	x	x	x	x
	Methedrone (bk-PMMA)	x	x	x	x	x			x
	Methylone	x	x	x	x	x	x	x	x
	Mexedrone	x	x	x	x	x			x
	N-acetyl mephedrone		x		x				x
	N-ethyl-pentedrone		x		x				x
	Naphyrone	x	x	x	x	x			x
	N-ethylhexedrone	x	x	x	x	x			x
	N-ethylnorpentedrone		x		x				x
	Pentedrone	x	x	x	x	x	x	x	x
Synthetic cannabinoids	4CN-Cumyl-BINACA		x		x				x
	5F-APINACA	x	x		x	x	x		x
	5F-MDMB-PINACA	x	x		x	x			x
	5F-PB-22	x	x		x	x	x		x
	AB-CHMINACA	x	x		x	x			x
	AB-FUBINACA	x	x		x	x			x
	AMB-FUBINACA	x	x		x	x			x
	MMB-CHMINACA		x		x				x
Benzodiazepines	3OH-Phenazepam	x	x	x	x	x			x
	Alprazolam	x	x	x	x	x	x	x	x
	Bromazepam	x	x	x	x	x			x
	Chlordiazepoxide	x	x	x	x	x			x
	Clobazam	x	x	x	x	x			x
	Clonazepam	x	x	x	x	x	x	x	x
	Clonazolam	x	x	x	x	x			x
	Delorazepam	x	x	x	x	x			x
	Deschloroetizolam	x	x	x	x	x			x
	Desmethyldiazepam	x	x	x	x	x	x		x
	Diazepam	x	x	x	x	x	x	x	x
	Diclazepam	x	x	x	x	x	x		x
	Etizolam	x	x	x	x	x	x	x	x
	Flubromazepam	x	x	x	x	x	x		x
	Flubromazolam	x	x	x	x	x	x		x
	Flunitrazepam	x	x	x	x	x	x	x	x
	Lorazepam	x	x	x	x	x			x
	Lormetazepam	x	x	x	x	x			x
	Meclonazepam	x	x	x	x	x			x
	Metizolam	x	x	x	x	x			x
	Midazolam	x	x	x	x	x	x	x	x
	Nifoxipam	x	x	x	x	x			x
	Nitrazepam	x	x	x	x	x	x		x
	Oxazepam	x	x	x	x	x	x	x	x
	Phenazepam	x	x	x	x	x	x		x
	Pyrazolam	x	x	x	x	x			x
	Temazepam	x	x	x	x	x		x	x
Piperidines	2-DPMP		x	x	x				x
	3,4-CTMP		x		x				x
	4-Fluoro-methylphenidate	x	x	x	x	x			x
	Ethylphenidate	x	x	x	x	x	x	x	x
	Methylphenidate	x	x	x	x	x	x	x	x
MDMA	MDA	x	x	x	x	x		x	x
	MDEA	x	x	x	x	x		x	x

Drug category, metabolite or adulterant	Drug/substance ([1])	Amsterdam	Budapest	Cologne	Helsinki	Lausanne	Oslo	Paris	Vilnius
	MDMA	x	x	x	x	x	x	x	x
Ketamine	**Ketamine**	x	x	x	x	x	x	x	x
Other medicines	Bupropion	x	x	x	x	x			x
	Carbamazepine	x	x	x	x	x			x
	Doxepin		x	x	x				x
	Etorecoxib		x		x				x
	Gabapentin	x	x	x	x	x			x
	Methiopropamine	x	x	x	x	x	x	x	x
	Methotrexate	x	x	x	x	x		x	x
	Piracetam		x	x	x				x
	Pregabalin	x	x	x	x	x			x
	Propranolol		x	x	x				x
	Quetiapine	x	x	x	x	x			x
	Sertraline		x	x	x				x
	Tiapride	x	x	x	x	x			x
	Tizanidine	x	x	x	x	x			x
	Zolpidem	x	x	x	x	x	x	x	x
	Zopiclone	x	x	x	x	x	x	x	x
Other amphetamines	3-Fluoromethamphetamine	x	x		x	x			x
	4-Fluoro-amphetamine	x	x	x	x	x		x	x
	F-ethamphetamine		x		x				x
	N-acetylamphetamine		x		x				x
	N-propylamphetamine	x	x		x	x			x
	PMA	x	x	x	x	x			x
	PMMA	x	x		x	x			x
Other drugs	5-EAPB	x	x	x	x	x		x	x
	Amisulpride		x	x	x				x
	Mephtetramine	x	x	x	x	x			x
	THC	x	x	x	x	x	x		x
Metabolites and degradation products	**6-monoacetylmorphine (heroin)**	x	x	x	x	x	x	x	x
	Meconin (opiate)	X	x	x					x
	7-Aminoclonazepam (clonazepam)	x	x	x	x	x	x		x
	7-Aminoflunitrazepam (flunitrazepam)	x	x	x	x	x	x		x
	7-Aminonitrazepam (nitrazepam)		X	x	x		x		x
	10-Monohydroxycarbamazepine (carbamazepine)	x	x		x	x			x
	α-Hydroxy-alprazolam (alprazolam)	x	x	x	x	x			x
	α-Hydroxy-midazolam (midazolam)	x	x	x	x	x			x
	Acetylcodeine (heroine)	x	x	x	x	x			x
	Amphetamine AC		x						x
	Benzoylecgonine (cocaine)	x	x	x	x	x	x	x	x
	Ecgonine methyl ester		x	x				x	x
	EDDP (methadone)	x	x	x	x	x			x
	HMMA (MDMA)	x	x		x	x			x
	Hydrocotarnine		x						x
	Metamizole breakdown		x	x					x
	N-[2-(3,4-methylenedioxyphenyl)-1-methylvinyl]-N,N-dimethylamine		x						x
	Nicotine		x	x					x
	Norbuprenorphine (buprenorphine)	x	x	x	x	x			x
	Norcocaine		x	x					x
	Norcodeine		x	x					x
	Normorphine		x	x					x
	Noscapine		x	x					x
	O-desmethyltramadol (tramadol)	x	x	x	x	x			x
	Ritalinic acid		x	x	x				x
	Thebromine		x	x					x
	Theophylline		x	x					x

Drug category, metabolite or adulterant	**Drug/substance** ([1])	**Amsterdam**	**Budapest**	**Cologne**	**Helsinki**	**Lausanne**	**Oslo**	**Paris**	**Vilnius**
Adulterants	Caffeine	x	x	x		x			x
	Dextromethorphan	x	x	x	x	x	x	x	x
	Dibutylhydroxytoluene		x						x
	Dimethylsulfone		x						x
	Diphenhydramine		x	x	x				x
	Griseofulvine	x	x	x		x			x
	Hydroxyzine	x	x	x	x	x			x
	Levamisole	x	x	x	x	x	x	x	x
	Lidocaine	x	x	x		x			x
	Papaverin		x	x					x
	Paracetamol	x	x	x		x			x
	Phenacetin	x	x	x		x			x
	Procaine		x	x					x

([1]) Substances in bold are included in the minimum required list of substances to be tested for in laboratory analysis.

APPENDIX 2

Number and percentage of syringes by drug category and substance detected, by city, ESCAPE 2018

Drug category, metabolite or adulterant	Drug/substance ([1])	Budapest (N = 141) ([2])		Cologne (N = 163) ([2])		Helsinki (N = 387) ([2])		Lausanne (N = 128) ([2])		Paris (N = 80) ([2])	
		Count	%	Count	%	Count	%	Count	%	Count	%
Amphetamines	Amphetamine	25.0	17.7	0.0	0.0	155.0	40.1	0.0	0.0	4.0	5.0
	Methamphetamine	0.0	0.0	0.0	0.0	96.0	24.8	0.0	0.0	0.0	0.0
	Total	**25.0**	**17.7**	**0.0**	**0.0**	**163.0**	**42.1**	**0.0**	**0.0**	**4.0**	**5.0**
Cocaine	**Cocaine**	**7.0**	**5.0**	**112.0**	**68.7**	**13.0**	**3.4**	**85.0**	**66.4**	**39.0**	**48.8**
Heroin	**Heroin ([3])**	**47.0**	**33.3**	**112.0**	**68.7**	**0.0**	**0.0**	**47.0**	**36.7**	**16.0**	**20.0**
Morphine	**Morphine**	**0.0**	**0.0**	**1.0**	**0.6**	**0.0**	**0.0**	**18.0**	**14.1**	**10.0**	**12.5**
Buprenorphine	**Buprenorphine**	**0.0**	**0.0**	**0.0**	**0.0**	**258.0**	**66.7**	**1.0**	**0.8**	**2.0**	**2.5**
Naloxone	**Naloxone**	**0.0**	**0.0**	**0.0**	**0.0**	**32.0**	**8.3**	**0.0**	**0.0**	**0.0**	**0.0**
Methadone	**Methadone**	**4.0**	**2.8**	**0.0**	**0.0**	**8.0**	**2.1**	**0.0**	**0.0**	**0.0**	**0.0**
Fentanyl and derivatives	Fentanyl	0.0	0.0	1.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
	Total ([1])	**0.0**	**0.0**	**1.0**	**0.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Other opioids	Codeine	1.0	0.7	0.0	0.0	0.0	0.0	5.0	3.9	1.0	1.3
	Oxycodone	0.0	0.0	0.0	0.0	4.0	1.0	0.0	0.0	0.0	0.0
	Total	**1.0**	**0.7**	**0.0**	**0.0**	**4.0**	**1.0**	**5.0**	**3.9**	**1.0**	**1.3**
Cathinones	3-MMC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.0	41.3
	4-Chloro-alpha-PVP	34.0	24.1	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	4-Chloroethcathinone	9.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4-Chloromethcathinone	9.0	6.4	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	4-Chloro-alpha-PPP	1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4-Chloro-Pentedrone	1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4-Fluoro-alpha-PVP	0.0	0.0	0.0	0.0	5.0	1.3	0.0	0.0	0.0	0.0
	4-MEC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	18.8

Drug category, metabolite or adulterant	Drug/substance ([1])	Budapest (N = 141) ([2])		Cologne (N = 163) ([2])		Helsinki (N = 387) ([2])		Lausanne (N = 128) ([2])		Paris (N = 80) ([2])	
	alpha-PBP	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	alpha-PEP (PV8)	0.0	0.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0
	alpha-PHP	0.0	0.0	0.0	0.0	10.0	2.6	0.0	0.0	0.0	0.0
	alpha-PVP	0.0	0.0	0.0	0.0	11.0	2.8	0.0	0.0	0.0	0.0
	alpha-PVT	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	Butylone (bk-MBDB)	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	Dipentylone	13.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ephylone (bk-EBDB)	0.0	0.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0
	F-alpha-PHP	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	MDPBP	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	MDPPP	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	MDPV	0.0	0.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0
	Mephedrone (4-MMC)	10.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	N-acetyl mephedrone	1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	N-ethylhexedrone	44.0	31.2	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0
	Total	**61.0**	**43.3**	**0.0**	**0.0**	**21.0**	**5.4**	**0.0**	**0.0**	**41.0**	**51.3**
Synthetic cannabinoids	MMB-CHMINACA	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	Total	**0.0**	**0.0**	**0.0**	**0.0**	**1.0**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**
Benzodiazepines	Diazepam	0.0	0.0	0.0	0.0	9.0	2.3	0.0	0.0	0.0	0.0
	Midazolam	0.0	0.0	0.0	0.0	4.0	1.0	37.0	28.9	0.0	0.0
	Temazepam	0.0	0.0	0.0	0.0	9.0	2.3	0.0	0.0	0.0	0.0
	Total	**0.0**	**0.0**	**0.0**	**0.0**	**14.0**	**3.6**	**37.0**	**28.9**	**0.0**	**0.0**
Piperidines	Ethylphenidate	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	Methylphenidate	0.0	0.0	0.0	0.0	10.0	2.6	1.0	0.8	2.0	2.5
	Total	**0.0**	**0.0**	**0.0**	**0.0**	**10.0**	**2.6**	**1.0**	**0.8**	**2.0**	**2.5**
MDMA	**MDMA**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Ketamine	**Ketamine**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Drug category, metabolite or adulterant	Drug/substance ([1])	Budapest (N = 141) ([2])		Cologne (N = 163) ([2])		Helsinki (N = 387) ([2])		Lausanne (N = 128) ([2])		Paris (N = 80) ([2])	
Other medicines	Bupropion	0.0	0.0	0.0	0.0	8.0	2.1	0.0	0.0	0.0	0.0
	Etorecoxib	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	Gabapentin	0.0	0.0	0.0	0.0	6.0	1.6	0.0	0.0	0.0	0.0
	Pregabalin	0.0	0.0	0.0	0.0	11.0	2.8	0.0	0.0	0.0	0.0
	Propranolol	0.0	0.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0
	Sertraline	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0
	Tizanidine	0.0	0.0	0.0	0.0	5.0	1.3	0.0	0.0	0.0	0.0
	Zolpidem	0.0	0.0	0.0	0.0	3.0	0.8	1.0	0.8	0.0	0.0
	Total	**0.0**	**0.0**	**0.0**	**0.0**	**35.0**	**9.0**	**1.0**	**0.8**	**0.0**	**0.0**
Other drugs	**Total**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Other amphetamines	F-ethamphetamine	0.0	0.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0
	N-acetylamphetamine	4.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**4.0**	**2.8**	**0.0**	**0.0**	**2.0**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**
Metabolites and degradation products	Benzoylecgonine	0.0	0.0	102.0	62.6	6.0	1.6	0.0	0.0	0.0	0.0
	Ritalinic acid	0.0	0.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0
	Total	**0.0**	**0.0**	**102.0**	**62.6**	**8.0**	**2.1**	**0.0**	**0.0**	**0.0**	**0.0**
Adulterants	Caffeine	82.0	58.2	102.0	62.6	0.0	0.0	65.0	50.8	0.0	0.0
	Hydroxyzine	0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.1	0.0	0.0
	Levamisole	1.0	0.7	24.0	14.7	3.0	0.8	70.0	54.7	0.0	0.0
	Lidocaine	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.3	0.0	0.0
	Paracetamol	48.0	34.0	112.0	68.7	0.0	0.0	32.0	25.0	0.0	0.0
	Phenacetin	0.0	0.0	5.0	3.1	0.0	0.0	61.0	47.7	0.0	0.0
	Total	**97.0**	**68.8**	**128.0**	**78.5**	**3.0**	**0.8**	**101.0**	**78.9**	**0.0**	**0.0**

([1]) Totals can be less than the sum of positive counts within the drug category, since one syringe can contain more than one substance from the same category.
([2]) N refers to the number of syringes testing positive for drugs from at least one drug category (excluding syringes testing positive exclusively for metabolites, degradation products and/or adulterants).
([3]) Includes reclassification based on combinations of 6-MAM (a metabolite of heroin) with morphine or codeine or meconin (degradation products of heroin).

Number and percentage of syringes by drug category and substance detected, by city, ESCAPE 2019

Drug category, metabolite or adulterant	Drug/substance ([1])	Amsterdam (N = 117) ([2])		Budapest (N = 108) ([2])		Cologne (N = 146) ([2])		Helsinki (N = 194) ([2])		Lausanne (N = 116) ([2])		Oslo (N = 157) ([2])		Paris (N = 161) ([2])		Vilnius (N = 132) ([2])	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Amphetamines	Amphetamine	1.0	0.9	2.0	1.9	4.0	2.7	60.0	30.9	0.0	0.0	77.0	49.0	0.0	0.0	2.0	1.5
	Methamphetamine	80.0	68.4	0.0	0.0	0.0	0.0	19.0	9.8	0.0	0.0	7.0	4.5	20.0	12.4	3.0	2.3
	Total	**81.0**	**69.2**	**2.0**	**1.9**	**4.0**	**2.7**	**64.0**	**33.0**	**0.0**	**0.0**	**78.0**	**49.7**	**20.0**	**12.4**	**4.0**	**3.0**
Cocaine	**Cocaine**	**22.0**	**18.8**	**2.0**	**1.9**	**106.0**	**72.6**	**4.0**	**2.1**	**92.0**	**79.3**	**5.0**	**3.2**	**43.0**	**26.7**	**2.0**	**1.5**
Heroin	**Heroin ([3])**	**29.0**	**24.8**	**43.0**	**39.8**	**118.0**	**80.8**	**2.0**	**1.0**	**19.0**	**16.4**	**113.0**	**72.0**	**10.0**	**6.2**	**1.0**	**0.8**
Morphine	**Morphine**	**1.0**	**0.9**	**0.0**	**0.0**	**1.0**	**0.7**	**1.0**	**0.5**	**26.0**	**22.4**	**0.0**	**0.0**	**17.0**	**10.6**	**2.0**	**1.5**
Buprenorphine	**Buprenorphine**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**130.0**	**67.0**	**0.0**	**0.0**	**7.0**	**4.5**	**11.0**	**6.8**	**0.0**	**0.0**
Naloxone	**Naloxone**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**10.0**	**5.2**	**0.0**	**0.0**	**1.0**	**0.6**	**0.0**	**0.0**	**0.0**	**0.0**
Methadone	**Methadone**	**0.0**	**0.0**	**4.0**	**3.7**	**7.0**	**4.8**	**1.0**	**0.5**	**0.0**	**0.0**	**2.0**	**1.3**	**4.0**	**2.5**	**121.0**	**91.7**
Fentanyl and derivatives	Carfentanil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.0	32.6
	Fentanyl	0.0	0.0	0.0	0.0	1.0	0.7	0.0	0.0	0.0	0.0	1.0	0.6	2.0	1.2	0.0	0.0
	Total	**0.0**	**0.0**	**0.0**	**0.0**	**1.0**	**0.7**	**0.0**	**0.0**	**0.0**	**0.0**	**1.0**	**0.6**	**2.0**	**1.2**	**43.0**	**32.6**
Other opioids	Tramadol	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.2	0.0	0.0
	U-47700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.6	0.0	0.0
	Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**3.0**	**1.9**	**0.0**	**0.0**
Cathinones	3-MMC	0.0	0.0	2.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4-Chloromethcathinone	0.0	0.0	20.0	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4-MEC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	4.4	0.0	0.0
	alpha-PHP	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	alpha-PVP	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mephedrone (4-MMC)	0.0	0.0	19.0	17.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	104.0	64.6	0.0	0.0
	Methylone	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.6	0.0	0.0
	N-ethyl-pentedrone	0.0	0.0	4.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	N-ethylhexedrone	0.0	0.0	6.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	N-ethylnorpentedrone	0.0	0.0	8.0	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Drug category, metabolite or adulterant	Drug/substance [1]	Amsterdam (N = 117) [2]		Budapest (N = 108) [2]		Cologne (N = 146) [2]		Helsinki (N = 194) [2]		Lausanne (N = 116) [2]		Oslo (N = 157) [2]		Paris (N = 161) [2]		Vilnius (N = 132) [2]	
	Total	**0.0**	**0.0**	**59.0**	**54.6**	**0.0**	**0.0**	**2.0**	**1.0**	**0.0**	**0.0**	**0.0**	**0.0**	**108.0**	**67.1**	**0.0**	**0.0**
Synthetic cannabinoids	**Total**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Benzodiazepines	Alprazolam	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	3.0	1.9	0.0	0.0	0.0	0.0
	Clonazepam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	4.5	0.0	0.0	0.0	0.0
	Diazepam	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Midazolam	0.0	0.0	0.0	0.0	0.0	0.0	6.0	3.1	38.0	32.8	0.0	0.0	0.0	0.0	0.0	0.0
	Temazepam	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**0.0**	**0.0**	**4.0**	**3.7**	**0.0**	**0.0**	**9.0**	**4.6**	**38.0**	**32.8**	**10.0**	**6.4**	**0.0**	**0.0**	**0.0**	**0.0**
Piperidines	**Total**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
MDMA	**MDMA**	**31.0**	**26.5**	**0.0**	**0.0**	**0.0**	**0.0**	**3.0**	**1.6**	**0.0**	**0.0**	**3.0**	**1.9**	**6.0**	**3.7**	**3.0**	**2.3**
Ketamine	**Ketamine**	**9.0**	**7.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.0**	**0.6**	**0.0**	**0.0**
Other medicines	Doxepin	0.0	0.0	0.0	0.0	3.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gabapentin	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Piracetam	0.0	0.0	4.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Quetiapine	0.0	0.0	0.0	0.0	1.0	0.7	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tizanidine	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Zolpidem	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	3.0	1.9	0.0	0.0
	Total	**0.0**	**0.0**	**4.0**	**3.7**	**4.0**	**2.7**	**5.0**	**2.6**	**0.0**	**0.0**	**0.0**	**0.0**	**3.0**	**1.9**	**0.0**	**0.0**
Other drugs	Amisulpride	0.0	0.0	0.0	0.0	2.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	THC	0.0	0.0	0.0	0.0	1.0	0.7	0.0	0.0	0.0	0.0	1.0	0.6	0.0	0.0	0.0	0.0
	Total	**0.0**	**0.0**	**0.0**	**0.0**	**3.0**	**2.1**	**0.0**	**0.0**	**0.0**	**0.0**	**1.0**	**0.6**	**0.0**	**0.0**	**0.0**	**0.0**
Other amphetamines	**Total**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Metabolites and degradation products	6-monoacetylmorphine	0.0	0.0	0.0	0.0	7.0	4.8	0.0	0.0	0.0	0.0	4.0	2.6	0.0	0.0	0.0	0.0
	Acetylcodeine	0.0	0.0	0.0	0.0	112.0	76.7	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Amphetamine AC	1.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Benzoylecgonine	6.0	5.1	0.0	0.0	93.0	63.7	2.0	1.0	0.0	0.0	0.0	0.0	21.0	13.0	0.0	0.0
	Ecgonine methyl ester	0.0	0.0	0.0	0.0	77.0	52.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

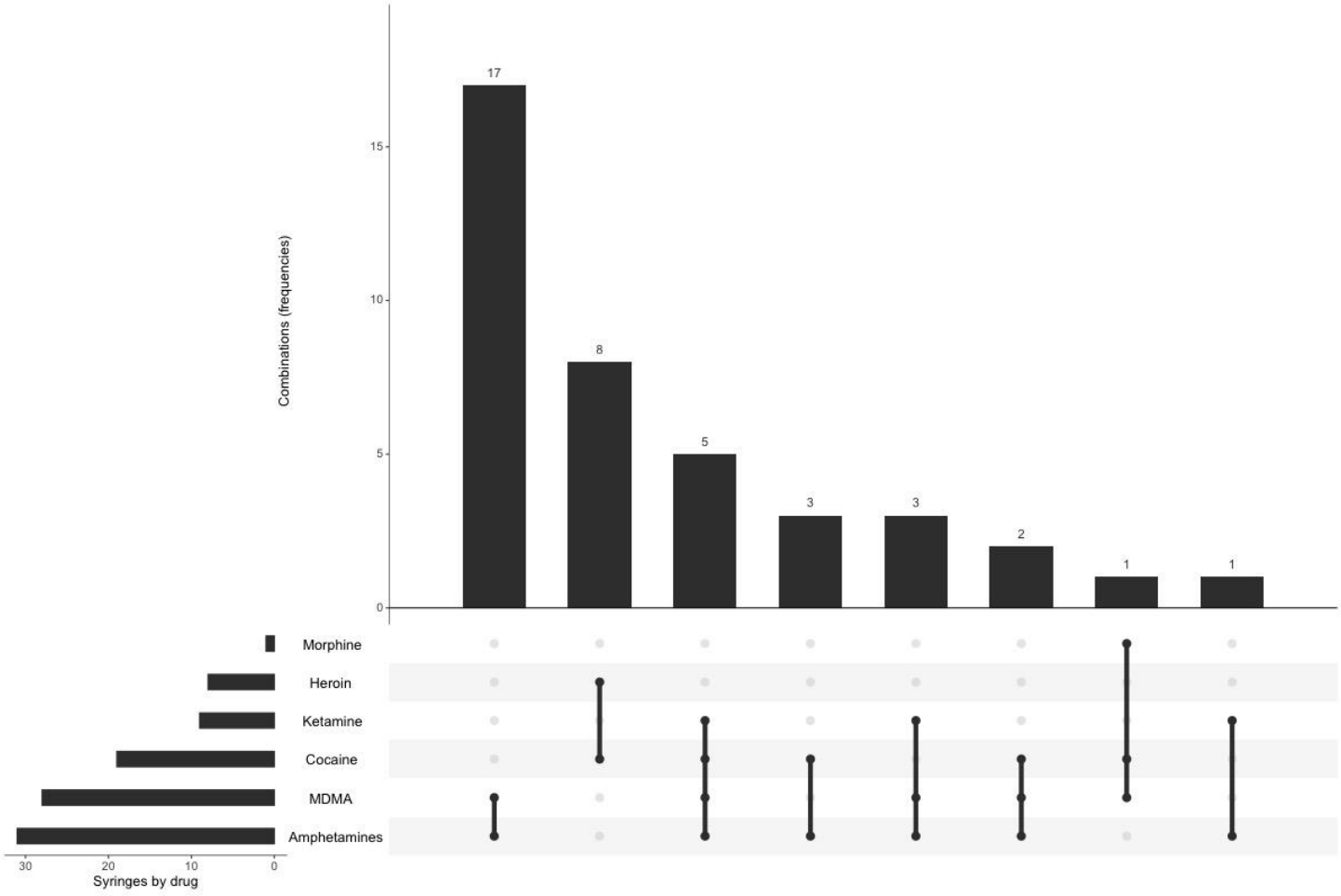
Drug category, metabolite or adulterant	Drug/substance ([1])	Amsterdam (N = 117) ([2])		Budapest (N = 108) ([2])		Cologne (N = 146) ([2])		Helsinki (N = 194) ([2])		Lausanne (N = 116) ([2])		Oslo (N = 157) ([2])		Paris (N = 161) ([2])		Vilnius (N = 132) ([2])	
	EDDP	0.0	0.0	3.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hydrocotarnine	2.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	N-[2-(3,4-methylenedioxyphenyl)-1-methylvinyl]-N,N-dimethylamine	28.0	23.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Nicotine	0.0	0.0	0.0	0.0	30.0	20.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Norcocaine	0.0	0.0	0.0	0.0	77.0	52.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Norcodeine	0.0	0.0	0.0	0.0	3.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Normorphine	0.0	0.0	0.0	0.0	6.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Noscapine	0.0	0.0	0.0	0.0	124.0	84.9	1.0	0.5	0.0	0.0	0.0	0.0	19.0	11.8	1.0	0.8
	O-desmethyltramadol	0.0	0.0	3.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Thebromine	0.0	0.0	0.0	0.0	7.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Theophylline	0.0	0.0	0.0	0.0	2.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**31.0**	**26.5**	**6.0**	**5.6**	**146.0**	**100.0**	**4.0**	**2.1**	**0.0**	**0.0**	**4.0**	**2.6**	**21.0**	**13.0**	**1.0**	**0.8**
Adulterants	Caffeine	21.0	18.0	0.0	0.0	113.0	77.4	8.0	4.1	49.0	42.2	0.0	0.0	0.0	0.0	0.0	0.0
	Dextromethorphan	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5
	Dibutylhydroxytoluene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	5.3
	Dimethylsulfone	70.0	59.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Diphenhydramine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	127.0	96.2
	Griseofulvin	0.0	0.0	0.0	0.0	2.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Levamisole	0.0	0.0	0.0	0.0	22.0	15.1	0.0	0.0	68.0	58.6	0.0	0.0	18.0	11.2	0.0	0.0
	Lidocaine	0.0	0.0	0.0	0.0	15.0	10.3	0.0	0.0	13.0	11.2	0.0	0.0	0.0	0.0	0.0	0.0
	Papaverin	0.0	0.0	0.0	0.0	115.0	78.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Paracetamol	10.0	8.6	43.0	39.8	116.0	79.5	0.0	0.0	19.0	16.4	0.0	0.0	0.0	0.0	0.0	0.0
	Phenacetin	2.0	1.7	0.0	0.0	5.0	3.4	0.0	0.0	73.0	62.9	0.0	0.0	0.0	0.0	0.0	0.0
	Procaine	0.0	0.0	0.0	0.0	17.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**93.0**	**79.5**	**43.0**	**39.8**	**137.0**	**93.8**	**8.0**	**4.1**	**92.0**	**79.3**	**0.0**	**0.0**	**18.0**	**11.2**	**128.0**	**97.0**

([1]) Totals can be less than the sum of positive counts within the drug group, since one syringe can contain more than one substance from the same group.
([2]) N refers to the number of syringes testing positive for drugs from at least one drug group (excluding syringes testing positive exclusively for metabolites, degradation products and/or adulterants).
([3]) Includes reclassification based on combinations of 6-MAM (metabolite of heroin) with morphine or codeine or meconin (degradation products of heroin).

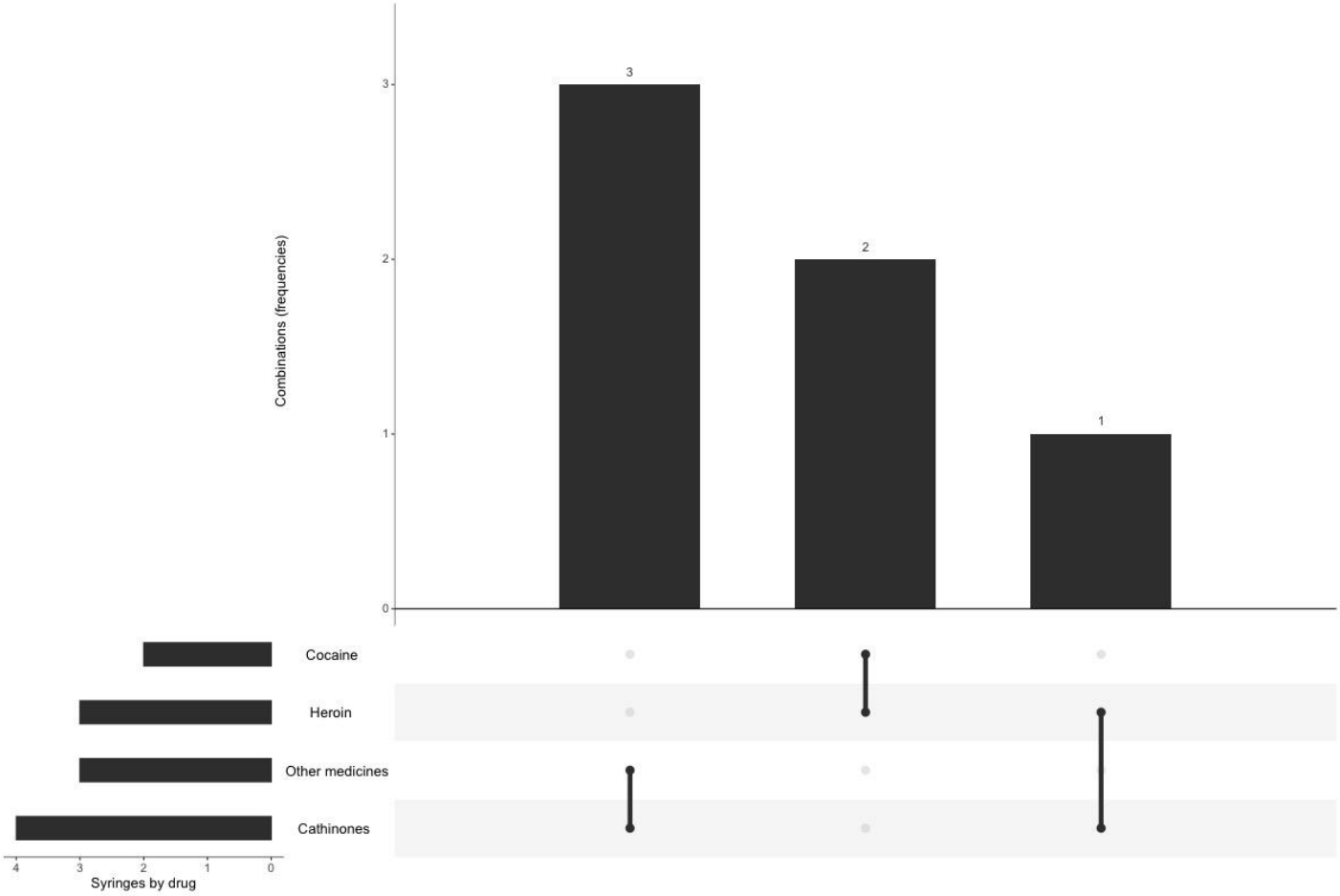
APPENDIX 3

Most frequent combinations of drug categories found in syringes (data cover syringes containing drugs from only two or more drug categories), by city, ESCAPE network 2019 (drug combinations are indicated by black dots connected by a line)

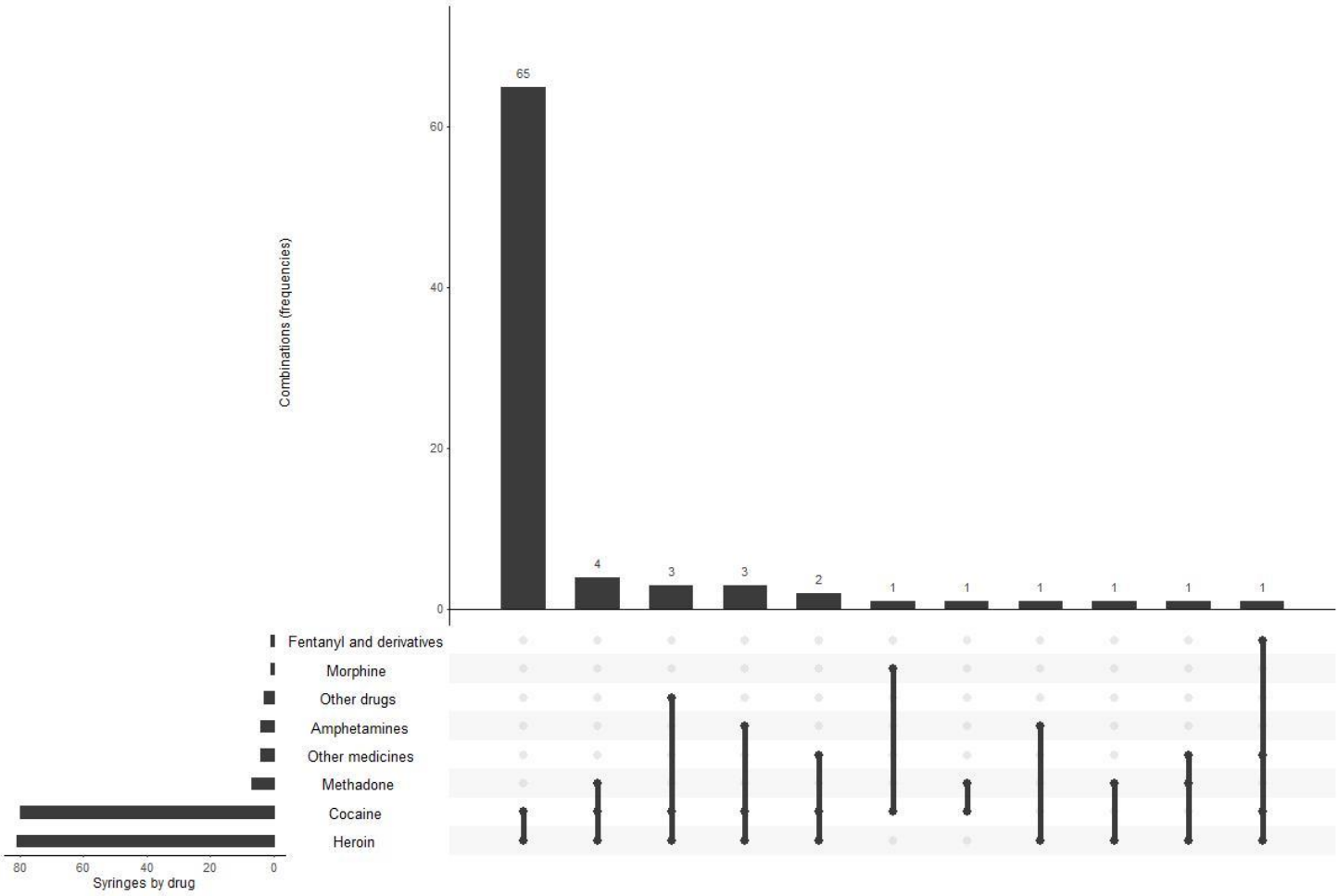
Amsterdam



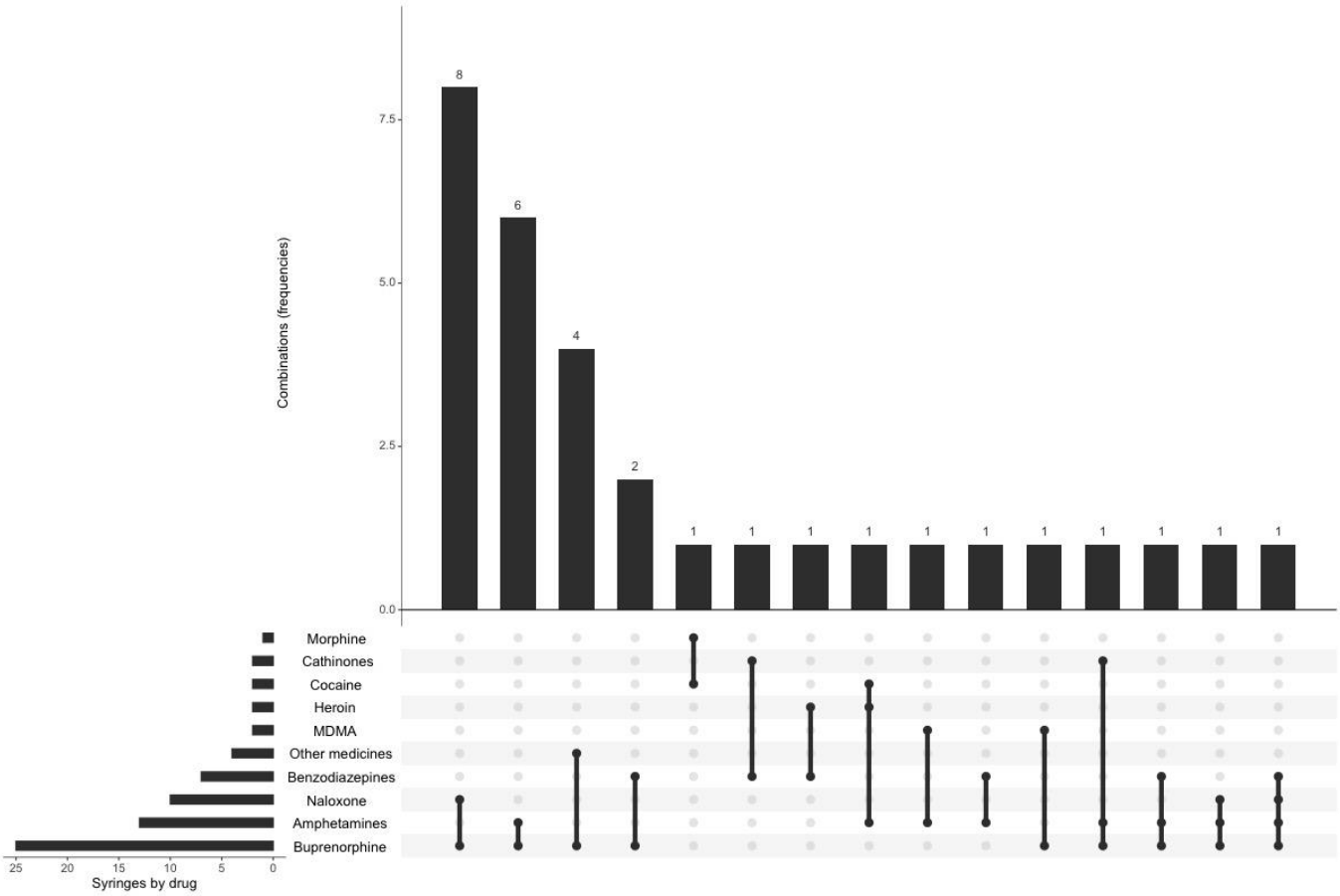
Budapest


Combinations (frequencies)
3
2
1
0
3
2
1
Cocaine
Heroin
Other medicines
Cathinones
4
3
2
1
0
Syringes by drug

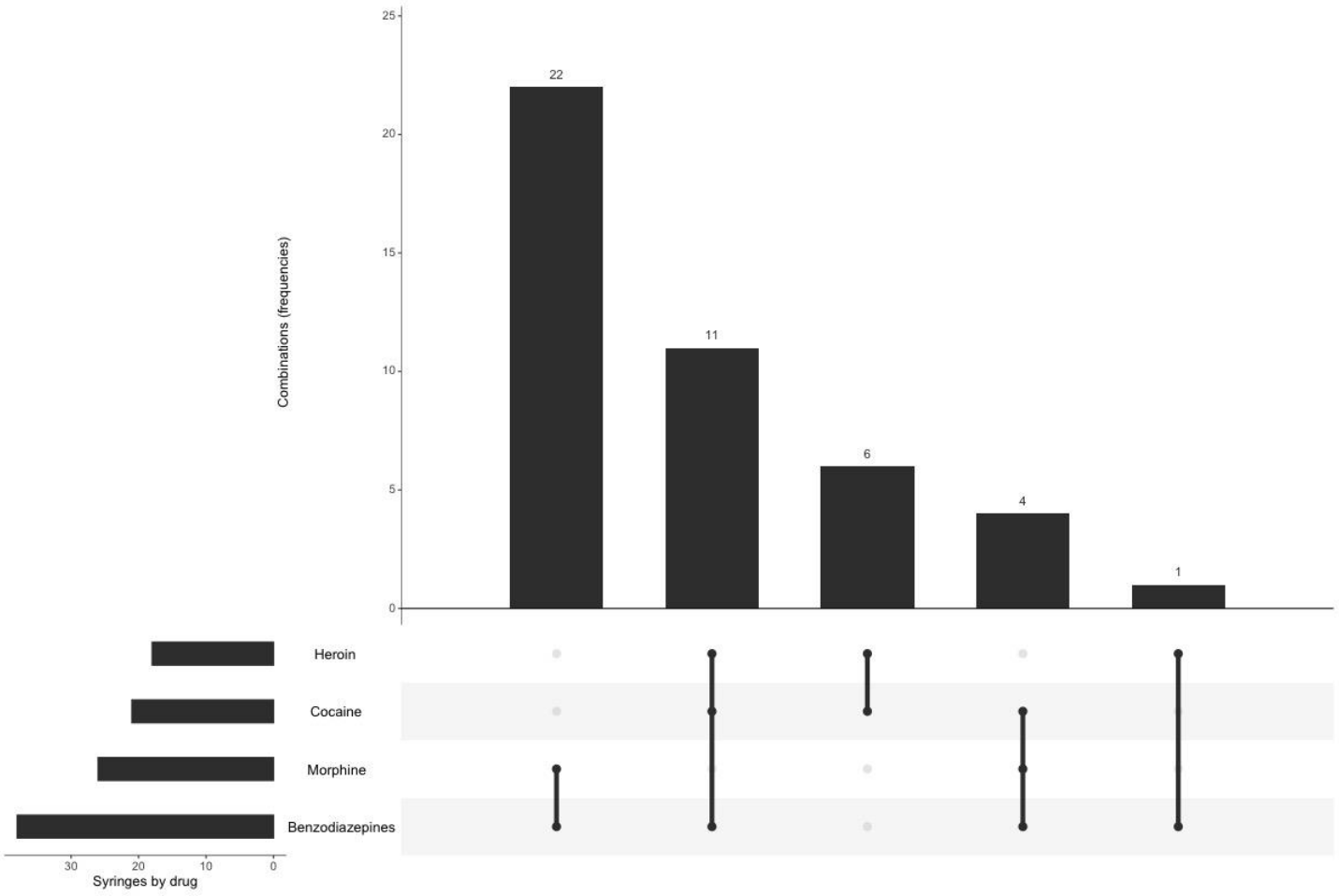
Cologne


Combinations (frequencies)
65
4
3
3
2
1
1
1
1
1
1
60
40
20
0
Fentanyl and derivatives
Morphine
Other drugs
Amphetamines
Other medicines
Methadone
Cocaine
Heroin
80
60
40
20
0
Syringes by drug

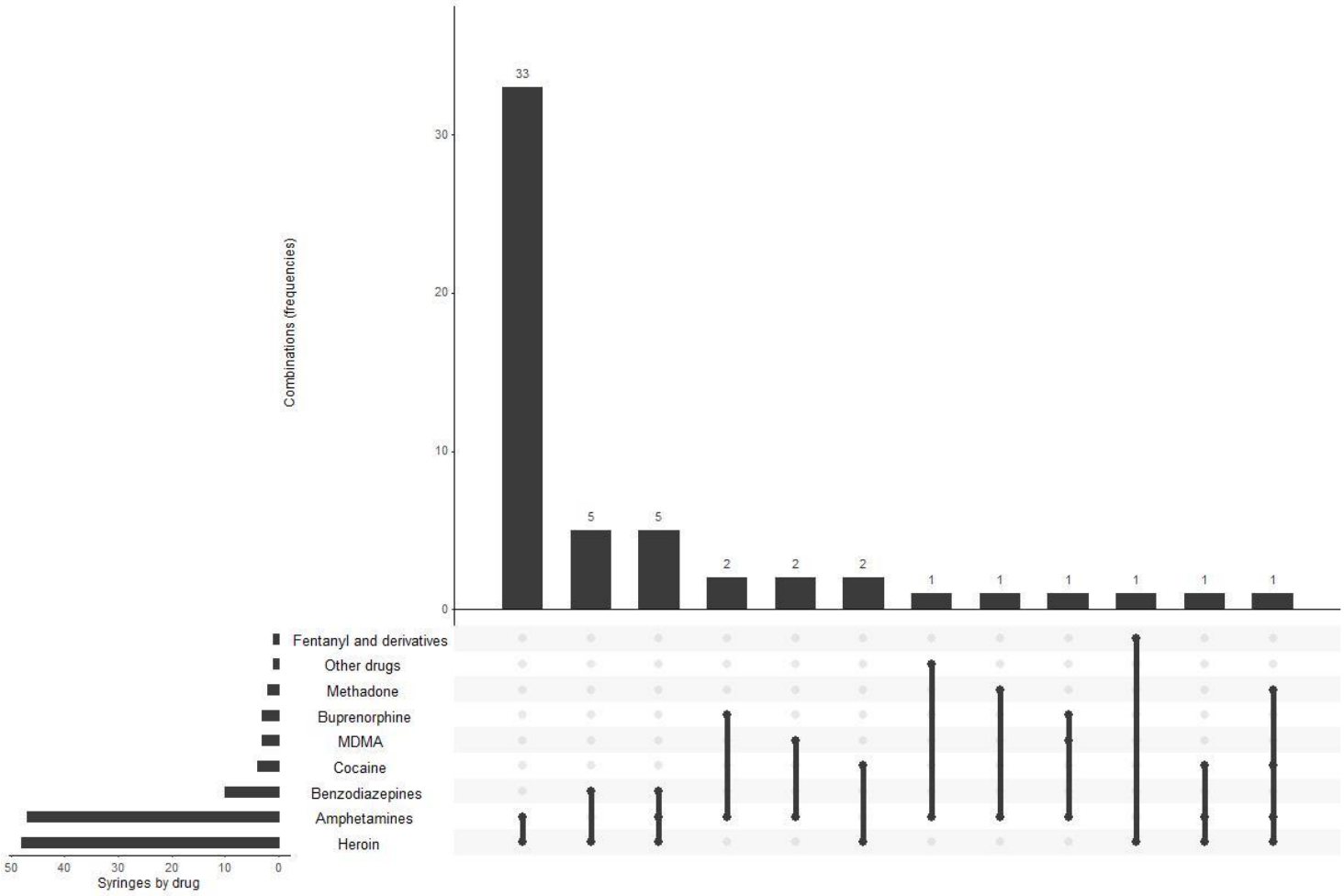
Helsinki


Combinations (frequencies)
8
6
4
2
1
1
1
1
1
1
1
1
1
1
1
7.5
5.0
2.5
0.0
Morphine
Cathinones
Cocaine
Heroin
MDMA
Other medicines
Benzodiazepines
Naloxone
Amphetamines
Buprenorphine
25
20
15
10
5
0
Syringes by drug

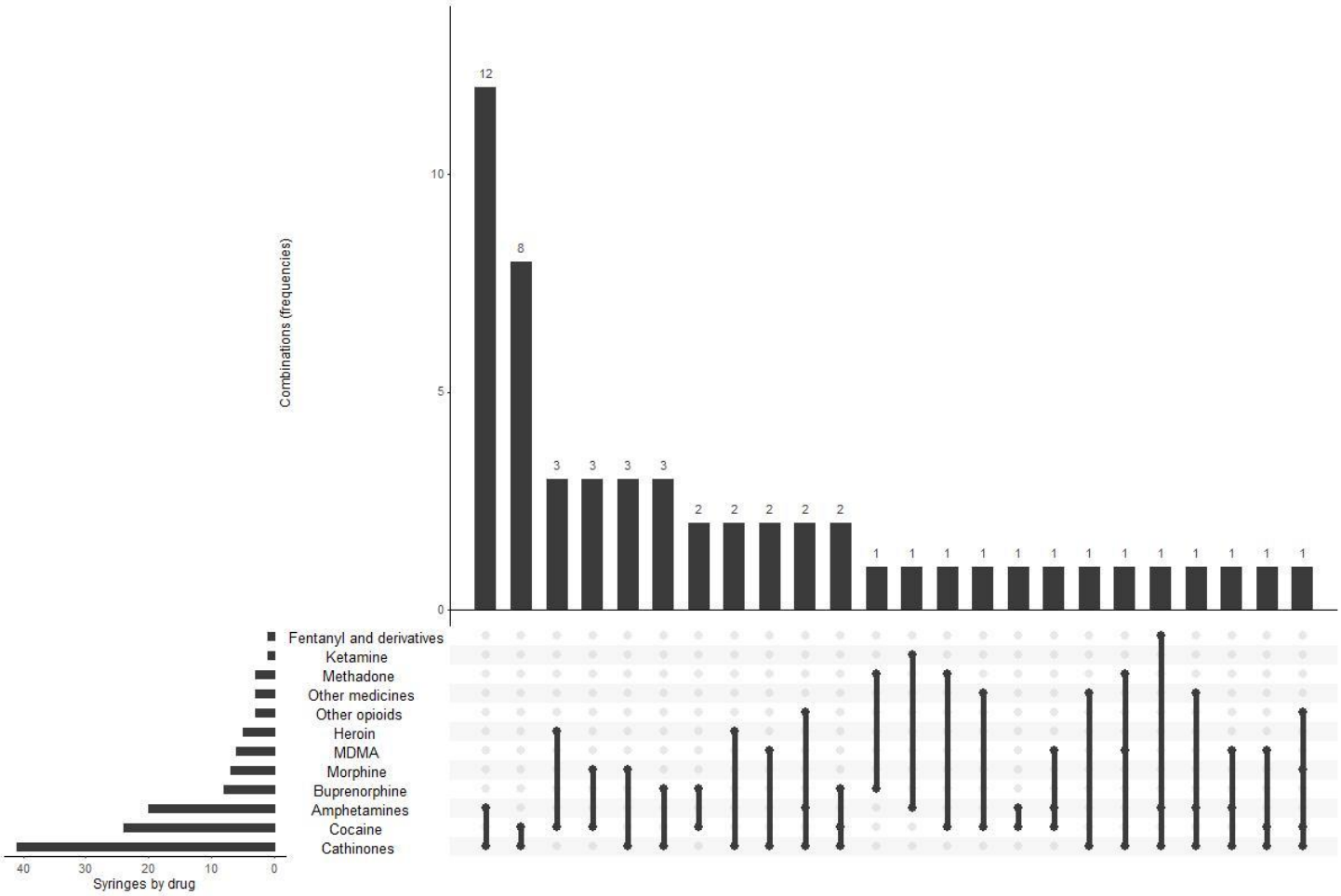
Lausanne


Combinations (frequencies)
25
20
15
10
5
0
22
11
6
4
1
Heroin
Cocaine
Morphine
Benzodiazepines
30
20
10
0
Syringes by drug

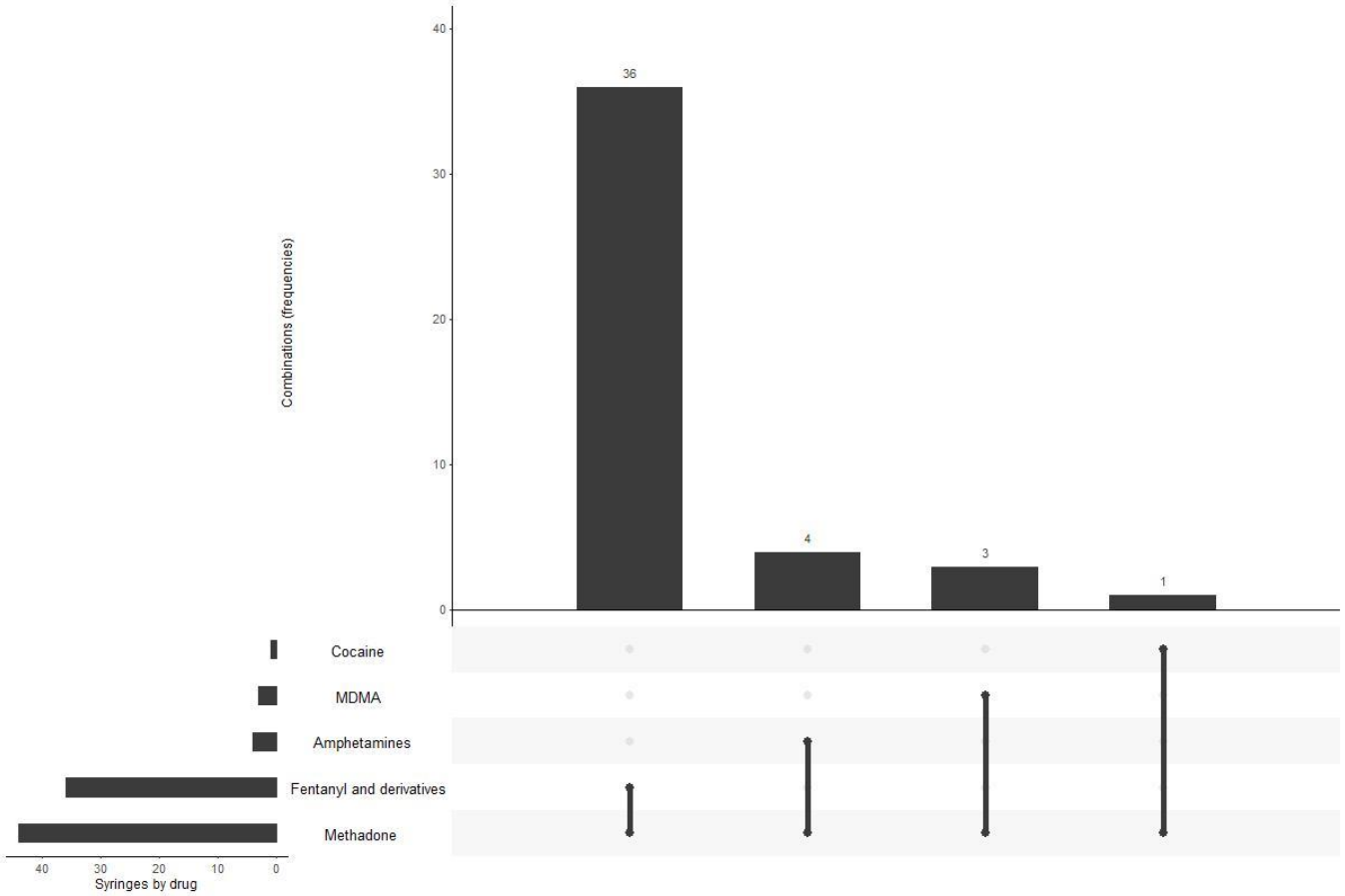
Oslo


Combinations (frequencies)
33
5
5
2
2
2
1
1
1
1
1
1
Fentanyl and derivatives
Other drugs
Methadone
Buprenorphine
MDMA
Cocaine
Benzodiazepines
Amphetamines
Heroin
Syringes by drug

Paris


Combinations (frequencies)
12
8
3
3
3
3
2
2
2
2
2
1
1
1
1
1
1
1
1
1
1
1
1
1
10
5
0
Fentanyl and derivatives
Ketamine
Methadone
Other medicines
Other opioids
Heroin
MDMA
Morphine
Buprenorphine
Amphetamines
Cocaine
Cathinones
40
30
20
10
0
Syringes by drug

Vilnius


40
30
20
10
0
Combinations (frequencies)
36
4
3
1
Cocaine
MDMA
Amphetamines
Fentanyl and derivatives
Methadone
40
30
20
10
0
Syringes by drug