2023

AT-A-GLANCE: NEW PSYCHOACTIVE SUBSTANCES IN CANADA - 2023

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Drug Analysis Service

Health Canada's Drug Analysis Service (DAS) operates laboratories across Canada that analyze illicit drugs and substances submitted by Canadian law enforcement and public health officials. DAS data is solely based on samples submitted to the laboratories and as such, samples analyzed by DAS may not be completely representative of drug seizure in Canada, including substances circulating on the market. DAS data should therefore be used with caution when determining trends or drawing conclusions about the type and nature of substances circulating in the illicit market. The data below represent the number of times a substance was identified in submitted samples. A single sample may contain more than one substance.

To improve awareness of new and emerging drugs in Canada, DAS sends notifications to law enforcement and public health officials whenever a potentially harmful substance or mixture is encountered for the first time in a province or territory or a product is found in a form that may mislead consumers. For more information, please refer to the Drug notification map.

New Psychoactive Substances in Canada
2023

Summary

- The Drug Analysis Service (DAS) identified 11 new psychoactive substances (NPS) in 2023.
- In total, there were 4 opioids, 3 cannabinoids, 2 stimulants, 1 hallucinogen and 1 sedative/hypnotic.
- 7 NPS were identified in samples submitted by law enforcement and public health officials from Ontario, 2 from Quebec, 1 from Alberta and 1 from Newfoundland and Labrador. No first identification of NPS were found in the other provinces and territories.
- In 2023, the opioid Methylfentanyl emerged as the most commonly identified NPS in DAS samples.

Aim

The aim of this report is to describe NPS that emerged in Canada in 2023 based on samples submitted to the DAS by law enforcement and public health officials.

New Psychoactive Substance – Definition

For the purpose of this report, a new psychoactive substance (NPS) is defined as a substance that has the potential to induce psychoactive effects and that has been identified in Canada for the first time in sample submitted to the DAS for analysis by law enforcement and public health officials. These substances may be dangerous compounds. It is important to note that these substances may not be regulated or controlled in Canada and comprehensive information regarding their toxicity may not always be readily accessible, thereby posing potential risks to the Canadian population and more specifically to people who use drugs.

Data Limitations

This report is based on data made available by the Drug Analysis Service, which analyzes illicit drugs and substances submitted by Canadian law enforcement and public health officials. Some limitations govern the present data. First, law enforcement officials submit samples for laboratory analysis based on investigation needs and orientations. Thus, analyzed samples may not be completely representative of substances circulating on the market as a number of factors may influence substances submitted by Canadian law enforcement officials. Additionally, DAS' mandate is to report substances that are controlled under the *Controlled Drugs and Substances Act*. As such, it is possible that noncontrolled substance were not reported.

Data Analysis

Results of analyzed samples submitted by law enforcement and public health officials are reported in a centralized database called the Laboratory Information Management System (LIMS). The presented data were retrieved from the LIMS and covers the period between January 1, 2023 and December 31, 2023, inclusively. NPS identifications are defined as the identification of a substance in a unique sample.

The analysis of presented data was performed in R4.3.2. Data wrangling and visualization was performed using the *tidyverse* package [1].

New Psychoactive Substances in Canada in 2023

- Between January 1st, 2023 and December 31st, 2023, the Drug Analysis Service identified 11 new psychoactive substances (NPS) in samples submitted by Canadian law enforcement and public health officials, including 4 opioids, 3 cannabinoids, 2 stimulants, 1 hallucinogen and 1 sedative/hypnotic (Table 1).

- Of the 11 NPS, 7 of them are controlled under the Controlled Drugs and Substances Act (CDSA) (Table 2).

Table 1. Number of new psychoactive substances by class (2023)

Pharmacological Class	Subclass	Number of substances (n)	Percent (%)
Cannabinoids	Cannabimimetics	3	27.3
Hallucinogens	Lysergic Acid (LSD) & analogues	1	9.1
Opioids	Fentanyl & analogues	1	9.1
	Nitazenes	3	27.3
Sedatives/Hypnotics	Benzodiazepines	1	9.1
Stimulants	Arylpiperazines & benzylpiperazines	1	9.1
	Cathinones	1	9.1
Total	-	**11**	**100**

Table 2. Summary of new psychoactive substances in Canada (2023)

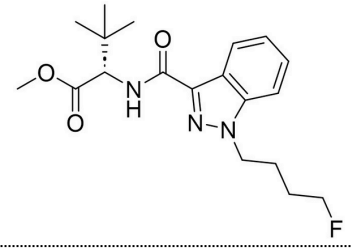
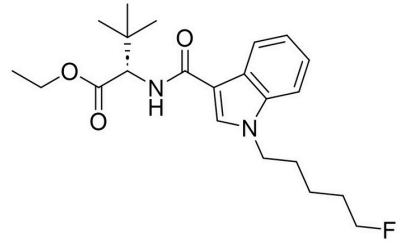
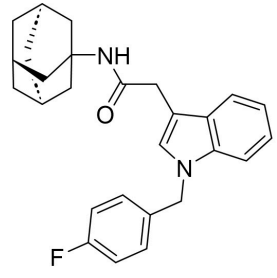
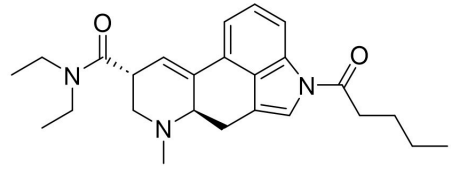
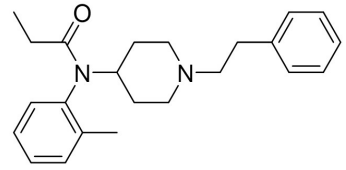
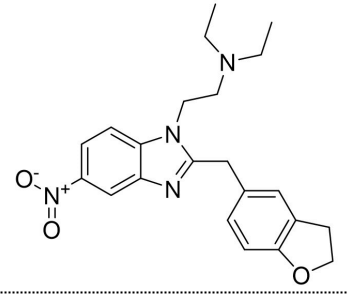
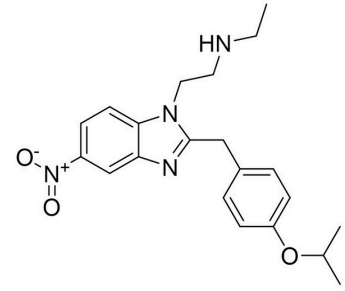
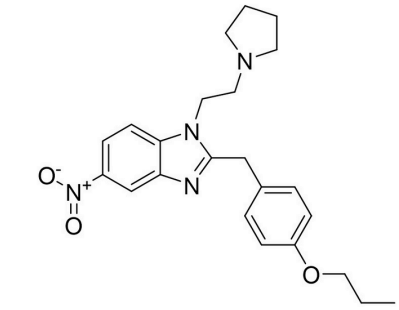
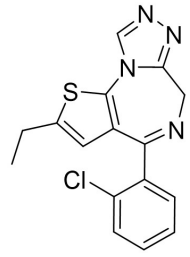
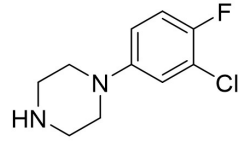
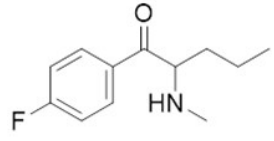
Pharmacological Class, Subclass	Substance	Synonym(s)	Controlled status	Structure
Cannabinoids, Cannabimimetics	4-fluoro-MDMB-BUTINACA	4-F MDMB-BUTINACA; 4-F MDMB-BINACA	*CDSA*: Schedule II, Item 2	
	5-Fluoro EDMB-PICA	5-fluoro EDMB-2201	*Not controlled*	
	AFUBIATA	Adamantyl-FUBIATA	*Not controlled*	
Hallucinogens, Lysergic Acid (LSD) & analogues	1V-LSD	1-Valeroyl-LSD	*Not controlled*	

Table 2. Summary of new psychoactive substances in Canada (2023)

Pharmacological Class, Subclass	Substance	Synonym(s)	Controlled status	Structure
Opioids, Fentanyl & analogues	Methylfentanyl [α]	ortho-Methylfentanyl ; meta-Methylfentanyl ; para-Methylfentanyl	*CDSA:* Schedule I, Item 16	
Opioids, Nitazenes	Ethyleneoxynitazene	3'-desoxy-3',4'-Methylenedioxynitazene; Tetrahydrofuranitazene	*CDSA:* Schedule I, Item 13	
	N-desethyl Isotonitazene	-	*CDSA:* Schedule I, Item 13	
	N-Pyrrolidino Protonitazene	-	*CDSA:* Schedule I, Item 13	

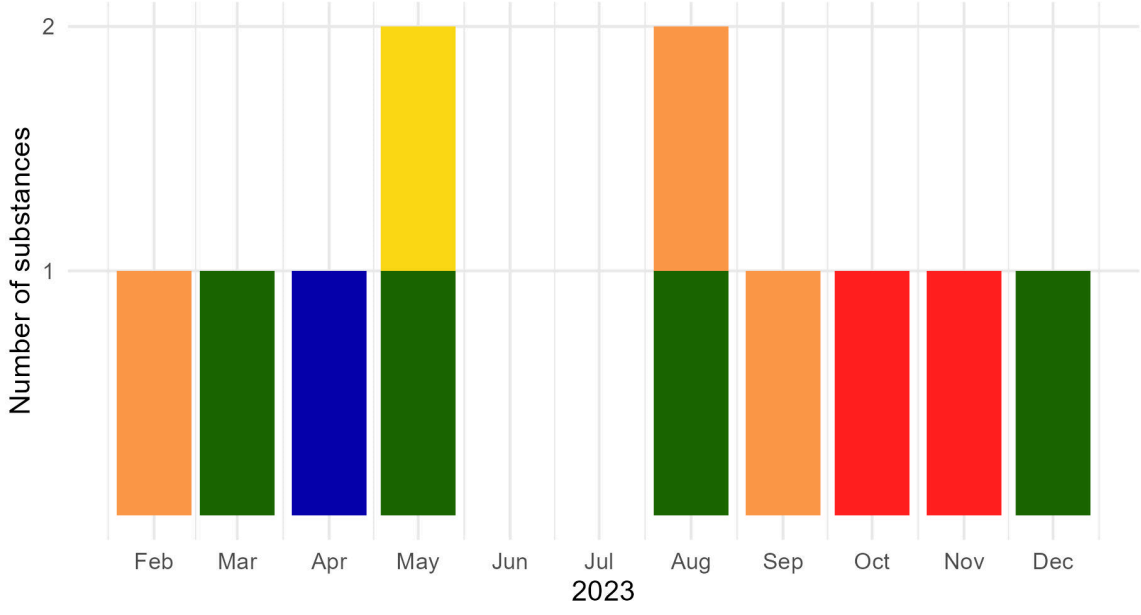
α There is multiple isomers available for this drug and only the ortho-substituted isomer have been drawn in this table.

Table 2. Summary of new psychoactive substances in Canada (2023)

Pharmacological Class, Subclass	Substance	Synonym(s)	Controlled status	Structure
Sedatives/Hypnotics, Benzodiazepines	Metizolam	Desmethyletizolam	*CDSA:* Schedule IV, Item 18	
Stimulants, Arylpiperazines & benzylpiperazines	1-(3-chloro-4-fluorophenyl)piperazine	3,4-CFP; Kleferein	*Not controlled*	
Stimulants, Cathinones	Fluoro Pentedrone [β]	2-fluoro Pentedrone ; 3-fluoro Pentedrone ; 4-fluoro Pentedrone	*CDSA:* Schedule I, Item 18	

β There is multiple isomers available for this drug and only the 4-substituted isomer have been drawn in this table

Figure 1. First NPS identification (month) in 2023 by pharmacological class

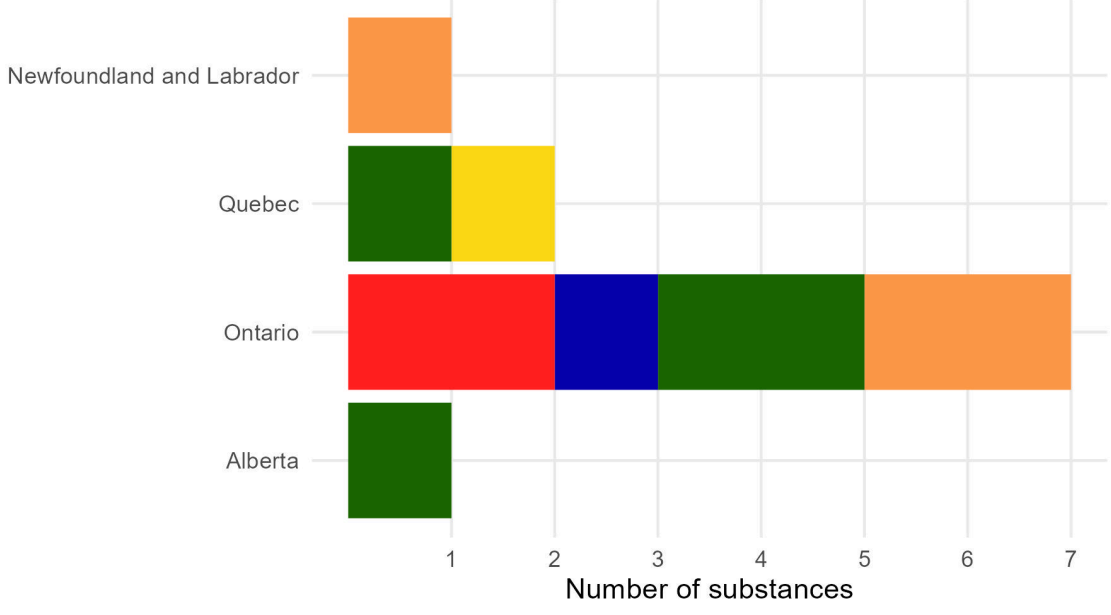


Data source: Health Canada, Drug Analysis Service

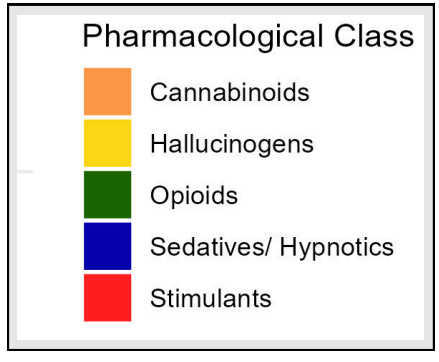
First Identifications

- New psychoactive substances were identified throughout 2023 (Figure 1).
- More than half (7) of the 11 NPS were first identified in samples submitted by law enforcement and public health officials in Ontario. Of the remaining 4 NPS, 2 were first identified in samples submitted by law enforcement and public health officials in Quebec, 1 in Alberta and 1 in Newfoundland and Labrador. No NPS were initially identified in the other provinces and territories (Figure 2).

Figure 2. Number of the first NPS identification in 2023 per province and territory



Legend



Data source: Health Canada, Drug Analysis Service

New Psychoactive substances profile

Additional details on NPS identified in samples submitted to the DAS for analysis by Canadian law enforcement and public health officials are provided below and in Table 3.

Cannabinoids

Synthetic cannabinoids exhibit effects that are similar to delta-9-tetrahydrocannabinol (THC), the active component of cannabis, but they have the potential to induce more potent effects than THC [2].

- **4-fluoro MDMB-BUTINACA:** This synthetic cannabinoid has been associated with fatalities [3]. In 2023, DAS identified this substance only once in samples submitted for analysis. It was found in powder form and without any co-occurring substances.
- **5-Fluoro EDMB-PICA:** There is little information available in the literature regarding this synthetic cannabinoid. In 2023, DAS identified this substance only once in samples submitted for analysis. It was found in powder form and without any co-occurring substances.
- **AFUBIATA:** There is little information available in the literature regarding this synthetic cannabinoid. In 2023, DAS identified this substance only once in samples submitted for analysis. It was found in powder form and in co-occurrence with Amantadine.

Hallucinogens

- **1V-LSD:** This substances is an analogue of Lysergic acid diethylamide (LSD) and likely generates psychedelic effects, resembling those of LSD [4]. In 2023, DAS identified this substance only once in samples submitted for analysis. It was found in powder form and without co-occurring substances.

Table 3. Profile of new psychoactive substances (2023)

Pharmacological Class	Subclass	Substance	Number of samples (2023)	First identification		Description	Co-occurrences (other drugs identified in samples)
				Date	*City, Province*		
Cannabinoids	Cannabimimetics	4-fluoro MDMB-BUTINACA	1	August 03, 2023	Toronto, Ontario	Powder and/or grainy substance	-
		5-Fluoro EDMB-PICA	1	September 14, 2023	Toronto, Ontario	Powder and/or grainy substance	-
		AFUBIATA	1	February 14, 2023	Corner Brook, Newfoundland and Labrador	Powder and/or grainy substance	Amantadine
Hallucinogens	Lysergic acid (LSD) & analogues	1V-LSD	1	May 26, 2023	Sherbrooke, Quebec	Tablet(s)	-

New Psychoactive Substances profile (Continued)

Opioids

- **Methylfentanyl:** Scientific data suggests that this Fentanyl analog is an active opioid agonist* with a potency+ similar or slightly less than that of Fentanyl [5]. In 2023, although the first identification in a DAS sample was on December 1st, Methylfentanyl was identified in 100 samples. DAS identified this substance in powder (97 samples) and crystalline form (3 samples). Multiple co-occurring substances were identified in samples containing Methylfentanyl, including other opioids (Fentanyl, Fentanyl analogues and opiates), stimulants (Cocaine and Methamphetamine) and sedative/hypnotics (benzodiazepines, Medetomidine and Xylazine).
- **Ethyleneoxynitazene:** There is little information available in the literature regarding this nitazene. In 2023, DAS identified this substance in 3 powder form samples and in co-occurrence with caffeine.
- **N-Pyrrolidino Protonitazene:** Preliminary scientific data suggests that N-Pyrrolidino Protonitazene is an active opioid agonist with approximately 25 times the potency of Fentanyl [6] . In 2023, N-Pyrrolidino Protonitazene was identified in 25 samples and primarily found in powder (21 samples) and tablet form (4 samples). Only one sample contained co-occurring substances with N-Pyrrolidino Protonitazene and it includes Bromazolam, Caffeine, Fentanyl and para-Fluorofentanyl.
- **N-desethyl Isotonitazene:** This substance is a metabolite‡ of Isotonitazene, but started emerging in its own right. Preliminary scientific data suggest that this compound is an active opioid agonist. It demonstrated the highest potency compared to several nitazenes, including Isotonitazene. This substance is also believed to be more potent than Fentanyl [7]. In 2023, this substance was identified in 69 samples and was found in powder and tablet form. Multiple co-occurring substances were identified in samples containing N-desethyl Isotonitazene, including opioids (Fentanyl, para-Fluorofentanyl and Metonitazene), sedative/hypnotics (benzodiazepines and Xylazine) and dissociatives (Ketamine).

*Agonist refers to a substance that activates the receptors in the body and produce a biological response.
+ Potency refers to the strength of a drug's effects on humans.
‡Metabolite refers to a substance produced when a drug is broken down (metabolized) by the body.

Table 3. Profile of new psychoactive substances (2023)

Pharmacological Class	Subclass	Substance	Number of samples (2023)	First identification		Description	Co-occurrences (other drugs identified in samples)
				Date	*City, Province*		
Opioids	Fentanyl & analogues	Methylfentanyl	100	December 01, 2023	Stettler, Alberta	Powder and/or grainy substance, Crystalline substance, Residue	Caffeine, Dimethylsulphone, Bromazolam, Fentanyl, Heroin, Cocaine, para-Fluorofentanyl, Deschloroetizolam, Xylazine, 6-Acetylmorphine, Desalkylgidazepam, Medetomidine, Methamphetamine
	Nitazenes	Ethyleneoxynitazene	3	August 24, 2023	Toronto, Ontario	Powder and/or grainy substance	Caffeine
		N-Pyrrolidino Protonitazene	25	May 04, 2023	Sherbrooke, Quebec	Tablet(s), Powder and/or grainy substance	Bromazolam, Caffeine, Fentanyl, para-Fluorofentanyl
		N-desethyl Isotonitazene	69	March 29, 2023	Peterborough, Ontario	Powder and/or grainy substance, Residue, Tablet(s)	Caffeine, Dimethylsulphone, Fentanyl, Bromazolam, Xylazine, Melatonin, para-Fluorofentanyl, Desalkylgidazepam, Flubromazepam, Metonitazene, Acetaminophen, Deschloroetizolam, Ketamine, Theophylline, Primidone

New Psychoactive Substances profile (Continued)

Sedatives/Hypnotics

- **Metizolam:** This benzodiazepine is structurally similar to Etizolam and produces effects comparable to Etizolam, though with roughly half its potency [8]. In 2023, DAS identified this substance only once in powder form and with co-occurring substances, including other benzodiazepines (Etizolam and Flualprazolam), Fentanyl and Methamphetamine.

Stimulants

- **1-(3-chloro-4-fluorophenyl)piperazine:** There is little information available in the literature regarding this substance. In 2023, DAS identified this substance only once in samples submitted for analysis in powder and in co-occurrence with caffeine.
- **Fluoro Pentedrone:** There is little information available in the literature regarding this substance. Fluoro Pentedrone is structurally similar to Pentedrone, a known stimulant [9]. In 2023, DAS identified this substance only once in samples submitted for analysis in crystalline form, without any co-occurring substances (Table 3).

Table 3. Profile of new psychoactive substances (2023)

Pharmacological Class	Subclass	Substance	Number of samples (2023)	First identification		Description	Co-occurrences (other drugs identified in samples)
				Date	*City, Province*		
Sedatives/ Hypnotics	Benzodiazepines	Metizolam	1	April 05, 2023	Ohsweken, Ontario	Powder and/or grainy substance	Caffeine, Etizolam, Fentanyl, Flualprazolam, Methamphetamine
Stimulant	Arylpiperazines & benzylpiperazines	1-(3-chloro-4-fluorophenyl) piperazine	1	October 11, 2023	Oakville, Ontario	Powder and/or grainy substance	Caffeine
	Cathinones	Fluoro Pentedrone	1	November 02, 2023	Toronto, Ontario	Crystalline substance	-

Other New Substances

In 2023, DAS identified 5 other new substances in samples submitted for analysis by Canadian law enforcement and public health officials. Four of these substances are precursors which are used in the synthesis of psychoactive substances and do not produce psychoactive effects. The first of these is 2-Bromo-3',4'-(methylenedioxy)propiophenone which is known to be used in the synthesis of cathinones (stimulants) [10]. The other 3 precursors, Ethyl 4-anilinopiperidine-1-carboxylate, Fluoro 4-ANPP and N-boc fluoro Norfentanyl are believed to be used in the synthesis of Fentanyl and/or analogues [11] [12]. The fifth newly identified substance, N-propionyl fluoro Norfentanyl, is a byproduct[§] of Fentanyl analogue synthesis, which means that it is an inactive impurity found in Fentanyl and analogues product [13] (Table 4). All five of these substances were found in powder form, with N-propionyl fluoro Norfentanyl also found in residue, crystalline, and tablet form.

§ A byproduct refers to an unwanted substance produced or left over from the synthesis of a specific drug (e.g., Fentanyl). Byproducts are not the intended final drug product.

Table 4. Profile of new substances (2023)

Pharmacological Class	Subclass	Substance	Number of samples (2023)	First identification		Description	Co-occurrences (other drugs identified in samples)
				Date	*City, Province*		
Other	Precursors / Key Intermediates / Reagents	2-Bromo-3',4'-(methylenedioxy) propiophenone	1	January 27, 2023	New Westminster, British Columbia	Powder and/or grainy substance	-
		Ethyl 4-anilinopiperidine-1-carboxylate	1	July 07, 2023	Surrey, British Columbia	Powder and/or grainy substance	-
		Fluoro 4-ANPP	2	May 18, 2023	Victoria, British Columbia	Powder and/or grainy substance	Caffeine
		N-boc fluoro Norfentanyl	1	August 24, 2023	Toronto, Ontario	Powder and/or grainy substance	-
		N-propionyl fluoro Norfentanyl	73	May 23, 2023	New Westminster, British Columbia	Powder and/or grainy substance, Residue, Crystalline substance, Tablet(s)	Bromazolam, Caffeine, Fentanyl, Dimethylsulphone, para-Fluorofentanyl, Methamphetamine, Phenacetin, Etizolam, Bromofentanyl, Diacetylmorphine, Cocaine, Oxycodone, Xylazine

Conclusion

This At-A-Glance report describes 11 new psychoactive substances (NPS) and 5 other new substances that were first identified by the DAS in 2023 in samples submitted by law enforcement and public health officials. NPS identified in Canada for 2023 include 4 opioids (1 Fentanyl analogue and 3 nitazenes), 3 cannabinoids (synthetic cannabinoids), 2 stimulants (1 arylpiperazine and 1 cathinone), 1 hallucinogen (LSD analog) and 1 sedative/hypnotic (benzodiazepine). More than half of the NPS were identified for the first time in samples submitted by law enforcement and public health officials from Ontario. The other half was identified in the other provinces of Canada. Co-occurring substances with newly identified NPS included Fentanyl and analogues, benzodiazepines, nitazenes and stimulants (Methamphetamine and Cocaine). Continued monitoring of NPS is required to ensure accurate information is available to partners about potentially harmful substances and to identify emerging trends on the Canadian market.

Suggested Citation

Government of Canada. (2024). Health Canada Drug Analysis Service. At-a-glance: New psychoactive substances in Canada - 2023. Longueuil (QC), 2024. Retrieved from https://www.canada.ca/en/health-canada/services/publications/healthy-living/new-psychoactive-substances-canada-2023.html .

For more information, please contact Health Canada's Drug Analysis Service

Cat.: H136-1E-PDF | ISBN: 2818-4777 | Pub.: 240341

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