

SPOTLIGHT: THE EVOLUTION OF FENTANYL IN CANADA OVER THE PAST 11 YEARS

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Health Canada's Drug Analysis Service (DAS) operates laboratories across Canada that analyze suspected illegal drugs seized by Canadian law enforcement agencies. These statistics are based on samples analyzed and may not be representative of all substances seized in Canada, nor of what drugs are circulating on the 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. Categorization of substances is based on the [Controlled Drugs and Substances Act \(CDSA\)](#).

The Evolution of Fentanyl in Canada over the Past 11 Years

January 2012- December 2022

SUMMARY

- Between January 2012 and December 2022, Fentanyl has been identified in 77,141 samples submitted to the Drug Analysis Service (DAS) by Canadian law enforcement agencies.
- A majority of Fentanyl identifications were reported from samples submitted by law enforcement agencies in Ontario and British Columbia.
- 75% of exhibits containing Fentanyl were in powder form.
- Fentanyl has most often been detected with co-occurring substances.
- The number of co-occurring substances with Fentanyl has increased across the years.
- Since 2020, sedative/hypnotics have increasingly been co-occurring with Fentanyl.

CONTEXT

Fentanyl was first identified in Canada in 1989 in exhibits submitted by law enforcement agencies. Since 2016, there has been a sharp increase in the number of Fentanyl identifications in Canada (Figure 1, Table 1). Between January 2012 and December 2022, Fentanyl has been identified in 77,141 exhibits submitted for analysis to the Drug Analysis Service (DAS).

AIM

The aim of this spotlight report is to characterize trends in Fentanyl identifications across Canada since 2012 and draw a more comprehensive picture of Fentanyl in Canada based on exhibits seized and submitted to DAS for analysis by law enforcement agencies.

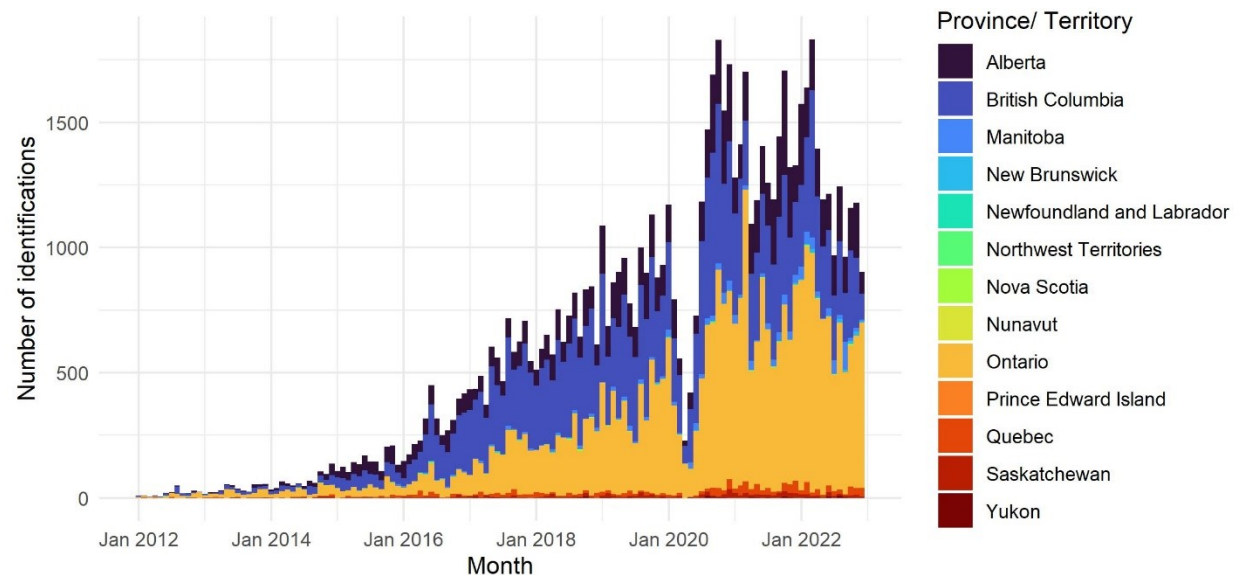


Figure 1. Fentanyl identifications across time, per province or territory (2012-2022)*

*Decrease of Fentanyl identifications in April 2020 is due to a number of factors related to the COVID-19 pandemic.

FENTANYL AND CANADA'S OPIOID CRISIS

- Fentanyl is a synthetic opioid that is 50 to 100 times more potent than morphine and has been a key contributor to the opioid crisis in Canada. It is prescribed to help control severe pain, especially after surgery.¹
- The sale, possession and production of Fentanyl and its analogues is illegal (unless authorized for medical, scientific or industrial purposes) and controlled under Schedule I of the *Controlled Drugs and Substances Act*.¹
- The fast-acting drug Naloxone can be used to temporarily reverse the effects of Fentanyl (opioids) overdose.²
- Fentanyl is a major contributor to the opioid crisis in Canada; in 2021, 86% of all accidental apparent opioid toxicity death involved Fentanyl and 32% of all opioid-related poisoning hospitalizations involved Fentanyl or Fentanyl analogues.³
- The opioid crisis has had a significant human toll in Canada with an estimated 30,843 apparent opioid toxicity deaths and 32,319 opioid-related poisoning hospitalizations reported between January 2016 and March 2022 in Canada.³
- During the first two years of the COVID-19 pandemic (April 2020 – March 2022), the number of apparent opioid toxicity deaths increased by 91% and the number of opioid-related poisoning hospitalizations increased by 24% compared to the two previous years (April 2018 – March 2020).³

DATA LIMITATIONS

This report is based on data made available by the Drug Analysis Service (DAS) which regularly analyses suspected illegal drugs seized by Canadian law enforcement agencies and samples submitted by public health partners. Some limitations govern the present data. First, law enforcement agencies submit samples for laboratory analysis based on investigation needs. Thus, analyzed samples may not be representative of substances circulating on the market as a number of factors may influence substances submitted by Canadian law enforcement agencies and reporting, such as increased awareness of substances and law enforcement capacities and priorities. Additionally, the DAS is only required to report substances that are controlled under the *Controlled Drugs and Substances Act*. As such, it is possible that not all noncontrolled substance were reported.

ANALYTICAL METHODS

Results of analyzed samples submitted by Canadian law enforcement agencies are reported in a centralized database, the Laboratory Information Management System (LIMS). The presented data were retrieved from the LIMS and covers the period between January 1, 2012 and December 31, 2022, inclusively. Fentanyl identifications are defined as the identification of Fentanyl in a unique exhibit.

The analysis of presented data was performed in R4.0.2. Data wrangling and visualization was performed using the *tidyverse* package⁴. Time trends were computed on a monthly basis and 3-month rolling averages are plotted in line plots.

GEOGRAPHICAL LOCATIONS

- From 2012 to 2022, the majority of Fentanyl identifications originated from sample submitted by law enforcement agencies in Ontario (43%), British Columbia (36%) and Alberta (16%) (Table 1).
- In 2016, there was an increase in Fentanyl identifications from samples submitted by law enforcement agencies in British Columbia. While samples containing Fentanyl from British Columbia represented 35% of all Fentanyl samples in Canada in 2015, they accounted for almost half (49%) of all Fentanyl samples in Canada in 2016.
- In 2021-2022, the majority of samples containing Fentanyl were from samples submitted by Ontario's law enforcement agencies.

Table 1. Fentanyl identifications (count (n) and percent (%)) per province or territory (2012 - 2022)[†]

Province/ Territory	Year																							
	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
Alberta	18	8.3	60	13.5	182	22.5	565	32.8	746	21.4	874	13.4	1,167	14.3	1,843	17.1	2,048	15.3	2,666	16.3	2,250	14.7		
British Columbia	76	35.0	124	27.8	242	29.9	608	35.3	1,713	49.1	3,334	51.0	3,970	48.5	4,211	39.0	4,842	36.3	4,521	27.7	3,755	24.6		
Manitoba	2	0.9	8	1.8	5	0.6	15	0.9	42	1.2	63	1.0	86	1.1	131	1.2	273	2.0	308	1.9	411	2.7		
New Brunswick	-	-	-	-	-	-	1	0.1	9	0.3	-	-	4	<0.1	4	<0.1	11	0.1	9	0.1	92	0.6		
Newfoundland and Labrador	5	2.3	-	-	-	-	1	0.1	5	0.1	15	0.2	9	0.1	5	<0.1	9	0.1	5	<0.1	8	0.1		
Northwest Territories	-	-	-	-	4	0.5	3	0.2	11	0.3	-	-	-	-	-	-	-	-	3	<0.1	-	0.0		
Nova Scotia	-	-	1	0.2	-	-	2	0.1	-	-	5	0.1	21	0.3	13	0.1	11	0.1	15	0.1	13	0.1		
Nunavut	-	-	-	-	3	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0		
Ontario	106	48.8	235	52.7	325	40.2	467	27.1	809	23.2	2,054	31.4	2,730	33.3	4,344	40.2	5,854	43.9	8,258	50.6	8,324	54.5		
Prince Edward Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	<0.1	-	-	7	0.0		
Quebec	10	4.6	14	3.1	26	3.2	45	2.6	118	3.4	141	2.2	130	1.6	128	1.2	176	1.3	350	2.1	275	1.8		
Saskatchewan	-	-	4	0.9	22	2.7	14	0.8	38	1.1	49	0.7	65	0.8	110	1.0	108	0.8	177	1.1	108	0.7		
Yukon	-	-	-	-	-	-	-	-	-	-	3	<0.1	6	0.1	6	0.1	15	0.1	14	0.1	18	0.1		
Total	217	100	446	100	809	100	1,721	100	3,491	100	6,538	100	8,188	100	10,795	100	13,349	100	16,326	100	15,261	100		

[†]<0.1 indicates that the proportion of identifications is smaller than 0.1%

PHYSICAL DESCRIPTION

- Since 2019, over 85% of exhibits containing Fentanyl were in powder form. Between 2012 and 2016, however, Fentanyl was predominantly identified in tablet form or in a material (Figure 2).
- The majority of Fentanyl derma patches analysed by the DAS were from Ontario (87%) and Quebec (11%). Fentanyl found in a material were primarily from exhibits from British Columbia (74%) and Alberta (19%). Finally, 42% of Fentanyl in tablet form were from Alberta, 32% from British Columbia and 16% from Ontario. Fentanyl in tablets form was predominantly found in the provinces of Alberta and British Columbia (data not shown).
- Nevertheless, in 2022, Fentanyl in powder appears to be the dominant form in most provinces and territories.

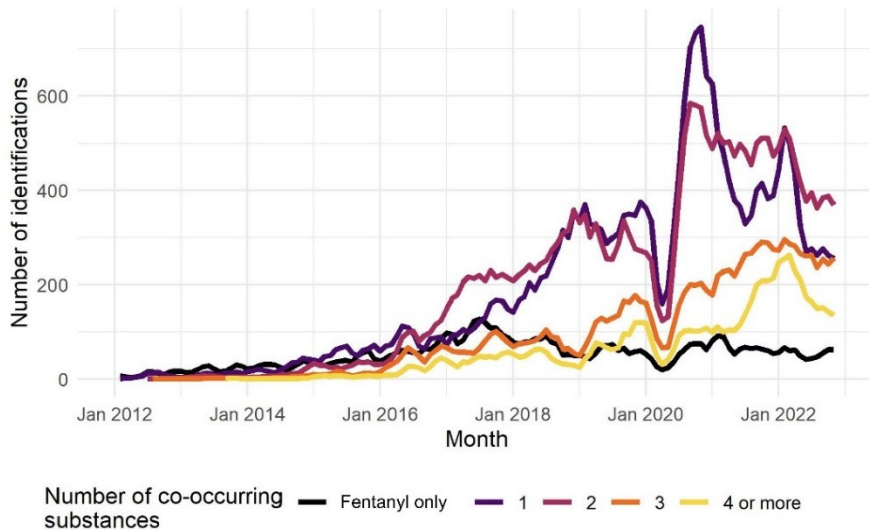


Figure 3. Number of co-occurring substances with Fentanyl, 3-month rolling average (2012-2022)

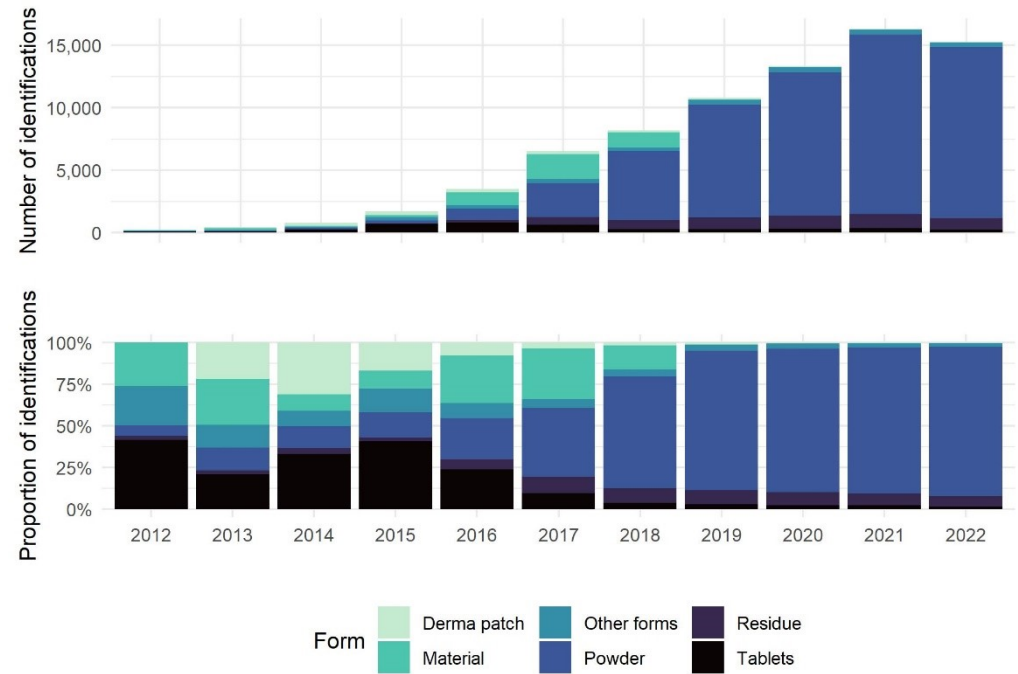


Figure 2. Form of exhibits containing Fentanyl per year (2012 –2022)

CO-OCCURRING SUBSTANCES

- From 2012 to 2022, there was an increase in the number of Fentanyl exhibits containing multiple co-occurring substances (Figure 3, Table 2). This trend is particularly apparent for provinces of Ontario, Alberta and British Columbia (Figure 4).
- From 2012 to 2022, there was a general decrease in the proportion of exhibits with only Fentanyl identified and an increase in Fentanyl identifications with two or more co-occurring substances (Table 2).
- In 2022, the proportion of Fentanyl samples containing two or more co-occurring substances was 53% in British Columbia, 62% in Alberta and 77% in Ontario. Overall, in 2022, 69% of Fentanyl samples contained two or more co-occurring substances (Table 2, Figure 4).

Table 2. Proportion of Fentanyl identifications (%) per number of co-occurring substances (2012-2022)

Number of co-occurring substances	Year											Total %
	2012 %	2013 %	2014 %	2015 %	2016 %	2017 %	2018 %	2019 %	2020 %	2021 %	2022 %	
Fentanyl only	58.1	57.6	41.4	28.2	19.9	18.9	10.7	6.6	4.6	5.0	4.4	8.8
1	39.2	26.9	39.1	38.5	29.2	22.5	33.1	37.4	41.8	29.9	27.0	32.4
2	1.4	12.1	14.1	21.2	27.4	37.6	38.1	33.4	33.1	36.0	33.0	33.7
3	1.4	2.2	4.1	7.8	15.9	13.2	11.4	14.2	13.1	18.3	20.7	15.5
4	0.0	0.7	0.6	2.4	5.2	5.6	4.6	5.3	5.2	7.3	8.9	6.2
5	0.0	0.4	0.5	1.1	1.6	1.6	1.3	1.9	1.5	2.4	3.4	2.1
6	0.0	0.0	0.0	0.7	0.5	0.4	0.6	1.0	0.4	0.7	1.7	0.8
7 or more	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.8	0.4

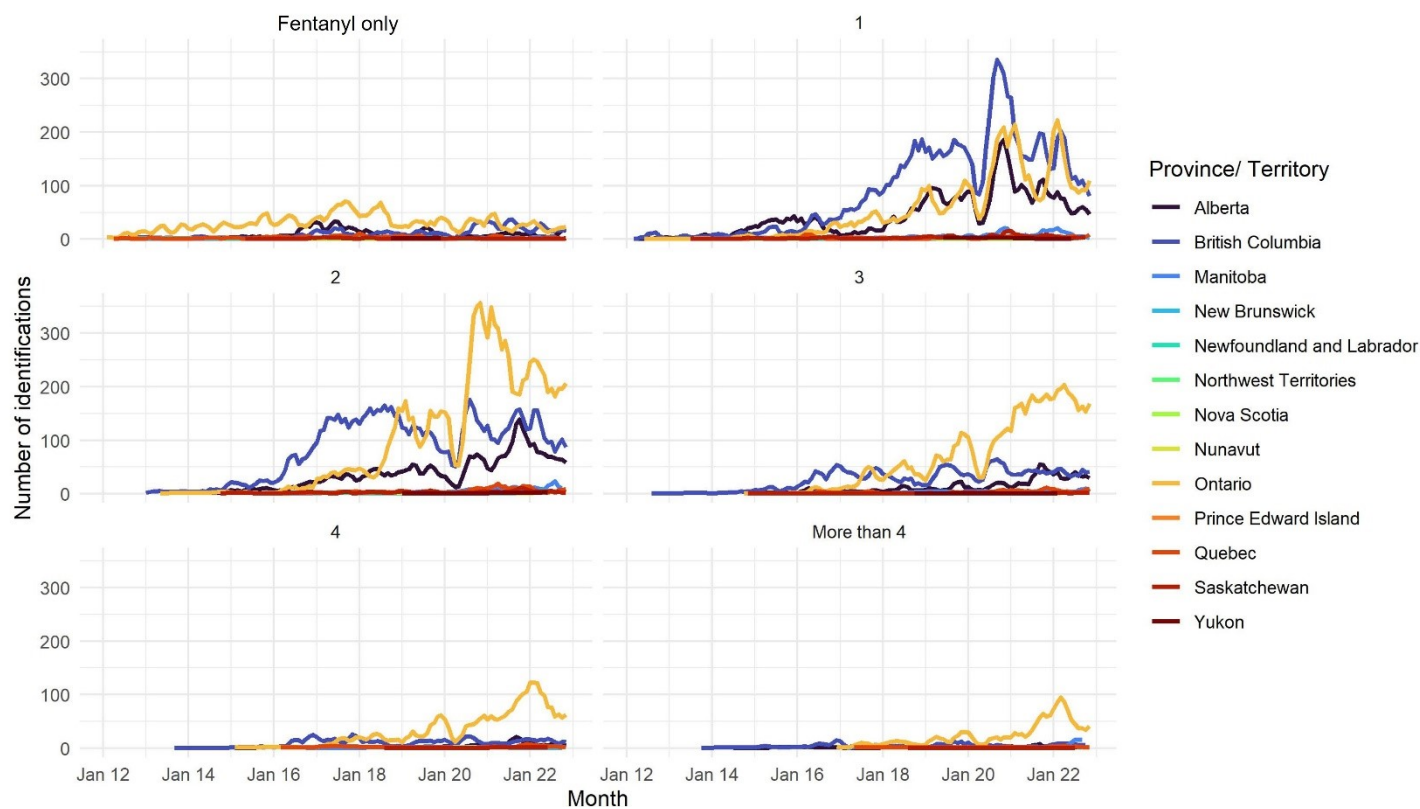


Figure 4. Number of co-occurring substances with Fentanyl per province and territories, 3-month rolling average (2012-2022)

CO-OCCURRING SUBSTANCES (CONTINUED)

- Pharmacological classes of substances frequently co-occurring with Fentanyl are opioid, sedative/hypnotic and stimulant. The rise in the co-occurrences of sedative/hypnotics with Fentanyl can be observed since late 2019 (Figure 5).
- Caffeine (cutting agent) has consistently been the most common co-occurrence with Fentanyl in the past 10 years (Figure 6A).
- The top ten co-occurring substances have changed throughout the years. The psychoactive substances that were most often co-occurring with Fentanyl from 2012 to 2016 include Diacetylmorphine (aka Heroin) (opioid), Cocaine and Methamphetamine (stimulant) (Figure 6B).
- With the increase in co-occurring sedative/hypnotics with Fentanyl since 2020, Etizolam and Flualprazolam were among the top ten psychoactive substances most often identified alongside Fentanyl between 2017 and 2022 (Figure 6C).

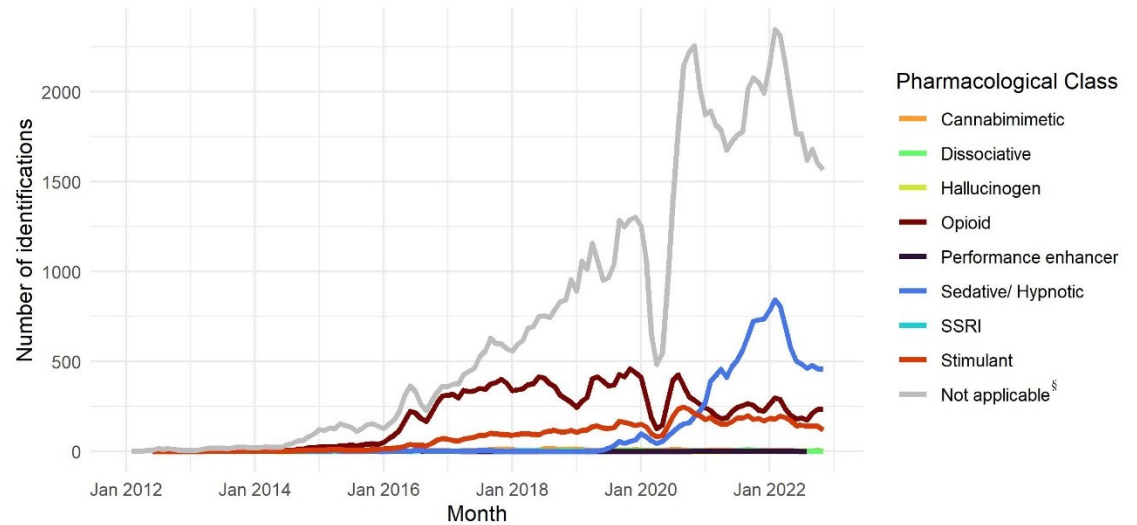


Figure 5. Number of fentanyl co-occurrences by pharmacological class, 3-month rolling average (2012-2022)

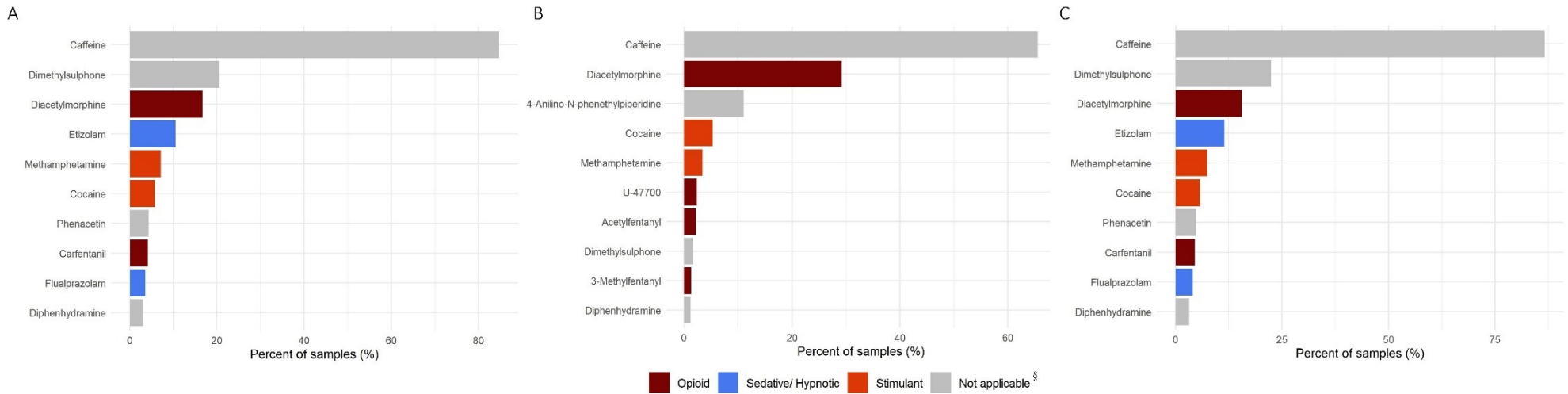


Figure 6. Top 10 co-occurring substances with Fentanyl for (A) 2012-2022, (B) 2012-2016 and (C) 2017-2022

[§] Includes cutting agents, precursors/key intermediates/reagents, prescription drugs, over the counter drugs and non-drugs.

CO-OCCURRING SUBSTANCES (2020–2022)

- In 2020 to 2022, psychoactive substances frequently co-occurring with Fentanyl include Etizolam (sedative/hypnotic), Methamphetamine (stimulant), Flualprazolam (sedative/hypnotic), and Diacetylmorphine (aka Heroin) (opioid) (Table 3). Emerging new psychoactive substances (NPS) such as Bromazolam (sedative/hypnotic), Metonitazene (opioid) and para-Fluorofentanyl (opioid) can also be found among the top 20 co-occurring substances with Fentanyl in 2020 to 2022.

Table 3. Top 20 co-occurring substances with Fentanyl for 2020-2022

Name	Chemical Class	Pharmacological Class	Count (n)	Percent (%)
Caffeine	Cutting Agent	<i>Not applicable</i>	39,977	89.0
Dimethylsulphone	Cutting Agent	<i>Not applicable</i>	11,956	26.6
Etizolam	Benzodiazepine (BZD) Class	Sedative/Hypnotic	7,825	17.4
Methamphetamine	Amphetamine / Methamphetamine (Sub) Class	Stimulant	3,338	7.4
Flualprazolam	Benzodiazepine (BZD) Class	Sedative/Hypnotic	2,794	6.2
Phenacetin	Cutting Agent	<i>Not applicable</i>	2,656	5.9
Diacetylmorphine	Opiate Class	Opioid	2,587	5.8
Cocaine	Tropane (Cocaine) Class	Stimulant	2,396	5.3
Diphenhydramine	Cutting Agent	<i>Not applicable</i>	2,106	4.7
Xylazine	Cutting Agent	<i>Not applicable</i>	1,924	4.3
Carfentanil	Fentanyl (Sub) Class	Opioid	1,653	3.7
Flubromazepam	Benzodiazepine (BZD) Class	Sedative/Hypnotic	1,629	3.6
Bromazolam	Benzodiazepine (BZD) Class	Sedative/Hypnotic	1,299	2.9
Lidocaine	Cutting Agent	<i>Not applicable</i>	1,078	2.4
Dextromethorphan	Other [‡]	<i>Not applicable</i>	861	1.9
Acetaminophen	Cutting Agent	<i>Not applicable</i>	612	1.4
Metonitazene	Opioid Class (Non-Fentanyl, Non-Opiates)	Opioid	605	1.3
para-Fluorofentanyl	Fentanyl (Sub) Class	Opioid	570	1.3
Flubromazolam	Benzodiazepine (BZD) Class	Sedative/Hypnotic	494	1.1
Furanyl UF-17	Opioid Class (Non-Fentanyl, Non-Opiates)	Opioid	486	1.1

[‡]Includes prescription and over the counter drugs

CONCLUSION

This spotlight report summarises the trends in Fentanyl identifications based on exhibits seized and submitted to DAS by law enforcement agencies in the past eleven years. Between 2012 and 2022, Fentanyl was identified in 77,141 samples and was most often found in exhibits from Ontario and British Columbia. The frequency of Fentanyl without any other co-occurring substances decreased in the past eleven years. Psychoactive substances most often co-occurring with Fentanyl from 2012 to 2016 include Diacetylmorphine (aka Heroin) (opioid), Cocaine (stimulant) and Methamphetamine (stimulant). However, there has been an increase in co-occurring sedative/hypnotics with Fentanyl since 2020. Several emerging new psychoactive substances (NPS) can also be found among the top 20 co-occurring substances with Fentanyl in 2020 to 2022. More information about the emergence of NPS, including nitazenes, can be found in our reports “At-A-Glance: Newly Reported Psychoactive Substances in Canada”⁵ and “At-A-Glance: The Emergence of Nitazenes and Brorphine in Canada”⁶. Continued monitoring of Fentanyl and its co-occurring substances is required to ensure accurate information is available about concomitant harmful substances with Fentanyl on the Canadian market.

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