

# Fentanyl Death Investigation in Four Washington State Counties

***Caleb Banta-Green, PhD, MPH, MSW, Principal Research Scientist***

## Background

Increases in deaths caused by overdoses from fentanyl and fentanyl-analog drugs are occurring in much of the U.S., in Vancouver, Canada, and in other parts of the world. Preliminary data provided by the Washington State Patrol Toxicology Lab indicated an increase in fentanyl involved drug caused deaths in 2016. The lab implemented new testing methods in July 2016 to allow for the detection of several new fentanyl-like drugs (also called fentanyl analogs) such as acetyl fentanyl and parafluorofentanyl, which are schedule I drugs, illegal for any use. The U.S. Drug Enforcement Administration notes that “acetyl fentanyl has been detected in tablets that mimic pharmaceutical opiate products, in powder form and spiked on blotter papers.” One compound, 4-ANPP, is known to be used to manufacture illicit fentanyl so its presence with fentanyl is highly indicative of illicitly manufactured fentanyl.

The goal of this analysis is to characterize drug overdose deaths involving fentanyl and fentanyl-like drugs in terms of the types of fentanyl products involved. In particular, we focused on trying to document the type of fentanyl substance, the possible source, the form/appearance, and how it was used. Findings will be used to inform public health educational messaging and possible improvements to death investigation procedures.

## Methods

Cases: Fentanyl and fentanyl-analog involved deaths as identified by toxicology results and confirmed by death certificate.

Definitions of fentanyl categories:

- Rx-type-fentanyl: Clear evidence of a pharmaceutical product, typically a transdermal patch. May or may not be prescribed to decedent.
- Non-Rx-type-fentanyls- Non-pharmaceutical form of fentanyl (e.g. tablet or powder); fentanyl + 4-ANPP indicating illicit production; or non-Rx fentanyl analog such as acetyl fentanyl.
- Unknown-fentanyl type- Toxicological analysis indicates fentanyl, but no information available about whether the product is pharmaceutical in origin.

Data collection: A data abstraction process for death investigation records was developed by Susan Kinne (Public Health-Seattle & King County) and Caleb Banta-Green (Alcohol and Drug Abuse Institute, University of Washington) while reviewing 22 fatal overdose cases involving fentanyl and fentanyl-related drugs from the King County Medical Examiner’s Office.

A data entry template for data abstraction was provided to and completed by staff at the Spokane, Pierce, and Snohomish Medical Examiners’ offices, providing data from 5, 5, and 9 cases, respectively, for fentanyl and fentanyl-related drug caused deaths. Data cleaning, coding, analysis and report writing were performed by Caleb Banta-Green.

## Findings

Among 41 deaths, 48 fentanyl-related compounds were identified (Table 1). Some deaths had multiple types of fentanyl-related compounds detected which could be due to the presence of multiple types of products ingested

in one or more products. There was one case where 4-ANPP, but no fentanyl-related drug was detected, another fentanyl-related drug could have been present, but at such a low concentration it could not be detected.

**Table 1. Type of fentanyl detected among 41 decedents**

<b>Drug type</b>	<b>#</b>
Fentanyl	33
4-ANPP	7
Acetyl fentanyl	2
Parafluorofentanyl	2
Despropionylfentanyl	1
<b>Total</b>	<b>48</b>

During 2016, the 41 deaths investigated included 9 involving Rx-type-fentanyl, 18 involving unknown-fentanyl and 14 involving non-Rx-fentanyls. These deaths are characterized by type of fentanyl in the tables below to determine if various characteristics are present in similar proportions across the fentanyl types. Characteristics of the 41 decedents are presented in Table 2. Age was different across the fentanyl types with Rx-type-fentanyl the oldest, 48.1 years on average, and unknown-fentanyl the youngest, 29.1 years on average. There were two deaths determined to be suicides, both with Rx-type-fentanyl; all other deaths were determined to be accidents. Three-quarters of the decedents were male and the majority were white.

**Table 2. Characteristics of 41 decedents**

	<b>Rx-type-fentanyl</b>		<b>Unknown-fentanyl</b>		<b>Non-Rx-fentanyls</b>		<b>Total</b>	
	Average	Std. Error	Average	Std. Error	Average	Std. Error	Average	Std. Error
Age	48.1	(5.4)	29.1	(2.3)	37.6	(3.5)	36.2	(2.2)
	#	%	#	%	#	%	#	%
Accident	7	78%	18	100%	14	100%	39	95%
Suicide	2	22%	0	0%	0	0%	2	5%
Male	7	78%	14	78%	10	71%	31	76%
White	6	67%	15	83%	12	86%	33	80%
African Am.	1	11%	2	11%	0	0%	3	7%
Nat. Amer.	0	0%	0	0%	1	7%	1	2%
Asian	2	22%	0	0%	1	7%	3	7%
Hispanic	0	0%	1	6%	0	0%	1	2%
<b>Total</b>	<b>9</b>	<b>100%</b>	<b>18</b>	<b>100%</b>	<b>14</b>	<b>100%</b>	<b>41</b>	<b>100%</b>

Overall, 12 (29%) of the 41 deaths involved only fentanyl or a fentanyl-related drug. Deaths involving unknown-fentanyl were the least likely to involve no other drug, 17%, whereas Rx-type-fentanyl involved deaths were the most likely to be single drug, 44% (Table 3).

Heroin was the least common type of major drug identified as a co-ingestant, with only 3 cases overall also testing positive for heroin. This is important as it helps address a commonly asked question: "Is heroin being laced with fentanyl?" There was no obvious evidence that in these cases heroin and fentanyl were in the same

drug that was consumed; further, it appears that heroin and fentanyl or fentanyl-related drugs are uncommonly consumed together, whether knowingly or unknowingly.

Illicit stimulants, usually methamphetamine, but occasionally cocaine or methcathinone/alpha-PVP, varied in frequency with which they were identified in combination with the fentanyl products. Illicit stimulants were most commonly identified in unknown-fentanyl cases, 39%, and least frequently, 11%, of Rx-type-fentanyl-cases. Benzodiazepines were identified in approximately one-quarter of cases overall, most commonly unknown-fentanyl, 44%, and least commonly with non-Rx-fentanyls. Among drug caused deaths generally, benzodiazepines are often co-ingested with heroin and illicitly used Rx-type-opioids. The low proportion of benzodiazepine in combination with non-Rx-fentanyls may be indicative of a different type of drug user. Rx-type-opioids, oxycodone or hydrocodone in these cases, were involved in about one-quarter of all cases, similar across the different fentanyl categories.

Ethanol was relatively uncommon. It was not present in any Rx-type-fentanyl cases, and was present in 22% of unknown-fentanyl cases.

**Table 3. Other drugs present with fentanyl or fentanyl-like-drugs.**

	Rx-type-fentanyl		Unknown-fentanyl		Non-Rx-fentanyls		Total	
	#	%	#	%	#	%	#	%
OTHER DRUGS								
Fentanyl only	4	44%	3	17%	5	36%	12	29%
Heroin	0	0%	2	11%	1	7%	3	7%
Illicit stimulant*	1	11%	7	39%	3	21%	11	27%
Benzodiazepine	2	22%	8	44%	2	14%	12	29%
Rx-type-opioid**	2	22%	5	28%	3	21%	10	24%
Ethanol	0	0%	4	22%	2	14%	6	15%
<b>Total</b>	<b>9</b>	<b>100%</b>	<b>18</b>	<b>100%</b>	<b>14</b>	<b>100%</b>	<b>41</b>	<b>100%</b>

\*Cocaine, methamphetamine, methcathinone/Alpha-PVP

\*\*Oxycodone, hydrocodone

Forms of fentanyl products varied greatly (Table 4). Six of the nine Rx-type-fentanyl deaths had a patch, the others had some indication of prescription without the product itself being located, most likely a dissolved lozenge as a patch would be identified on the skin or in the GI tract if swallowed. The form for unknown-fentanyl involved deaths were all unknown. For the non-Rx-fentanyl deaths, 8 (57%) were identified as powder, 2 (14%) were tablets and 4 (29%) were unknown; the implications here are that it seems unlikely these products were sold as or purchased as heroin which is virtually all brown powder or black tar in Washington State. Note that both WA State Patrol officers as well as reports from medical providers in the Seattle area indicate that in some instances people have purchased what appeared to be an oxycodone pill (e.g. Roxicodone), but in fact it was fentanyl. Fake pharmaceutical products posing as Xanax or Roxicodone have been found to contain fentanyl or fentanyl-related compounds throughout many cities in the United States.

The route of ingestion for Rx-type-fentanyl was most commonly transdermal, a patch on the skin. One Rx-type-fentanyl death involved a patch that was swallowed and another injection in a suicide. The route was mostly unknown for unknown-fentanyl, with just two cases injection. Non-Rx-fentanyls had the greatest variety of routes of injection, while 6 were unknown, 4 were smoking, 2 injection, 1 oral and 1 snorting.

The likely source for Rx-type-fentanyl was a prescription in 5 of the 9 cases, either in the decedents' name or a known alias. For unknown-fentanyl, 3 had an indication of a street/illicit source, though most were unknown source. The only compound with an apparent online source was non-Rx-fentanyls with 2 cases.

**Table 4: Form, route and source of fentanyls**

	Rx-type fentanyl		Unknown fentanyl		Non-Rx fentanyls		Total	
FORM	#	%	#	%	#	%	#	%
Patch	6	67%	0	0%	0	0%	6	15%
Tablet	0	0%	0	0%	2	14%	2	5%
Powder	0	0%	0	0%	8	57%	8	20%
Unknown	3	33%	18	100%	4	29%	25	61%
<b>ROUTE</b>								
Oral	1	11%	0	0%	1	7%	2	5%
Injection	1	11%	2	11%	2	14%	5	12%
Transdermal	4	44%	0	0%	0	0%	4	10%
Snort	0	0%	0	0%	1	7%	1	2%
Smoke	1	11%	0	0%	4	29%	5	12%
Unknown	2	22%	16	89%	6	43%	24	59%
<b>SOURCE</b>								
Street	1	11%	3	17%	2	14%	6	15%
Rx	5	56%	0	0%	0	0%	5	12%
Online	0	0%	0	0%	2	14%	2	5%
Unknown	3	33%	15	83%	10	71%	28	68%
<b>Total</b>	<b>9</b>	<b>100%</b>	<b>18</b>	<b>100%</b>	<b>14</b>	<b>100%</b>	<b>41</b>	<b>100%</b>

**Sub-analysis of fentanyl types July-December 2016**

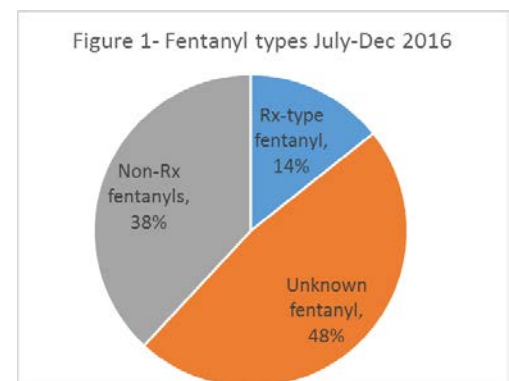
In July 2016, testing for fentanyl analogs began at the WA State Toxicology Lab allowing for a better sense of the relative proportion of different types of fentanyl-related drugs than prior time periods. For these six months, the 21 fentanyl-related deaths included 3 involving Rx-type-fentanyl, 10 involving unknown fentanyl, and 8 involving non-Rx-fentanyls (Figure 1).

**Summary**

The findings are complex and are limited by the small number of cases. Based upon the second half of 2016 when many types of fentanyl products could be detected, it appears that non-Rx-type-fentanyls are involved in a substantial proportion of these cases. Further, the non-Rx-type-fentanyls appear to be in both powder and tablet form, used via multiple routes and available through the internet although the source for most cases was unknown.

Rx-type-fentanyl deaths occurred among the oldest individuals, were most likely to be single drug deaths, were least likely to involve an illicit stimulant or ethanol and included the only two suicides. The unknown-fentanyl cases are by definition the most ambiguous, with the least information about the fentanyl product. However, they are by far the youngest individuals with an average age of 29 years. Unknown-fentanyl type deaths were the least likely to involve a single drug and most likely to involve illicit stimulants, benzodiazepines, and ethanol. The pattern of co-ingestant use among the unknown-fentanyl deaths closely resembles that of heroin involved drug caused deaths as reported in King County drug trends reports in recent years.

From a death investigation perspective, these cases are complex as the type of drugs involved at the time of death may not be clear based on evidence at the scene. It is not until toxicology results come back many weeks



later that the types of drugs involved are known. There may be cases where pills present at the scene (e.g. Xanax/alprazolam) are not detected in the blood which raises questions about whether these pills may actually be some type of fentanyl. In an ideal world, drugs found at the scene would be kept as evidence and tested later, however this is not necessary for a cause of death determination (from the medical examiner or coroners' perspective). In addition, rarely are police involved in complex narcotics investigations for which it is necessary to test the drugs at the scene in addition to getting toxicology done on the decedent. A modest data documentation enhancement by medical examiners and coroners would be to specifically note whether fentanyl detected is likely to be pharmaceutical in origin, as is the standard for morphine reporting in King County.

We are left, for the present time, with clear warning signs of a possible emergent drug phenomenon involving illicit fentanyl and non-Rx-type-fentanyls. Alarm bells are ringing to the north in Vancouver, BC and across much of the U.S., but we have limited ability to detect the types of drugs involved in overdose deaths in real time. We are fortunate to have very effective opioid use disorder (addiction) treatment options and great tools to intervene in an overdose before a person dies.

### Key messages about fentanyl

- Illicit fentanyl and non-Rx-type fentanyls are present locally and causing drug overdoses
- The form of these drugs is often unknown, and when it is known, variable.
- Some non-Rx-type-fentanyls are for sale on the internet and can be deadly.
- Rx-type-fentanyl can be deadly when used at high dose, when used in a non-standard route of administration and when used in combination with other drugs, however, it does not appear to be the major type of fentanyl involved in drug overdose deaths.

### To reduce chances of dying from a fentanyl-involved drug caused death

- If you are addicted to opioids learn about *treatment medications* and consider starting them as quickly as possible, they *support recovery and reduce your chances of dying from an opioid overdose by 50%* <http://stopoverdose.org/section/medication-assisted-treatment/>
- If you live with or are friends with anyone who uses any kind of opioid for any reason you should **learn how to recognize and intervene in an overdose at [www.stopoverdose.org](http://www.stopoverdose.org)**:
  - **If you see someone who uses opioids struggling to breath, try to wake them up** by rubbing your knuckles on their chest bone.
  - If you can't wake them up **call 911** immediately. WA's Good Samaritan Overdose Law protects both you and the person experiencing an overdose from drug possession prosecutions.
  - Do **mouth to mouth rescue breathing** and see if you can wake them up.
  - If they don't wake up after giving 2 breaths, **administer naloxone** if you have it.
  - **Keep doing rescue breathing** until they breathe on their own or first responders arrive.

### Acknowledgments

Thank you to Dr. Richard Harruff, Chief Medical Examiner of the King County Medical Examiner's Office and Dr. Fiona Couper, State Toxicologist with the Washington State Toxicology Laboratory for their support, guidance, and reviews.

Thank you to representatives from the medical examiners' offices in Snohomish, Spokane and Pierce Counties for contributing data.

Thank you to colleagues at the Washington State Department of Health for the collaboration necessary to conduct this investigation.

## References

- Drug Enforcement Administration. (July 2015). Acetyl fentanyl (N-(1-phenethylpiperidin-4-yl)-N-phenylacetamide. Retrieved from [https://www.deadiversion.usdoj.gov/drug\\_chem\\_info/acetylfentanyl.pdf](https://www.deadiversion.usdoj.gov/drug_chem_info/acetylfentanyl.pdf)
- Drug Enforcement Administration. (December 2016). Fentanyl (Trade Names: Actiq®, Fentora™, Duragesic®). Retrieved from [https://www.deadiversion.usdoj.gov/drug\\_chem\\_info/fentanyl.pdf](https://www.deadiversion.usdoj.gov/drug_chem_info/fentanyl.pdf).
- European Monitoring Centre for Drugs and Drug Addiction. Fentanyl Drug Profile. Retrieved from <http://www.emcdda.europa.eu/publications/drug-profiles/fentanyl>.
- Mitchell, G. (2017, March 21). DEA: More than 30 Maricopa County deaths linked to cartel-made drugs. *The Arizona Republic*. Retrieved from: <http://www.azcentral.com/story/news/local/phoenix/2017/03/21/dea-more-than-30-maricopa-county-deaths-linked-cartel-made-drugs/99466708/>
- Banta-Green C, Kingston S, Ohta J, Taylor M, Sylla L, Tinsley J, . . . Von Derau K. (2016). 2015 Drug Use Trends in King County, Washington. Alcohol & Drug Abuse Institute, University of Washington. Retrieved from <http://adai.uw.edu/pubs/pdf/2015drugusetrends.pdf>.
- Somerville NJ, O'Donnell J, Gladden RM, et al. Characteristics of Fentanyl Overdose — Massachusetts, 2014–2016. *MMWR Morb Mortal Wkly Rep* 2017;66:382–386. DOI: [10.15585/mmwr.mm6614a2](https://doi.org/10.15585/mmwr.mm6614a2).
- Harruff RC, Couper FJ, Banta-Green CJ. Tracking the opioid drug overdose epidemic in King County, Washington using an improved methodology for certifying heroin related deaths. *Acad Forensic Pathol* 2015;5(3):499-506. DOI: [10.23907/2015.055](https://doi.org/10.23907/2015.055)

**Citation:** Banta-Green CJ. Fentanyl Death Investigation in Four Washington State Counties. Alcohol & Drug Abuse Institute, University of Washington, May 2017. URL: <http://adai.uw.edu/pubs/pdf/2017fentanyldeaths.pdf>