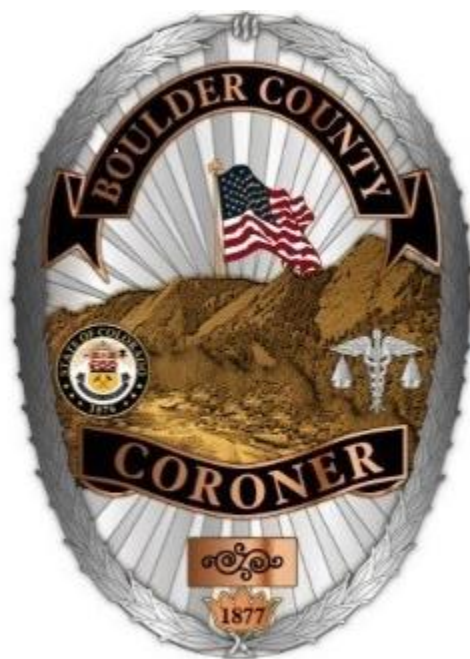


# **Drugs Identified in Deceased Persons by The Office of the Boulder County Coroner**



## **2023 Annual Drug Report**

## Data Collection

The State of Colorado Bureau of Vital Statistics reported 2,439 deaths in Boulder County from January 1, 2023, to December 31, 2023. Of the 2,439 deaths, the Boulder County Coroner's Office (BCCO) certified 393 deaths. Of the 393 deaths, toxicology testing was performed on 220 individuals. Toxicology results determined that the drugs listed below were present at the time of death in 165 decedents. BCCO assessed whether the drug(s) identified was the cause of death or merely present at the time of death. It is important to note that each death is a single case, while each time a drug is detected represents an occurrence. The vast majority of the 165 deaths had more than one drug occurrence.

A drug is indicated as the cause of death only when, after examining all evidence, the autopsy, and toxicology results, a forensic pathologist determines the drug played a causal role in the death. It is not uncommon for a decedent to have multiple drugs listed as a cause of death. However, a drug may not have played a causal role in the death even when the forensic pathologist determines the drug is present or identifiable in the decedent. Therefore, a decedent often is found to have multiple drugs listed as present; these are drug occurrences and are not equivalent to deaths.

Data collection occurred on the following drugs:

Alcohol	Anti-Depressant	Benzodiazepine	Inhalant	Opioid	Other	Stimulant
Ethanol	Aripiprazole	Alprazolam	Halogenated	Buprenorphine	Acetaminophen	Amphetamine
	Desmethylsertraline	Bromazolam	Helium	Codeine	Dextromethorphan	Cocaine
	Duloxetine	Clonazepam	Nitrous Oxide	Fentanyl	Diphenhydramine	Methamphetamine
	Fluoxetine	Diazepam		Heroin	Gabapentin	
	Mirtazapine	Midazolam		Hydrocodone	Ketamine	
	Olanzapine	Nordiazepam		Hydromorphone	Mitragynine	
	Quetiapine	Oxazepam		Methadone	THC/Cannabinoids	
	Risperidone	Temazepam		Morphine		
	Trazadone			Oxycodone		
	Venlafaxine			Oxymorphone		
				Tramadol		
				Nitazenes		

## Highlights

- ✓ 68 total drug related deaths.
- ✓ 21 natural deaths where drugs were merely present at the time of death.
- ✓ 15 natural deaths where no drugs were present at the time of death.
- ✓ 10 opioids only caused deaths (1 Heroin, 9 Fentanyl).
- ✓ 2 Nitazene related deaths (1 Protonitazene, 1 Etonitazene).
- ✓ 38 Fentanyl related deaths.
- ✓ 8 Fentanyl deaths had a benzodiazepine present.
- ✓ 21 Fentanyl deaths had methamphetamine present, and 7 Fentanyl deaths had cocaine present.
- ✓ 41 individuals died with one or more prescription drugs in their system. The drugs were identified as either the cause of death or merely present in the decedent. These drugs may have also been mixed with illicit drugs and/or alcohol. While fentanyl is a prescription drug, data indicates that 100% of fentanyl occurrences were illicitly obtained.
- ✓ 7 individuals died with at least one prescription drug in their system that was identified as the cause of death. These drugs may have been mixed with other prescription drugs, illicit drugs and/or alcohol.
- ✓ 19 individuals died with at least one anti-depressant present in their system. These drugs may have been mixed with other prescription drugs, illicit drugs and/or alcohol.
- ✓ 3 individuals died with at least one anti-depressant identified as the cause of death. These drugs may have been mixed with other prescription drugs, illicit drugs and/or alcohol.
- ✓ 2 individuals died with at least one inhalant identified as the cause of death.
- ✓ The most frequently occurring drugs found in decedents were ethanol (50), fentanyl (47), methamphetamine (37), benzodiazepines (22, including 4 alprazolam and 4 diazepam and 6 clonazepam occurrences), cocaine (17), oxycodone (13) amphetamine (7), gabapentin (10), and morphine (3). Since heroin is rapidly metabolized to morphine, this may lead to a substantial over-reporting of morphine- related deaths as well as significant under-reporting of heroin-related deaths.

# Table of Contents

Summary of Drug Occurrences in Decedents	1
Boulder County Map	3
Ethanol Deaths by City	4
Ethanol Deaths by Age	4
Cannabinoid Deaths by City	5
Cannabinoid Deaths by Age	5
Fentanyl Deaths by City	6
Fentanyl Deaths by Age	6
Methamphetamine Deaths by City	7
Methamphetamine Deaths by Age	7
Cocaine Deaths by City	8
Cocaine Deaths by Age	8
Benzodiazepine Deaths by City	9
Benzodiazepine Deaths by Age	9
Ethanol and Contributing Drugs	10
Manner of Death for Reported Drug Occurrences	11
Glossary	12

## Summary of Drug Occurrences in Decedents

	Drugs Present in Body	Cause	Present	Total Occurrences
<b>Anti-Depressants</b>	Aripiprazole	0	4	4
	Desmethylsertraline	0	1	1
	Duloxetine	0	1	1
	Fluoxetine	0	1	1
	Mirtazapine	0	1	1
	Olanzapine	1	5	6
	Quetiapine	1	1	2
	Risperidone	0	2	2
	Trazadone	0	2	2
	Venlafaxine	1	2	3
<b>Benzodiazepines</b>	Alprazolam	3	1	4
	Bromazolam	2	1	3
	Clonazepam	2	4	6
	Diazepam	0	4	4
	Midazolam	0	5	5
	Nordiazepam	0	2	2
	Oxazepam	0	1	1
	Temazepam	0	2	2
	<b>Ethanol</b>	10	40	50
<b>Inhalants</b>	Halogenated Inhalants	0	0	0
	Helium	2	0	2
	Nitrous Oxide	0	0	0

## Summary of Drug Occurrences in Decedents

	Drugs Present in Body	Cause	Present	Total Occurrences
<b>Opioids</b>	Buprenorphine	0	2	2
	Codeine	0	1	1
	Fentanyl	38	9	47
	Heroin	2	0	2
	Hydrocodone	0	0	0
	Hydromorphone	0	3	3
	Methadone	0	3	3
	Morphine	2	1	3
	Nitazenes	2	0	2
	Oxycodone	3	10	13
	Oxymorphone	0	8	8
	Tramadol	2	0	2
<b>Other</b>	Acetaminophen	1	4	5
	Diphenhydramine	0	3	3
	Dextromethorphan	0	2	2
	Gabapentin	0	10	10
	Ketamine	1	5	6
	Mitragynine	1	2	3
	THC/Cannabinoids	0	64	64
<b>Stimulants</b>	Amphetamine	0	7	7
	Cocaine	14	3	17
	Methamphetamine	28	9	37

*Note: Boulder County Coroner identifies specific metabolites of parent drugs. Since heroin is rapidly metabolized to morphine, this may lead to a substantial over-reporting of morphine-related deaths as well as significant under-reporting of heroin-related deaths. Many deaths were found to have several drugs contributing to the death; therefore, the count of specific drugs listed is greater than the number of deaths.*



Boulder County GIS  
2045 13th St, Boulder CO 80302  
(303) 441-3958

# Boulder County Municipalities

## Municipalities

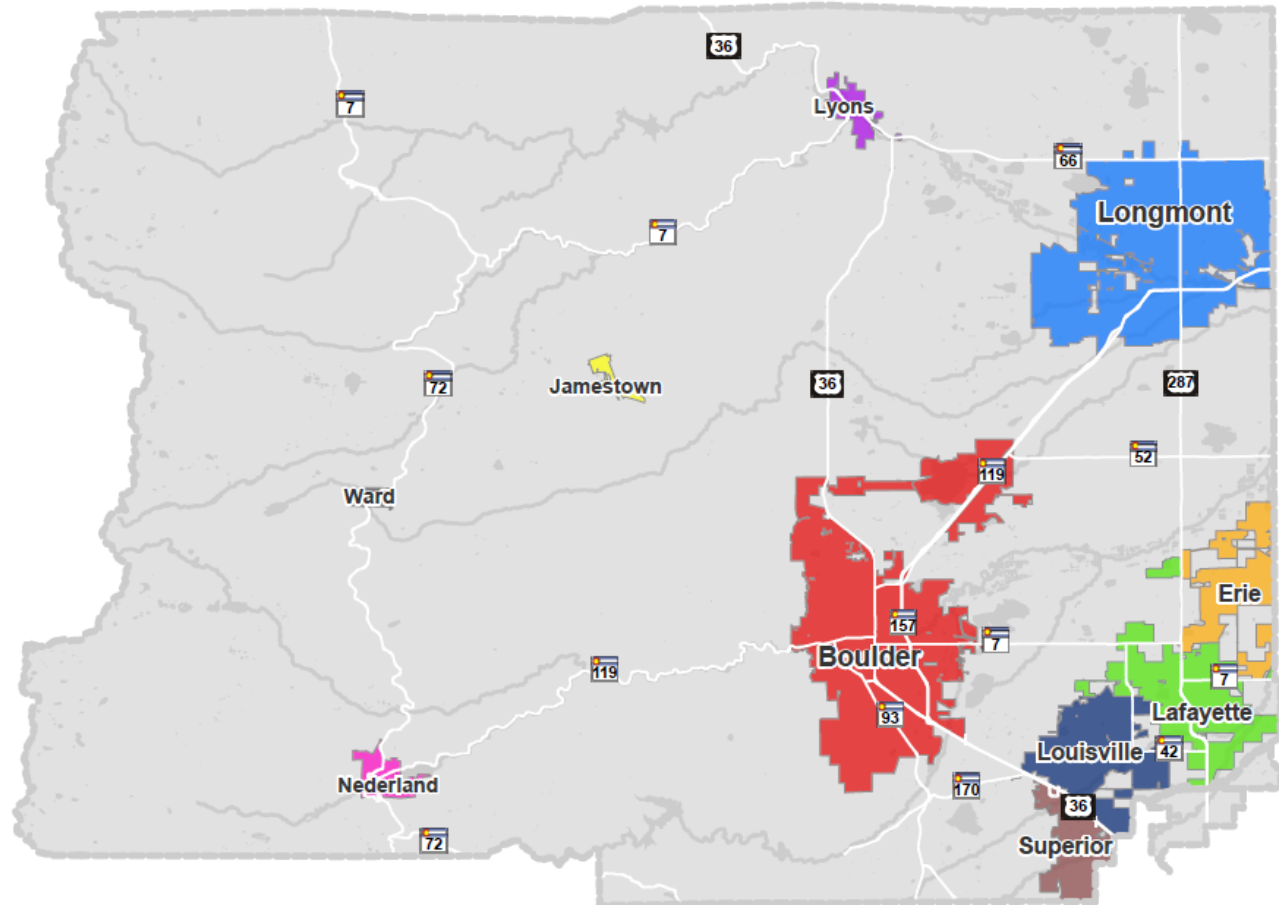
- Boulder
- Erie
- Jamestown
- Lafayette
- Longmont
- Louisville
- Lyons
- Nederland
- Superior
- Ward



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5/23/2022

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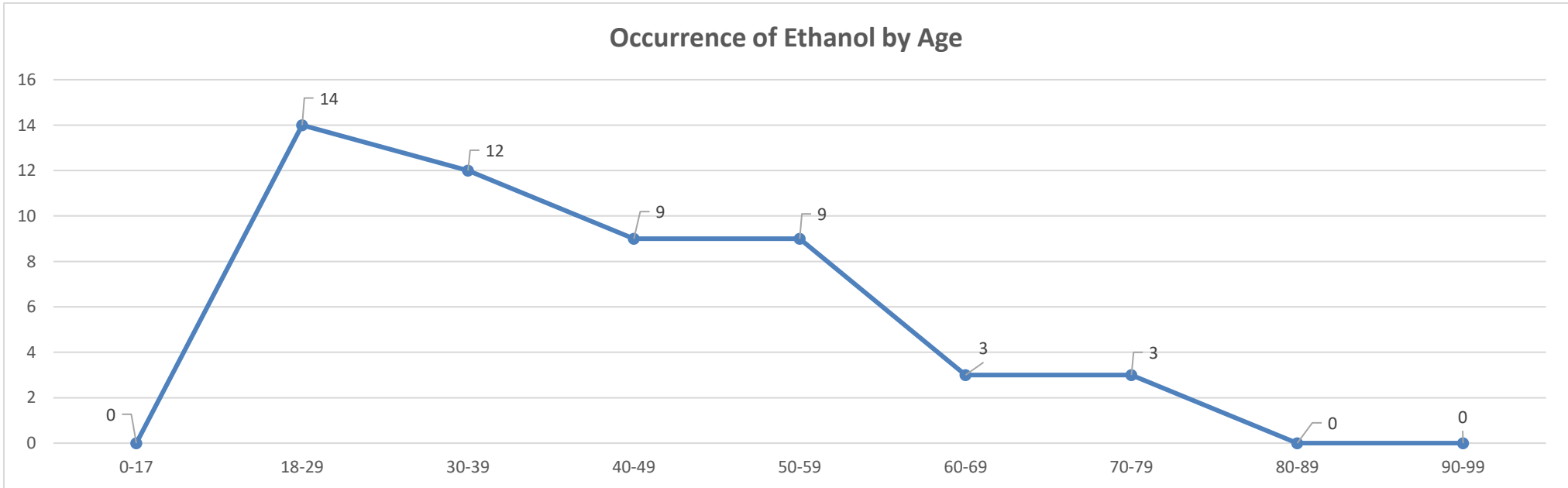
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Areas of Boulder County	
Cities	
Boulder	
Erie	
Jamestown	
Lafayette	
Longmont	
Louisville	
Lyons	
Nederland	
Superior	
Ward	
Unincorporated Areas	
<b>Countywide Totals</b>	

Total Deaths with Ethanol		
Total	Cause	Present
14	3	11
0	0	0
0	0	0
8	0	8
21	7	14
1	0	1
1	0	1
1	0	1
1	0	1
1	0	1
2	0	2
<b>50</b>	<b>10</b>	<b>40</b>

Deaths with Ethanol Only		
Total	Cause	Present
2	0	2
0	0	0
0	0	0
1	0	1
9	0	9
1	0	1
0	0	0
1	0	1
1	0	1
0	0	0
2	0	2
<b>17</b>	<b>0</b>	<b>17</b>

Deaths with Ethanol in Combination with Other Drugs		
Total	Cause	Present
12	3	9
0	0	0
0	0	0
7	0	7
12	7	5
0	0	0
1	0	1
0	0	0
0	0	0
1	0	1
0	0	0
<b>33</b>	<b>10</b>	<b>23</b>



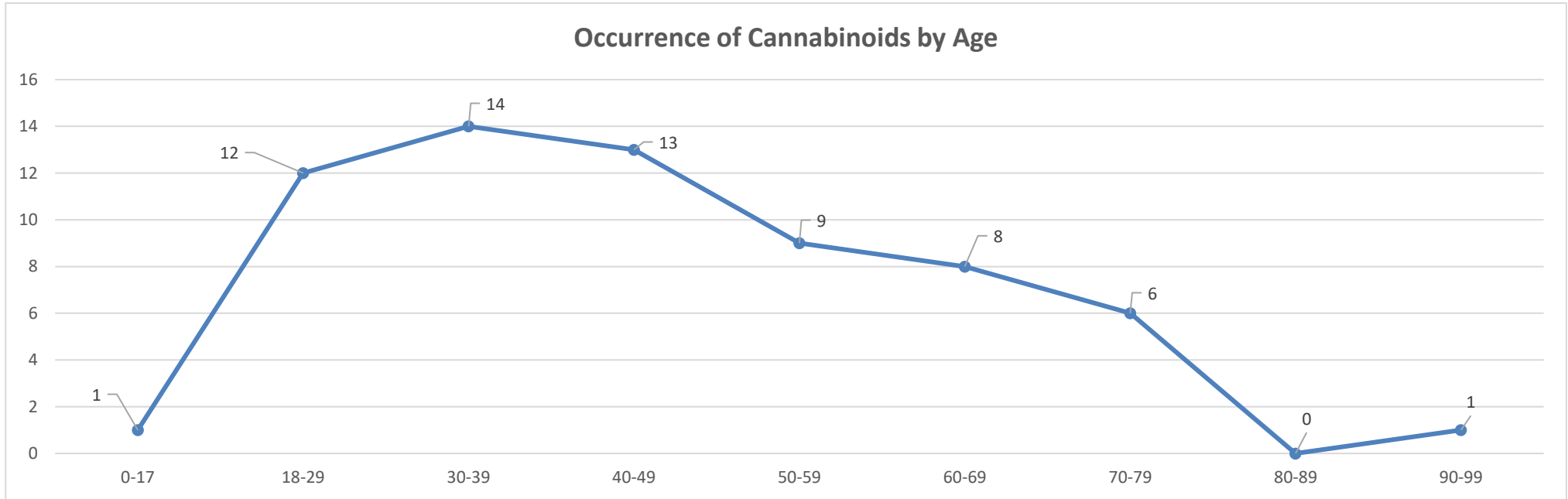


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Cities	
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Erie	
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Nederland	
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Ward	
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Total Deaths with Cannabinoids		
Total	Cause	Present
25	0	25
0	0	0
1	0	1
8	0	8
20	0	20
3	0	3
1	0	1
0	0	0
2	0	2
2	0	2
2	0	2
<b>64</b>	<b>0</b>	<b>64</b>

Deaths with Cannabinoids Only		
Total	Cause	Present
5	0	5
0	0	0
0	0	0
0	0	0
7	0	7
1	0	1
0	0	0
0	0	0
0	0	0
1	0	1
2	0	2
<b>16</b>	<b>0</b>	<b>16</b>

Deaths with Cannabinoids in Combination with Other Drugs		
Total	Cause	Present
20	0	20
0	0	0
1	0	1
8	0	8
13	0	13
2	0	2
1	0	1
0	0	0
2	0	2
1	0	1
0	0	0
<b>48</b>	<b>0</b>	<b>48</b>

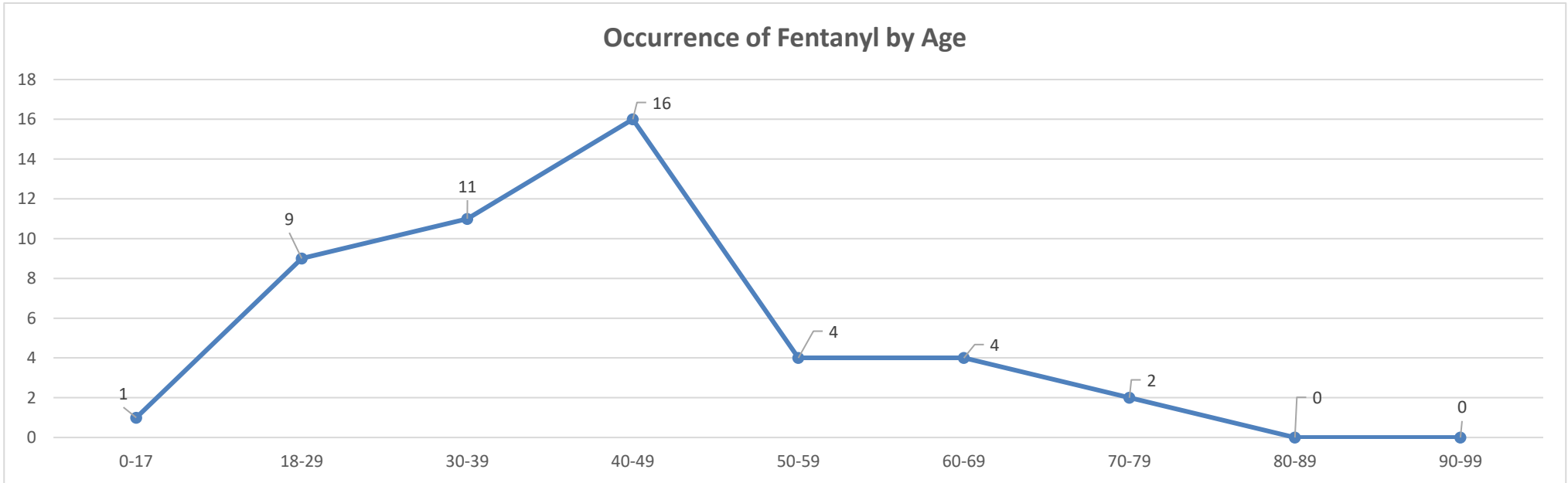


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Erie	
Jamestown	
Lafayette	
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Ward	
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Total Deaths with Fentanyl		
Total	Cause	Present
20	18	2
1	1	0
0	0	0
7	4	3
14	11	3
3	2	1
0	0	0
0	0	0
1	1	0
1	1	0
0	0	0
<b>47</b>	<b>38</b>	<b>9</b>

Deaths with Fentanyl Only		
Total	Cause	Present
1	0	1
0	0	0
0	0	0
1	1	0
4	3	1
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
<b>6</b>	<b>4</b>	<b>2</b>

Deaths with Fentanyl in Combination with Other Drugs		
Total	Cause	Present
18	18	0
1	1	0
0	0	0
6	3	3
11	8	3
3	2	1
0	0	0
0	0	0
1	1	0
1	1	0
0	0	0
<b>41</b>	<b>34</b>	<b>7</b>

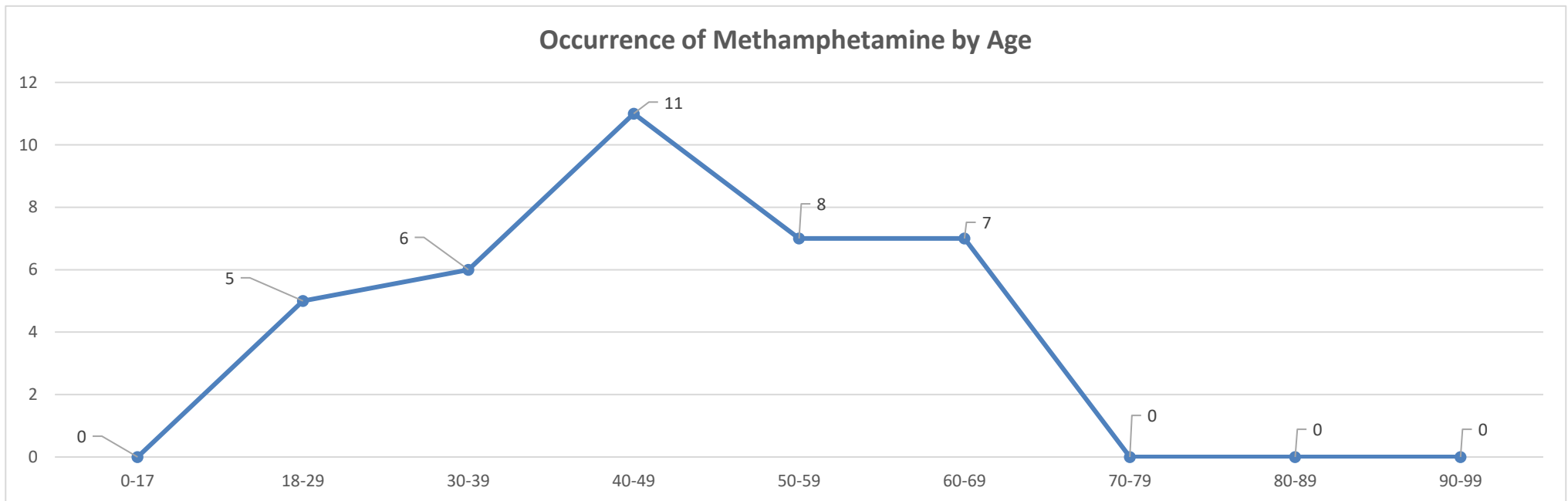


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Total Deaths with Methamphetamines		
Total	Cause	Present
19	16	3
0	0	0
0	0	0
3	1	2
11	8	3
1	1	0
0	0	0
1	0	1
0	0	0
1	1	0
1	1	0
<b>37</b>	<b>28</b>	<b>9</b>

Deaths with Methamphetamines Only		
Total	Cause	Present
5	2	3
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
1	0	1
0	0	0
0	0	0
0	0	0
<b>6</b>	<b>2</b>	<b>4</b>

Deaths with Methamphetamines in Combination with Other Drugs		
Total	Cause	Present
15	15	0
0	0	0
0	0	0
3	1	2
11	8	3
1	1	0
0	0	0
0	0	0
0	0	0
0	0	0
1	1	0
<b>31</b>	<b>26</b>	<b>5</b>

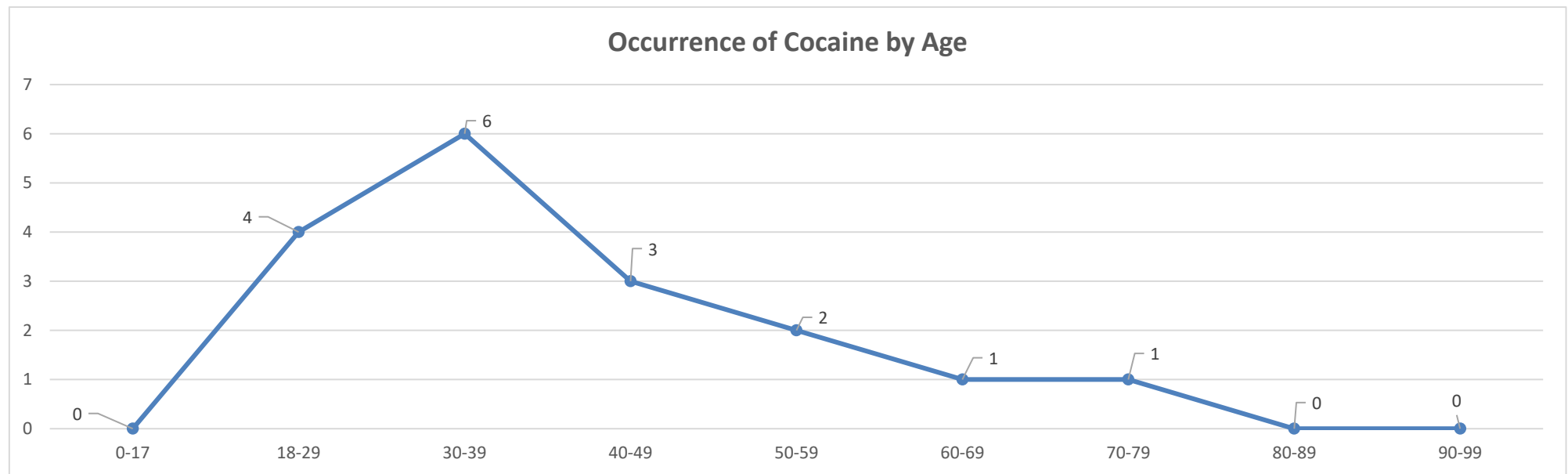


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Total Deaths with Cocaine		
Total	Cause	Present
2	2	0
1	1	0
0	0	0
2	1	1
8	7	1
0	0	0
0	0	0
0	0	0
2	2	0
2	1	1
0	0	0
<b>17</b>	<b>14</b>	<b>3</b>

Deaths with Cocaine Only		
Total	Cause	Present
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	0
0	0	0
0	0	0
0	0	0
<b>0</b>	<b>0</b>	<b>0</b>

Deaths with Cocaine in Combination with Other Drugs		
Total	Cause	Present
2	2	0
1	1	0
0	0	0
2	1	1
8	7	1
0	0	0
0	0	0
0	0	0
2	2	0
2	1	1
0	0	0
<b>17</b>	<b>14</b>	<b>3</b>

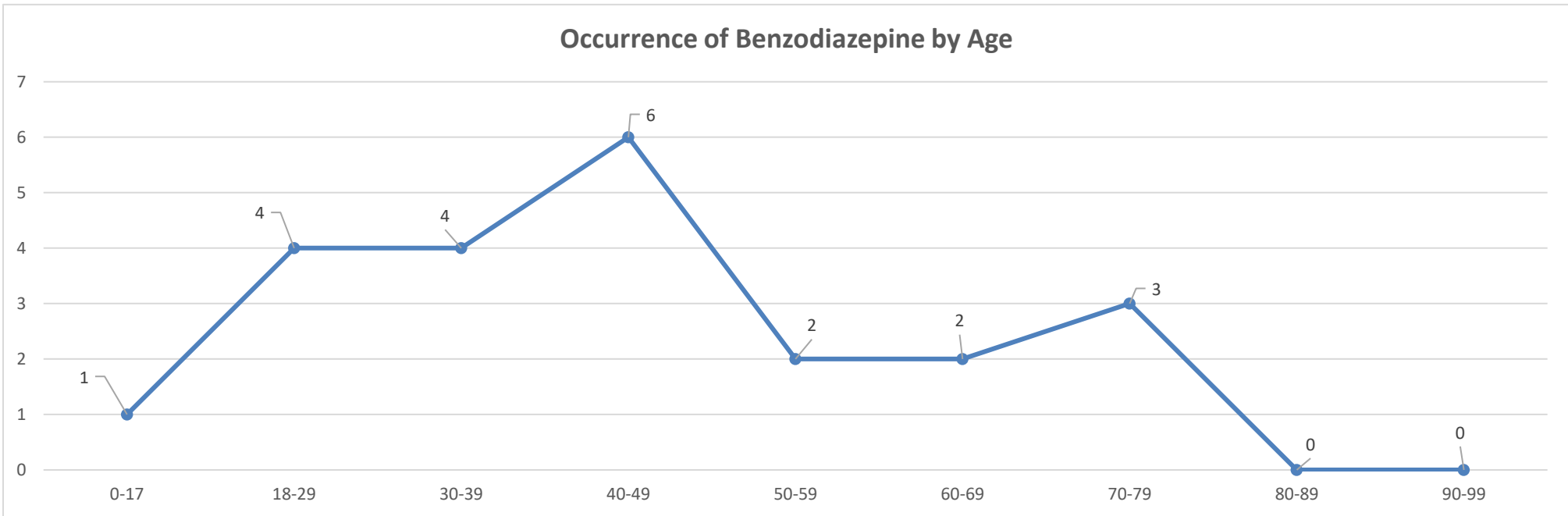


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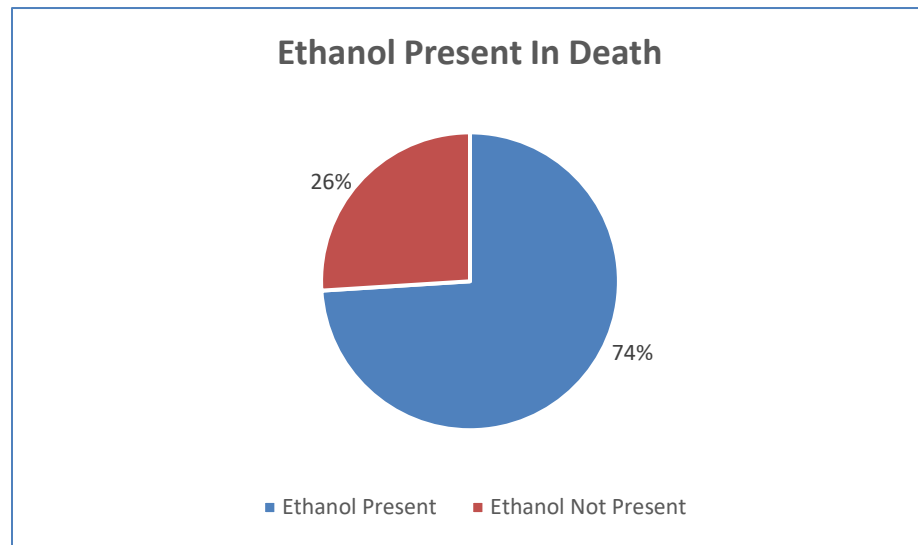
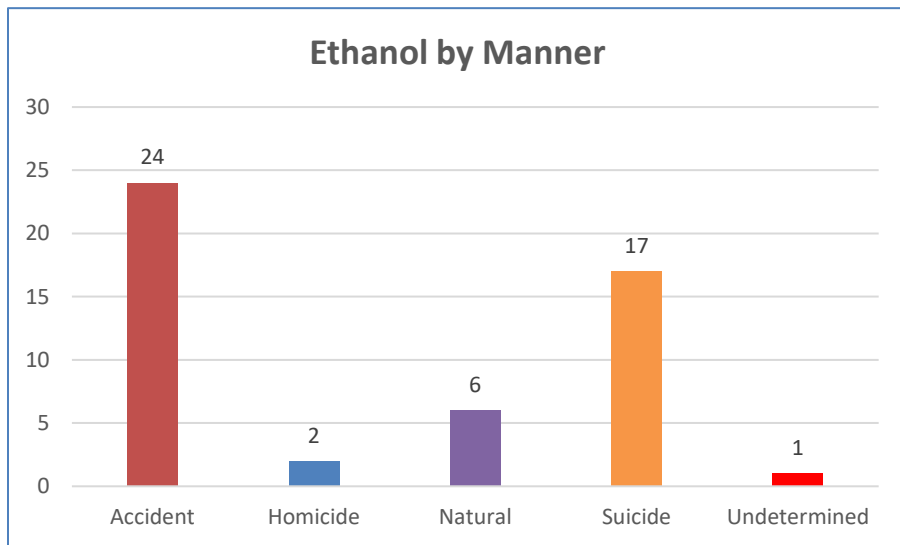
Total Deaths with Benzodiazepine		
Total	Cause	Present
11	4	7
1	0	1
0	0	0
3	0	3
4	1	3
2	1	1
0	0	0
0	0	0
1	0	1
0	0	0
0	0	0
22	6	16

Deaths with Benzodiazepine Only		
Total	Cause	Present
0	0	0
0	0	0
0	0	0
1	0	1
1	0	1
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
2	0	2

Deaths with Benzodiazepine in Combination with Other Drugs		
Total	Cause	Present
11	4	7
1	0	1
0	0	0
2	0	2
3	1	2
2	1	1
0	0	0
0	0	0
1	0	1
0	0	0
0	0	0
20	6	14

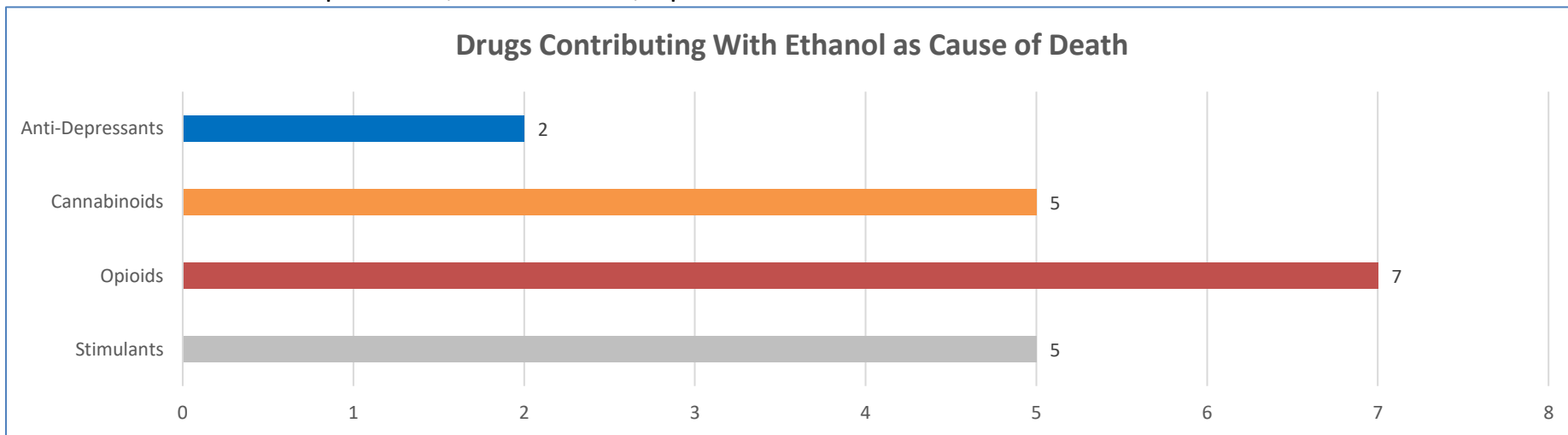


## Ethanol and Contributing Drugs

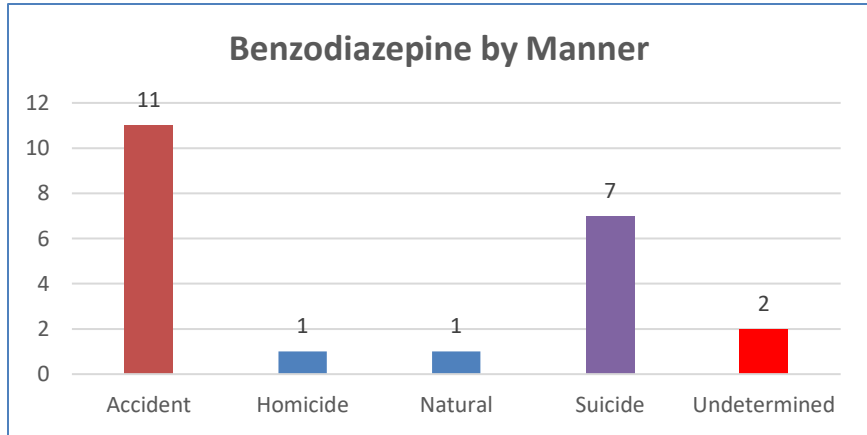
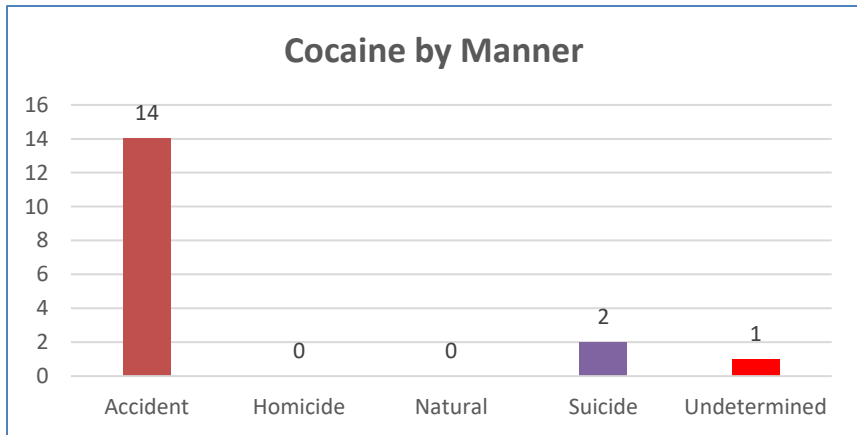
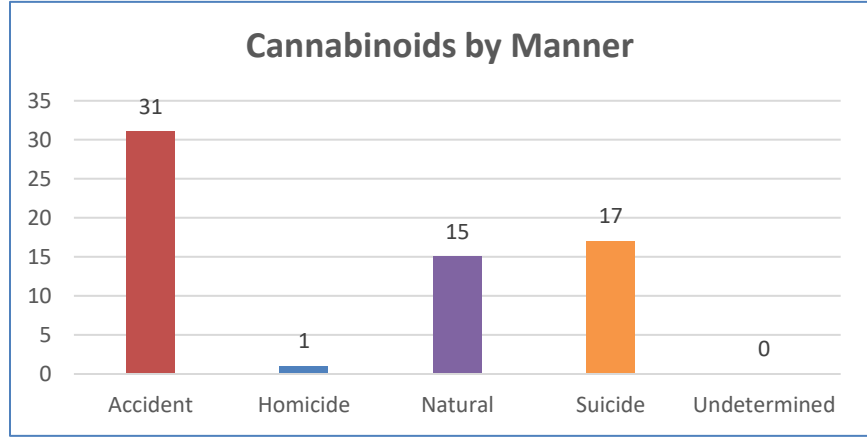
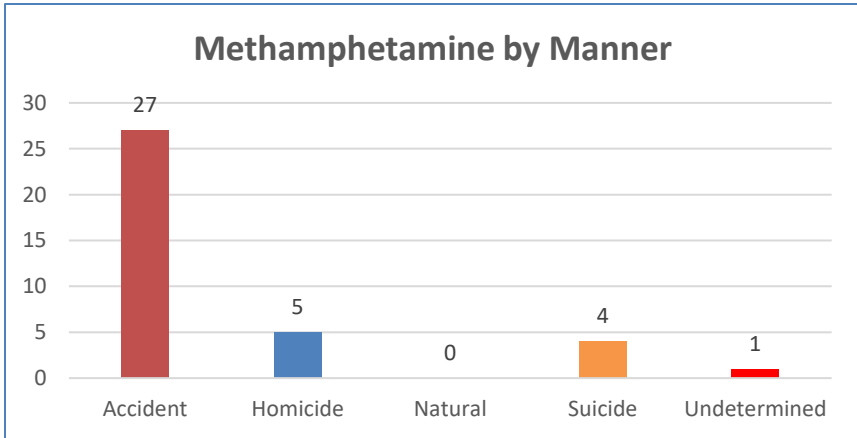
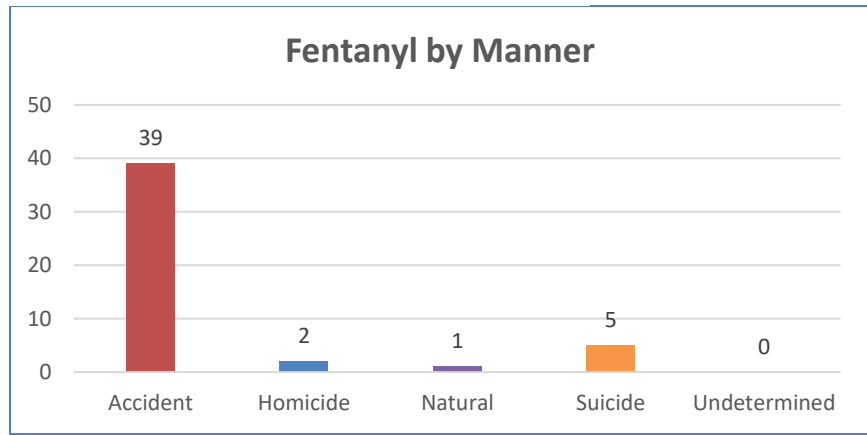
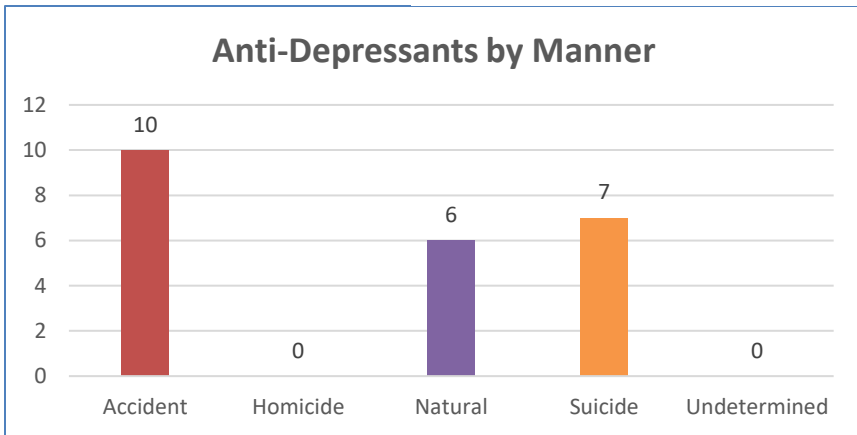


Ethanol is one of the most commonly detected substances found in body fluids during death investigations. While Ethanol was not the primary cause of death in any BCCO drug related death cases, it was present in 74% of the deaths (50/68).

In the 10 deaths where Ethanol was identified as a contributing cause of death, the most common associated mixture of substances were Anti-Depressants, Cannabinoids, Opioids and Stimulants.



# Manner of Death for Reported Drug Occurrences



## Glossary

**Acetaminophen** – Acetaminophen is an over-the-counter analgesic with antipyretic properties; however, it has no anti-inflammatory actions. Proprietary names include Tylenol.

**Alprazolam** – Alprazolam is a low-dose benzodiazepine used for the treatment of anxiety disorders and short-term relief of anxiety associated with depressive symptoms.

**Amphetamine** – A group of synthetic psychoactive drugs called central nervous system (CNS) stimulants. The collective group of amphetamines includes amphetamine, dextroamphetamine, and methamphetamine. Methamphetamine is also known as “meth,” “crank,” “speed,” and “tina.” Methamphetamine is metabolized to amphetamine, and thus, occurrences of amphetamine may represent methamphetamine ingestion rather than amphetamine ingestion.

**Aripiprazole** – Aripiprazole is a novel (atypical) antipsychotic drug that has complex and variable pharmacologic activity at both dopamine and serotonin receptors.

**Benzodiazepine** – A family of sedative-hypnotic drugs indicated for the treatment of stress, anxiety, seizures, and alcohol withdrawal. Benzodiazepines are often referred to as “minor tranquilizers.” Xanax (alprazolam) and Valium (diazepam) are the most commonly prescribed drugs in this drug class. Many benzodiazepines are interconverted to one another, making occurrences of these drugs difficult to interpret. Exceptions include alprazolam, clonazepam, lorazepam, and midazolam.

**Bromazolam** – Bromazolam is a benzodiazepine that is used as a novel psychoactive substance. It is reported to have central nervous system (CNS) depressant properties and shares anticonvulsant, muscle relaxant, hypnotic, anxiolytic and sedative effects with other benzodiazepines. It is not marketed for use as a pharmaceutical product in any country.

**Buprenorphine** - A semi-synthetic opioid known as Buprenex, Suboxone, and Subutex indicated for the treatment of opioid addiction and moderate to severe pain.

**Cannabinoids** - A series of compounds found in the marijuana plant, the most psychoactive of which is THC, a strong, illicit hallucinogen. Street names for this drug are often associated with a geographic area from which it came but also include generic names like “ganja,” “MJ,” “ragweed,” “reefer,” and “grass.”

**Clonazepam** - Clonazepam is an intermediate to long-acting benzodiazepine hypnotic used in the treatment of insomnia and in the prevention and treatment of various seizure disorders.

**Cocaine** – An illicit stimulant. Powdered cocaine goes by many street names including “C,” “blow,” “snow,” and “nose candy,” while freebase cocaine is mostly commonly known as “crack.”



## Glossary Continued

**Codeine** - Codeine is a DEA Schedule III narcotic analgesic with central nervous system depressant activity. Hydrocodone is also a reported metabolite of codeine.

**Desmethylsertraline** – Desmethylsertraline is the principal metabolite of sertraline and has about 10 to 20% of the pharmacologic activity of the parent analyte.

**Duloxetine** – Duloxetine is an antidepressant drug that is described as a 'balanced' inhibitor of both norepinephrine and serotonin neuronal reuptake.

**Diazepam** – Diazepam is a benzodiazepine used primarily for its sedative anxiolytic or muscle relaxing effects.

**Delta-9 THC** – Delta-9 THC is the principle psychoactive ingredient of marijuana (cannabis, hashish).

**Delta-9 Carboxy THC** - Delta-9 THC is the principle psychoactive ingredient of marijuana/hashish. Delta-9 carboxy THC (THCC) is the inactive metabolite of THC.

**Dextromethorphan** – Dextromethorphan is the d-isomer of a synthetic codeine analog that has antitussive activity but is without a significant analgesic effect. The drug is frequently found as a constituent of cough and cold medications for adults and children that are available over-the-counter.

**Diphenhydramine** - Diphenhydramine is an antihistamine with sedative and anti-emetic effects.

**Ethanol** – Ethyl alcohol is a central nervous system depressant and can cause effects such as impaired judgment, reduced alertness, and impaired muscular coordination. Ethanol can also be a product of decomposition or degradation of biological samples.

**Fentanyl** – Synthetic opioid analgesic supplied in transdermal patches and is also available for oral, nasal, intravenous, and spinal administration. Fentanyl is also produced illicitly and currently most fentanyl occurrences represent the ingestion of illicit fentanyl rather than pharmaceutically manufactured fentanyl.

**Fluoxetine** - Fluoxetine is a chemically atypical antidepressant used to help control major depressive disorders.

**Gabapentin** - An anti-epileptic drug also called an anticonvulsant to treat neuropathic pain (nerve pain) caused by herpes virus.

**Halogenated Inhalants** – Includes, but is not limited to, halogenated hydrocarbons, especially refrigerants such as difluoroethane, which is a component of “compressed air” electronics cleaners; these and similar halogenated substances are typically used illicitly as inhalants.

**Helium** – Considered a Noble gas typically used illicitly as inhalants.

## Glossary Continued

**Heroin** – An illicit narcotic derivative. It is a semi-synthetic product of opium. Heroin also has multiple street names including “H,” “hombre,” and “smack.”

**Hydrocodone** – A narcotic analgesic (pain killer). Vicodin and Lortab are two common drugs containing hydrocodone.

**Hydromorphone** – A narcotic analgesic (pain killer) used to treat moderate to severe pain. Marketed under the trade name Dilaudid, it is two to eight times more potent than morphine. Commonly used by abusers as a substitute for heroin.

**Ketamine** – An animal tranquilizer and a chemical relative of PCP. Street names for this drug include “special K,” “vitamin K,” and “cat valium.”

**Methadone** – A synthetic narcotic analgesic (pain killer) commonly associated with heroin detoxification and maintenance programs and is also prescribed to treat severe pain. It has been increasingly prescribed in place of oxycodone for pain management. Dolophine is one form of methadone.

**Methamphetamine** – Methamphetamine is a DEA schedule II stimulant drug capable of causing hallucinations, aggressive behavior and irrational reactions.

**Midazolam** – Midazolam is a short acting benzodiazepine (a DEA Schedule IV controlled analyte) with sedative/hypnotic properties and is a strong central nervous system depressant. It is used for preoperative sedation, as a sedative hypnotic and as an agent for the induction of anesthesia.

**Mirtazapine** – Mirtazapine is used clinically as an antidepressant.

**Mitragynine** – An alkaloid found in the Kratom plant, which is consumed for its stimulant and analgesic (opioid-like) effects. The leaves of the Kratom plant, either whole or crushed, are smoked, chewed, or prepared as tea. In addition, plant extract containing Mitragynine is available in tablets and capsules.

**Morphine** – A narcotic analgesic (pain killer) used to treat moderate to severe pain. MS (Morphine Sulfate), Kadian, and MS-Contin are the tablet forms; Roxanol is the liquid form. Heroin is metabolized to morphine, and thus, occurrences of morphine may represent heroin ingestion rather than morphine ingestion.

**Nitazenes** – A group of illicit synthetic opioids (e.g., isotonitazene, protonitazene, etonitazene).

**Nitrous Oxide (N<sub>2</sub>O)** – Also known as “laughing gas,” is an inhalant (gas) that produces light anesthesia and analgesia. “Whippets” are a common form of nitrous oxide.

**Nordiazepam** - Nordiazepam is a pharmacologically active metabolite of several benzodiazepines, including diazepam (Valium®) and chlordiazepoxide (Librium®).

## Glossary Continued

**Olanzapine** - Olanzapine is a drug used in the treatment of psychotic disorders (schizophrenia and bipolar mania).

**Oxazepam** - Oxazepam is a benzodiazepine. It is frequently seen as the metabolite of diazepam and other benzodiazepines; however, it is pharmacologically active and may be given as the primary medication for the short-term relief of symptoms of anxiety and in the management of alcohol withdrawal.

**Oxycodone** – A narcotic analgesic (pain killer). OxyContin is one form of this drug and goes by the street name “OC.” Percocet, Percodan, Roxicet, Tylox, and Roxicodone also contain oxycodone.

**Oxymorphone** – A narcotic analgesic (pain killer) that is often prescribed as Opana, Numorphan, and Numorphone.

**Quetiapine** – Quetiapine is an antipsychotic analyte approved by the FDA for the management of the manifestations of psychotic disorders, including schizophrenia.

**Risperidone** - Risperidone is an atypically structured antipsychotic agent.

**Temazepam** - Temazepam is a benzodiazepine hypnotic agent used in the short-term relief of insomnia.

**Tramadol** – A synthetic narcotic analgesic sold under the trade name Ultram and Ultracet. Indications include the treatment of moderate to severe pain. It is a chemical analogue to codeine. Not currently a scheduled drug.

**Trazadone** – Trazodone is a structurally atypical antidepressant agent. It is prescribed for the treatment of major depression.

**Venlafaxine** - Venlafaxine is a non-tricyclic antidepressant agent.