



## Fentanyl and Heroin-Related Deaths in North Carolina

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### OVERVIEW

The North Carolina Office of the Chief Medical Examiner (NC OCME) investigates all sudden, unexpected, and violent deaths in North Carolina, including all suspected drug-related or poisoning deaths, and oversees the operations of the state's entire medical examiner system. The NC OCME collects data from autopsy reports, death certificates, investigation reports, and toxicology reports on all deaths investigated by the medical examiner system in North Carolina. The data collected by the NC OCME can be used to identify trends relating to deaths in North Carolina, inform public health initiatives, and develop prevention strategies.

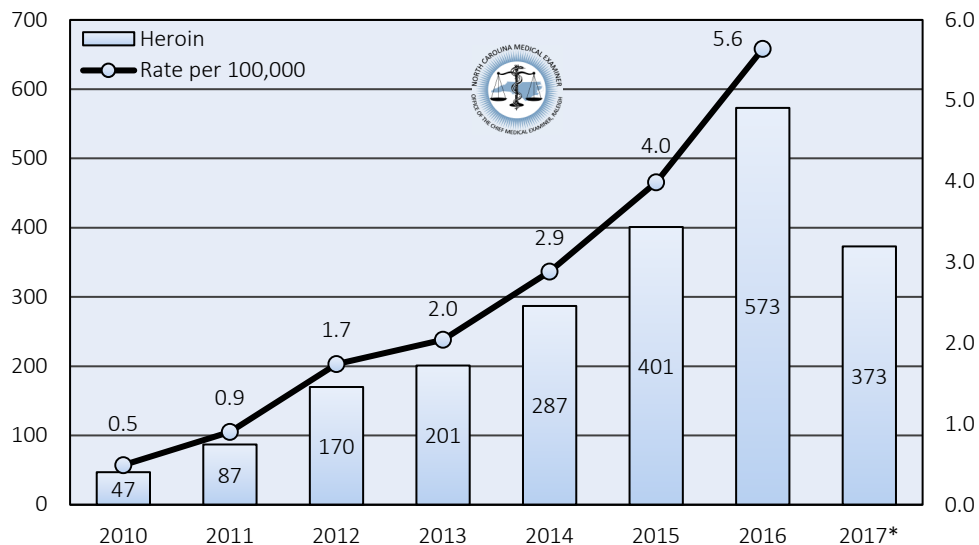
### NC OCME TOXICOLOGY LABORATORY

The NC OCME Toxicology Laboratory is accredited by the American Board of Forensic Toxicology (ABFT) and performs toxicology testing on all drug-related deaths in North Carolina to assist the pathologist in determining cause and manner of death. The NC OCME Toxicology Laboratory screens for more than 600 compounds. The number of novel compounds detected during screening has risen dramatically in the last several years.

### HEROIN-RELATED DEATHS IN NORTH CAROLINA

Deaths involving heroin increased by 1119.1% from 2010 to 2016. It is important to note that the NC OCME Toxicology Laboratory revised testing procedures for heroin in 2017, providing a more accurate representation of the involvement of this drug in poisoning deaths.

**Figure 1 Poisoning Deaths Involving Heroin in North Carolina, 2010 – 2017\***



\*2017 is considered provisional and subject to change as cases continue to be finalized.

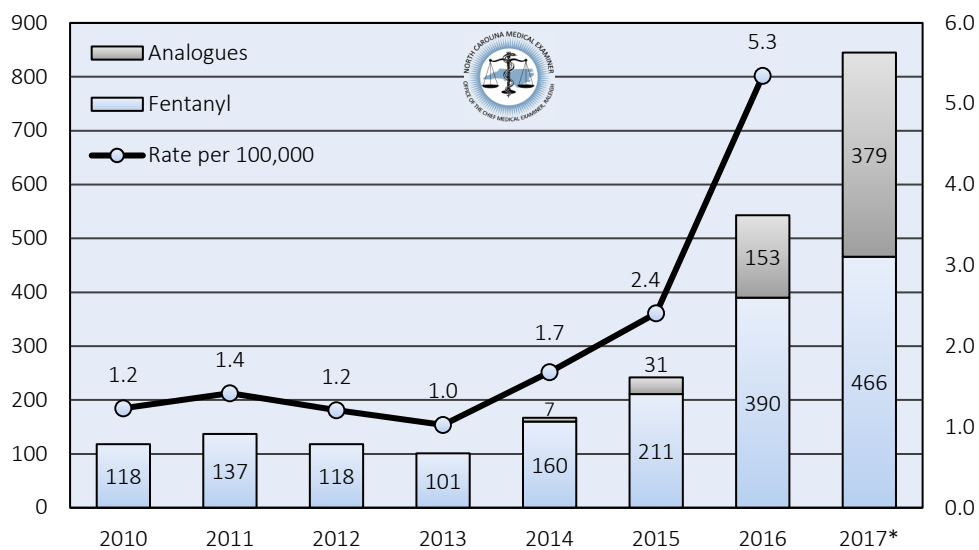


## FENTANYL-RELATED DEATHS IN NORTH CAROLINA

Based on provisional data, deaths involving fentanyl and/or analogues increased by 616.1% from 2010 to 2017.

- Deaths involving fentanyl and/or analogues increased by 124.4% from 2015 to 2016. Based on provisional data, deaths involving fentanyl and/or analogues increased by 55.6% from 2016 to 2017.
- Analogues represented 12.8% of deaths in this category in 2015 and 28.2% in 2016. Based on provisional data, 44.9% of deaths were attributed to analogues in 2017.

**Figure 2 Poisoning Deaths Involving Fentanyl and/or Analogues in North Carolina, 2010 – 2017\***



**Table 1 Poisoning Deaths Involving Fentanyl Analogues, 2010 – 2017\***

Fentanyl Analogue	2010	2011	2012	2013	2014	2015	2016	2017*	TOTAL
Acetyl fentanyl					7	30	2	4	43
Acrylfentanyl							1	8	9
Butyrylfentanyl						1			1
Carfentanil							1	18	19
Cyclopropylfentanyl								121	121
Fluorofentanyl							11		11
Fluoroisobutyrylfentanyl							7	42	49
Furanylfentanyl							119	107	226
Methoxyacetylfentanyl								31	31
Multiple Analogues							12	48	60
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>31</b>	<b>153</b>	<b>379</b>	<b>570</b>

\*2017 is considered provisional and subject to change as cases continue to be finalized.



**Table 2 Fentanyl and/or Analogue-Related Deaths in North Carolina, 2016 – 2017\***

County of Death	2016	2017*	Total
Alamance	4	19	23
Alexander	2	0	2
Alleghany	0	1	1
Anson	0	1	1
Ashe	2	1	3
Avery	0	1	1
Beaufort	0	6	6
Bertie	2	1	3
Bladen	0	0	0
Brunswick	17	11	28
Buncombe	17	68	85
Burke	6	5	11
Cabarrus	21	42	63
Caldwell	4	5	9
Camden	0	0	0
Carteret	6	6	12
Caswell	0	2	2
Catawba	9	14	23
Chatham	1	4	5
Cherokee	0	2	2
Chowan	1	1	2
Clay	1	0	1
Cleveland	1	4	5
Columbus	6	3	9
Craven	16	17	33
Cumberland	27	40	67
Currituck	2	0	2

County of Death	2016	2017*	Total
Dare	4	3	7
Davidson	4	17	21
Davie	1	2	3
Duplin	0	1	1
Durham	9	19	28
Edgecombe	2	1	3
Forsyth	9	22	31
Franklin	2	3	5
Gaston	9	14	23
Gates	4	1	5
Graham	0	0	0
Granville	2	5	7
Greene	0	0	0
Guilford	37	72	109
Halifax	3	2	5
Harnett	4	11	15
Haywood	1	5	6
Henderson	1	6	7
Hertford	1	2	3
Hoke	2	0	2
Hyde	1	2	3
Iredell	7	7	14
Jackson	3	1	4
Johnston	2	8	10
Jones	1	3	4
Lee	5	10	15
Lenoir	0	6	6

\*2017 is considered provisional and subject to change as cases continue to be finalized.



County of Death	2016	2017*	Total
Lincoln	3	2	5
Macon	3	3	6
Madison	0	0	0
Martin	1	1	2
McDowell	0	6	6
Mecklenburg	66	98	164
Mitchell	0	0	0
Montgomery	1	0	1
Moore	3	5	8
Nash	8	1	9
New Hanover	37	30	67
Northampton	0	1	1
Onslow	12	10	22
Orange	3	5	8
Pamlico	2	2	4
Pasquotank	7	5	12
Pender	9	3	12
Perquimans	1	0	1
Person	0	1	1
Pitt	8	24	32
Polk	1	0	1
Randolph	4	14	18
Richmond	1	1	2
Robeson	3	1	4
Rockingham	7	9	16
Rowan	16	33	49
Rutherford	5	1	6
Sampson	1	2	3

County of Death	2016	2017*	Total
Scotland	0	0	0
Stanly	1	5	6
Stokes	0	2	2
Surry	2	2	4
Swain	1	1	2
Transylvania	1	0	1
Tyrrell	1	0	1
Union	5	12	17
Vance	4	5	9
Wake	52	66	118
Warren	0	1	1
Washington	0	0	0
Watauga	1	1	2
Wayne	7	7	14
Wilkes	5	1	6
Wilson	1	6	7
Yadkin	1	1	2
Yancey	0	0	0
<b>TOTAL</b>	<b>543</b>	<b>845</b>	<b>1388</b>

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**Table 3 Heroin-Related Deaths in North Carolina, 2016 – 2017\***

County of Death	2016	2017*	Total
Alamance	3	4	7
Alexander	1	0	1
Alleghany	0	0	0
Anson	0	0	0
Ashe	0	0	0
Avery	0	1	1
Beaufort	0	3	3
Bertie	0	0	0
Bladen	0	0	0
Brunswick	10	8	18
Buncombe	33	15	48
Burke	1	0	1
Cabarrus	15	13	28
Caldwell	2	0	2
Camden	0	1	1
Carteret	3	3	6
Caswell	0	2	2
Catawba	11	7	18
Chatham	1	1	2
Cherokee	2	1	3
Chowan	0	0	0
Clay	0	0	0
Cleveland	1	0	1
Columbus	2	1	3
Craven	9	8	17
Cumberland	19	20	39
Currituck	1	1	2

County of Death	2016	2017*	Total
Dare	1	1	2
Davidson	14	11	25
Davie	3	0	3
Duplin	1	0	1
Durham	12	16	28
Edgecombe	4	1	5
Forsyth	37	27	64
Franklin	1	2	3
Gaston	25	9	34
Gates	0	0	0
Graham	0	0	0
Granville	3	1	4
Greene	0	0	0
Guilford	54	26	80
Halifax	3	2	5
Harnett	3	10	13
Haywood	1	1	2
Henderson	7	3	10
Hertford	1	2	3
Hoke	1	0	1
Hyde	0	1	1
Iredell	6	4	10
Jackson	5	0	5
Johnston	4	5	9
Jones	0	1	1
Lee	3	6	9
Lenoir	2	2	4

\*2017 is considered provisional and subject to change as cases continue to be finalized.



County of Death	2016	2017*	Total
Lincoln	2	0	2
Macon	2	1	3
Madison	0	0	0
Martin	1	1	2
McDowell	0	2	2
Mecklenburg	56	34	90
Mitchell	0	0	0
Montgomery	0	0	0
Moore	1	4	5
Nash	6	2	8
New Hanover	46	15	61
Northampton	0	0	0
Onslow	4	6	10
Orange	6	2	8
Pamlico	2	0	2
Pasquotank	2	2	4
Pender	7	2	9
Perquimans	1	1	2
Person	0	2	2
Pitt	13	8	21
Polk	0	0	0
Randolph	7	7	14
Richmond	1	1	2
Robeson	1	2	3
Rockingham	11	5	16
Rowan	15	2	17
Rutherford	2	0	2
Sampson	3	0	3

County of Death	2016	2017*	Total
Scotland	0	0	0
Stanly	5	1	6
Stokes	2	5	7
Surry	2	2	4
Swain	0	0	0
Transylvania	0	0	0
Tyrrell	0	0	0
Union	7	5	12
Vance	7	7	14
Wake	37	27	64
Warren	0	0	0
Washington	0	0	0
Watauga	0	2	2
Wayne	12	3	15
Wilkes	1	0	1
Wilson	5	0	5
Yadkin	1	2	3
Yancey	0	0	0
<b>TOTAL</b>	<b>573</b>	<b>373</b>	<b>946</b>

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## FAQ

### What are NPS or research chemicals?

- NPS is an acronym for new/novel psychoactive substances continually changed or modified to bypass current United States drug laws. These substances are usually targeted for production by illicit drug chemists/cartels after being identified in research papers and drug patents and are exploited for their different effects on the brain and body. Also referred to as “research chemicals” in online drug forums; different types of these compounds are listed below:
  - Synthetic Cannabinoids: commonly referred to as Spice or K2, these compounds mimic the effects of marijuana.
  - Cathinones: commonly referred to as bath salts, plant food and Flakka; these compounds mimic the effects of methamphetamine and MDMA (Ecstasy/Molly).
  - Synthetic Opioids: This group of compounds is designed to mimic the effects of morphine, oxycodone, heroin and other common prescription opiates/opioids. Some are similar in chemical structure to existing compounds (e.g., fentanyl) .while others are more novel (e.g., U-47700).

### If I see fentanyl on my toxicology report, how do I know which one it is? How do I know if the fentanyl detected was from a prescription product or illicitly manufactured?

- The toxicology report will always list the specific fentanyl variety detected, as we do not report positive drug findings in general terms. Negative results are reported by drug class/test. The lab uses a variety of techniques to detect fentanyl and fentanyl analogues and we keep informed about new variants so that we can expand our list of targeted drugs as needed.
- There is no definitive way to differentiate between prescription fentanyl (e.g., Duragesic®, Fentora®, Sublimaze®, etc.) and illicitly manufactured fentanyl on the basis of the detection of fentanyl alone. However, a moderate percentage of cases with illicitly manufactured fentanyl will also be positive for 4-ANPP which is a byproduct of the production process. The lab will list 4-ANPP on the toxicology report when detected and confirmed. This byproduct is also frequently detected in cases positive for fentanyl analogues.

### How are illicit fentanyl and fentanyl analogues produced?

- Fentanyl and its analogues can be produced in a moderately equipped home based laboratory (like a meth lab) but are primarily produced in large manufacturing facilities in China and Mexico. To illustrate how closely related these compounds are; fentanyl, 4-ANPP and some of the confirmed fentanyl analogues in NC cases are depicted below.

