



## 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.

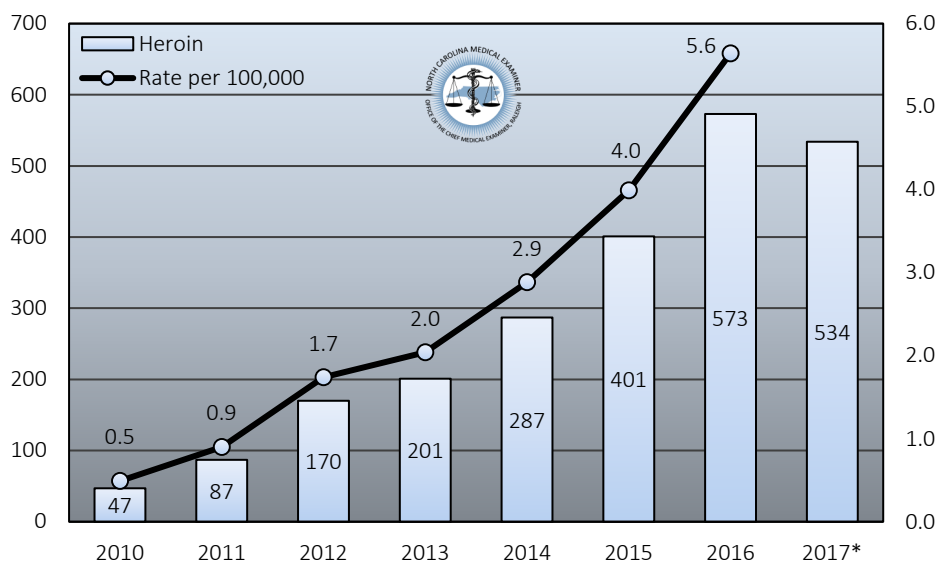
### NC OCME TOXICOLOGY LABORATORY

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 data are considered provisional and subject to change as cases continue to be finalized.

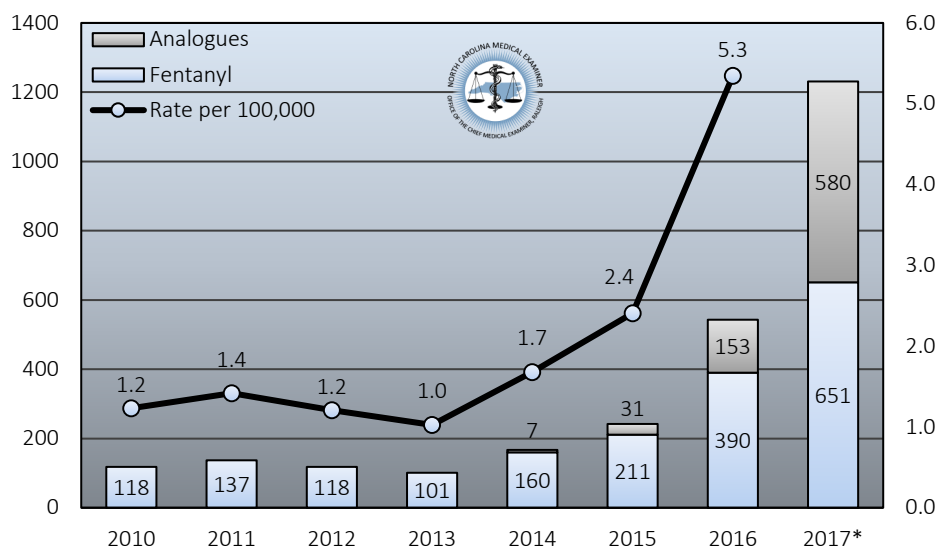


## FENTANYL-RELATED DEATHS IN NORTH CAROLINA

Based on provisional data, deaths involving fentanyl and/or analogues increased by 943.2% 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 126.7% from 2016 to 2017.
- Analogues represented 12.8% of deaths in this category in 2015 and 28.2% in 2016. Based on provisional data, 47.1% 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	13	52
Acrylfentanyl							1	8	9
Butyrylfentanyl						1		1	2
Carfentanil							1	26	27
Cyclopropylfentanyl								208	208
Fluorofentanyl							11		11
Fluoroisobutyrylfentanyl							7	68	75
Furanylfentanyl							119	114	233
Methoxyacetylfentanyl								55	55
Multiple Analogues							12	87	99
<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>580</b>	<b>771</b>

\*2017 data are 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	26	30
Alexander	2	0	2
Alleghany	0	2	2
Anson	0	1	1
Ashe	2	1	3
Avery	0	1	1
Beaufort	0	9	9
Bertie	2	1	3
Bladen	0	0	0
Brunswick	17	19	36
Buncombe	17	97	114
Burke	6	7	13
Cabarrus	21	61	82
Caldwell	4	6	10
Camden	0	0	0
Carteret	6	8	14
Caswell	0	2	2
Catawba	9	17	26
Chatham	1	6	7
Cherokee	0	2	2
Chowan	1	3	4
Clay	1	0	1
Cleveland	1	5	6
Columbus	6	5	11
Craven	16	26	42
Cumberland	27	52	79
Currituck	2	1	3

County of Death	2016	2017*	Total
Dare	4	7	11
Davidson	4	20	24
Davie	1	2	3
Duplin	0	1	1
Durham	9	25	34
Edgecombe	2	2	4
Forsyth	9	31	40
Franklin	2	3	5
Gaston	9	22	31
Gates	4	2	6
Graham	0	0	0
Granville	2	5	7
Greene	0	1	1
Guilford	37	104	141
Halifax	3	5	8
Harnett	4	13	17
Haywood	1	7	8
Henderson	1	11	12
Hertford	1	3	4
Hoke	2	1	3
Hyde	1	2	3
Iredell	7	16	23
Jackson	3	2	5
Johnston	2	12	14
Jones	1	4	5
Lee	5	11	16
Lenoir	0	9	9

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



County of Death	2016	2017*	Total
Lincoln	3	5	8
Macon	3	4	7
Madison	0	0	0
Martin	1	2	3
McDowell	0	7	7
Mecklenburg	66	137	203
Mitchell	0	0	0
Montgomery	1	0	1
Moore	3	7	10
Nash	8	2	10
New Hanover	37	58	95
Northampton	0	2	2
Onslow	12	12	24
Orange	3	9	12
Pamlico	2	3	5
Pasquotank	7	7	14
Pender	9	7	16
Perquimans	1	0	1
Person	0	1	1
Pitt	8	39	47
Polk	1	1	2
Randolph	4	24	28
Richmond	1	1	2
Robeson	3	5	8
Rockingham	7	9	16
Rowan	16	45	61
Rutherford	5	4	9
Sampson	1	3	4

County of Death	2016	2017*	Total
Scotland	0	0	0
Stanly	1	7	8
Stokes	0	6	6
Surry	2	2	4
Swain	1	1	2
Transylvania	1	0	1
Tyrrell	1	0	1
Union	5	17	22
Vance	4	10	14
Wake	52	83	135
Warren	0	1	1
Washington	0	0	0
Watauga	1	1	2
Wayne	7	16	23
Wilkes	5	3	8
Wilson	1	7	8
Yadkin	1	3	4
Yancey	0	1	1
<b>TOTAL</b>	<b>543</b>	<b>1231</b>	<b>1774</b>

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



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

County of Death	2016	2017*	Total
Alamance	3	5	8
Alexander	1	1	2
Alleghany	0	0	0
Anson	0	0	0
Ashe	0	0	0
Avery	0	1	1
Beaufort	0	5	5
Bertie	0	0	0
Bladen	0	0	0
Brunswick	10	11	21
Buncombe	33	25	58
Burke	1	0	1
Cabarrus	15	16	31
Caldwell	2	0	2
Camden	0	1	1
Carteret	3	3	6
Caswell	0	3	3
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	11	20
Cumberland	19	30	49
Currituck	1	1	2

County of Death	2016	2017*	Total
Dare	1	2	3
Davidson	14	12	26
Davie	3	0	3
Duplin	1	0	1
Durham	12	22	34
Edgecombe	4	4	8
Forsyth	37	34	71
Franklin	1	2	3
Gaston	25	14	39
Gates	0	1	1
Graham	0	0	0
Granville	3	1	4
Greene	0	0	0
Guilford	54	35	89
Halifax	3	2	5
Harnett	3	12	15
Haywood	1	2	3
Henderson	7	4	11
Hertford	1	2	3
Hoke	1	1	2
Hyde	0	1	1
Iredell	6	6	12
Jackson	5	0	5
Johnston	4	9	13
Jones	0	2	2
Lee	3	6	9
Lenoir	2	2	4

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



County of Death	2016	2017*	Total
Lincoln	2	1	3
Macon	2	2	4
Madison	0	0	0
Martin	1	2	3
McDowell	0	2	2
Mecklenburg	56	44	100
Mitchell	0	0	0
Montgomery	0	0	0
Moore	1	6	7
Nash	6	4	10
New Hanover	46	34	80
Northampton	0	0	0
Onslow	4	8	12
Orange	6	3	9
Pamlico	2	0	2
Pasquotank	2	3	5
Pender	7	5	12
Perquimans	1	1	2
Person	0	2	2
Pitt	13	12	25
Polk	0	1	1
Randolph	7	9	16
Richmond	1	1	2
Robeson	1	4	5
Rockingham	11	6	17
Rowan	15	4	19
Rutherford	2	2	4
Sampson	3	1	4

County of Death	2016	2017*	Total
Scotland	0	0	0
Stanly	5	2	7
Stokes	2	5	7
Surry	2	3	5
Swain	0	0	0
Transylvania	0	0	0
Tyrrell	0	0	0
Union	7	6	13
Vance	7	11	18
Wake	37	41	78
Warren	0	0	0
Washington	0	0	0
Watauga	0	2	2
Wayne	12	5	17
Wilkes	1	0	1
Wilson	5	0	5
Yadkin	1	2	3
Yancey	0	1	1
<b>TOTAL</b>	<b>573</b>	<b>534</b>	<b>1107</b>



## 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.

