

VIRGINIA DEPARTMENT OF HEALTH

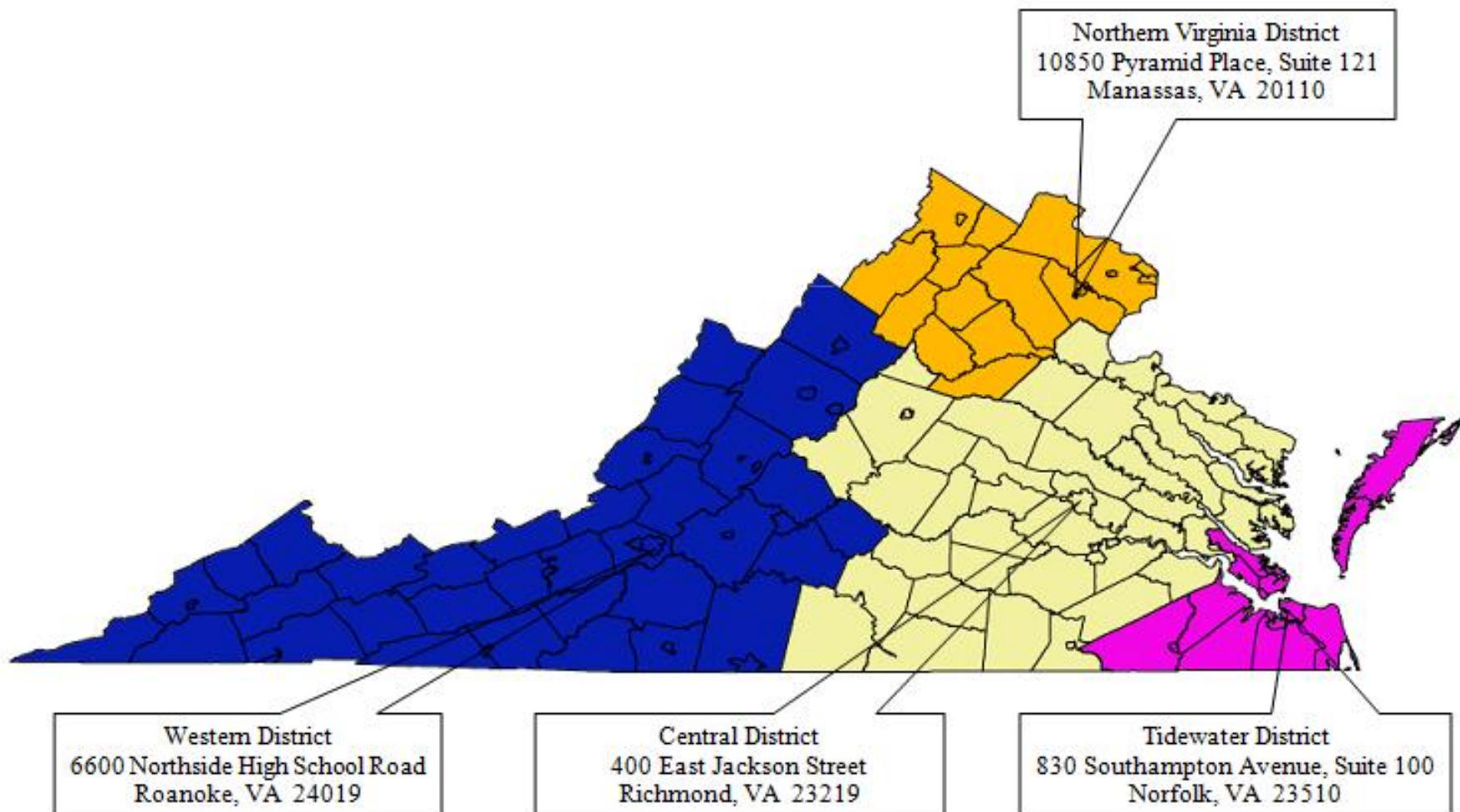
OFFICE OF THE CHIEF MEDICAL EXAMINER

“To promote and protect the health of all Virginians”

Synthetic Drugs: Regional Differences and Novel Forms

William T. Gormley, M.D., Ph.D.
May 9, 2017

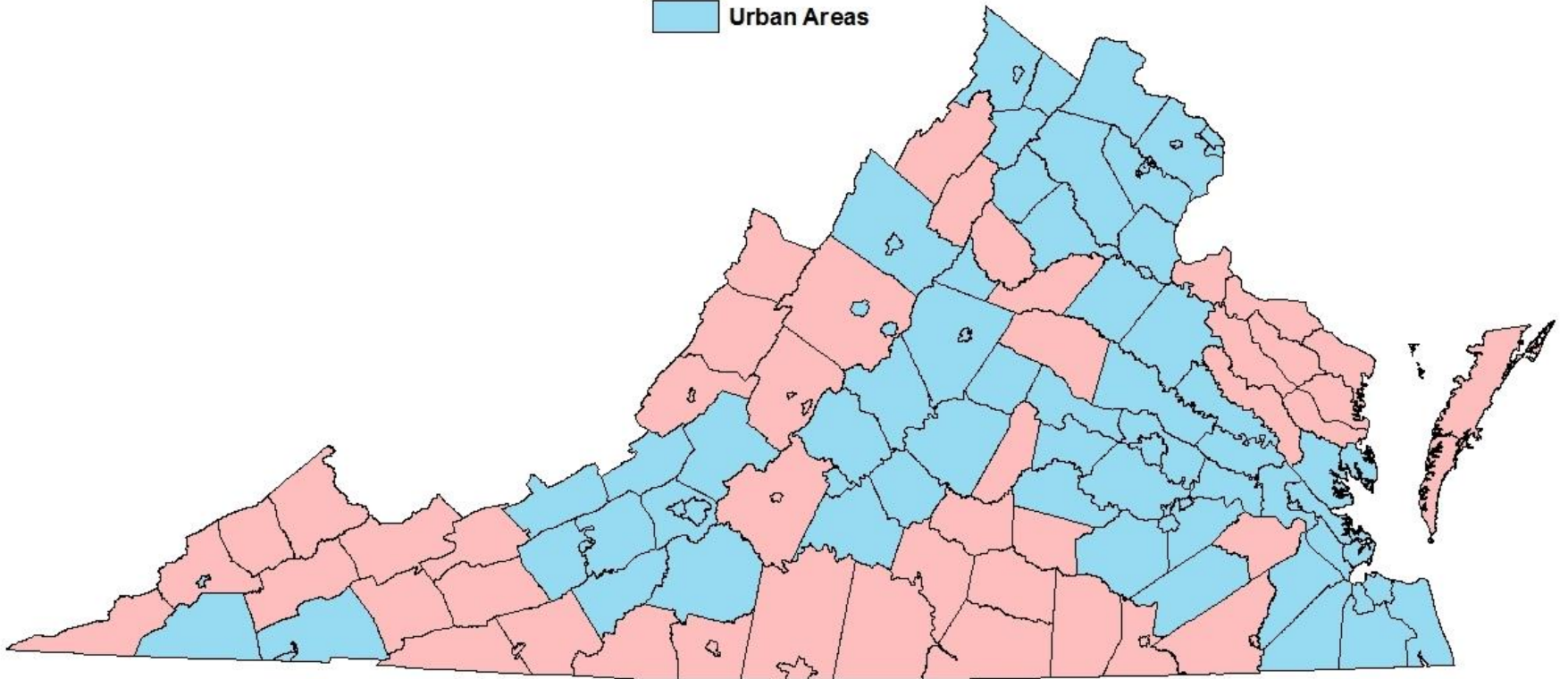
Virginia Department of Health Office of the Chief Medical Examiner District Offices



OCME Jurisdiction

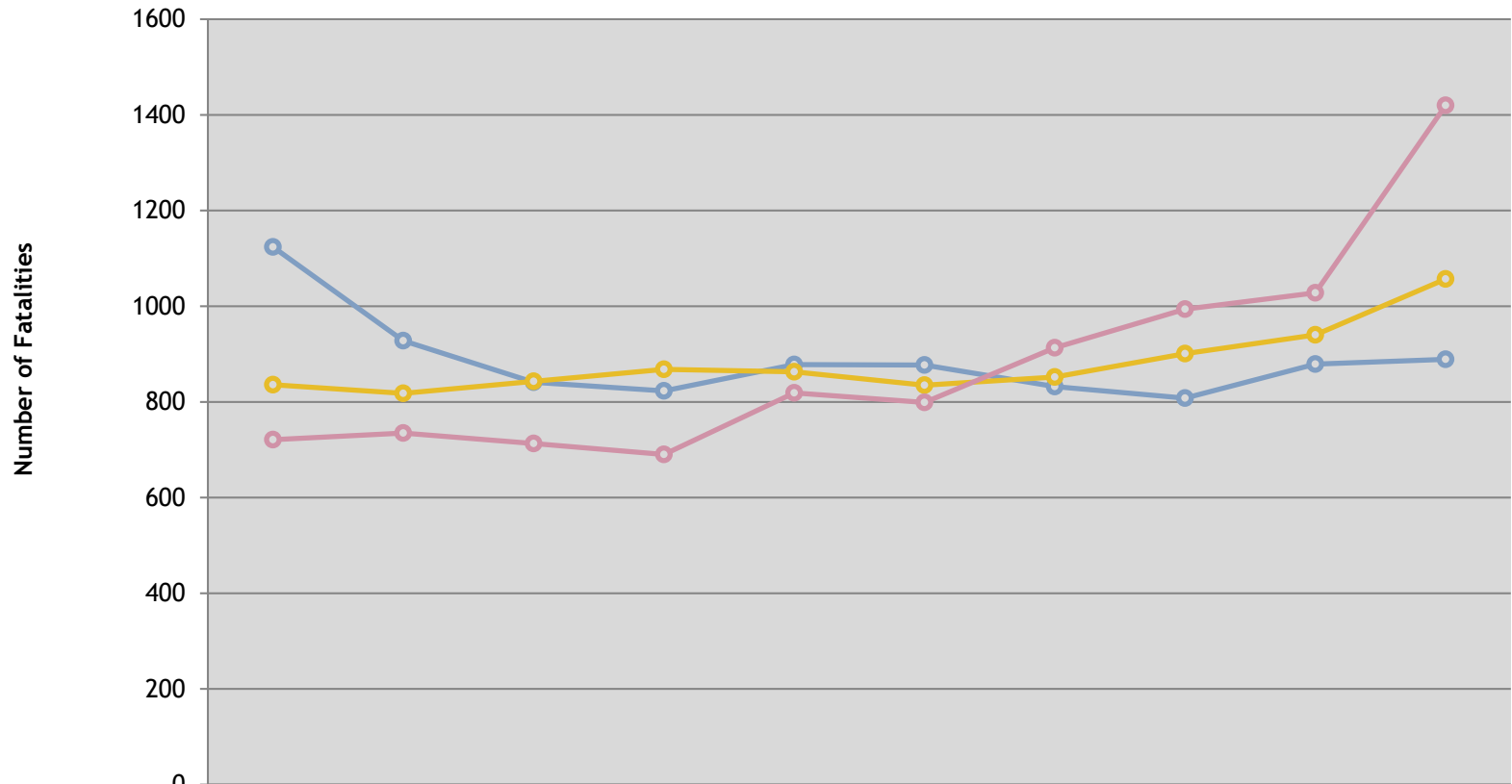
- Virginia-statewide medical examiner system
- Annually, roughly 10% of all deaths in VA come under jurisdiction of the OCME
- To become OCME case:
 - Death must have occurred in VA
 - Pursuant to § 32.1-283 of the Code of Virginia
 - any death from trauma, injury, violence, or poisoning attributable to accident, suicide or homicide
 - any other suspicious, unusual, or unnatural death
 - sudden deaths to persons in apparent good health or deaths unattended by a physician

Rural vs. Urban Localities of Virginia



TOP 3 METHODS OF UNNATURAL DEATH

Total Number of Motor Vehicle, Gun, and Drug Related Fatalities by Year of Death, 2007-2016

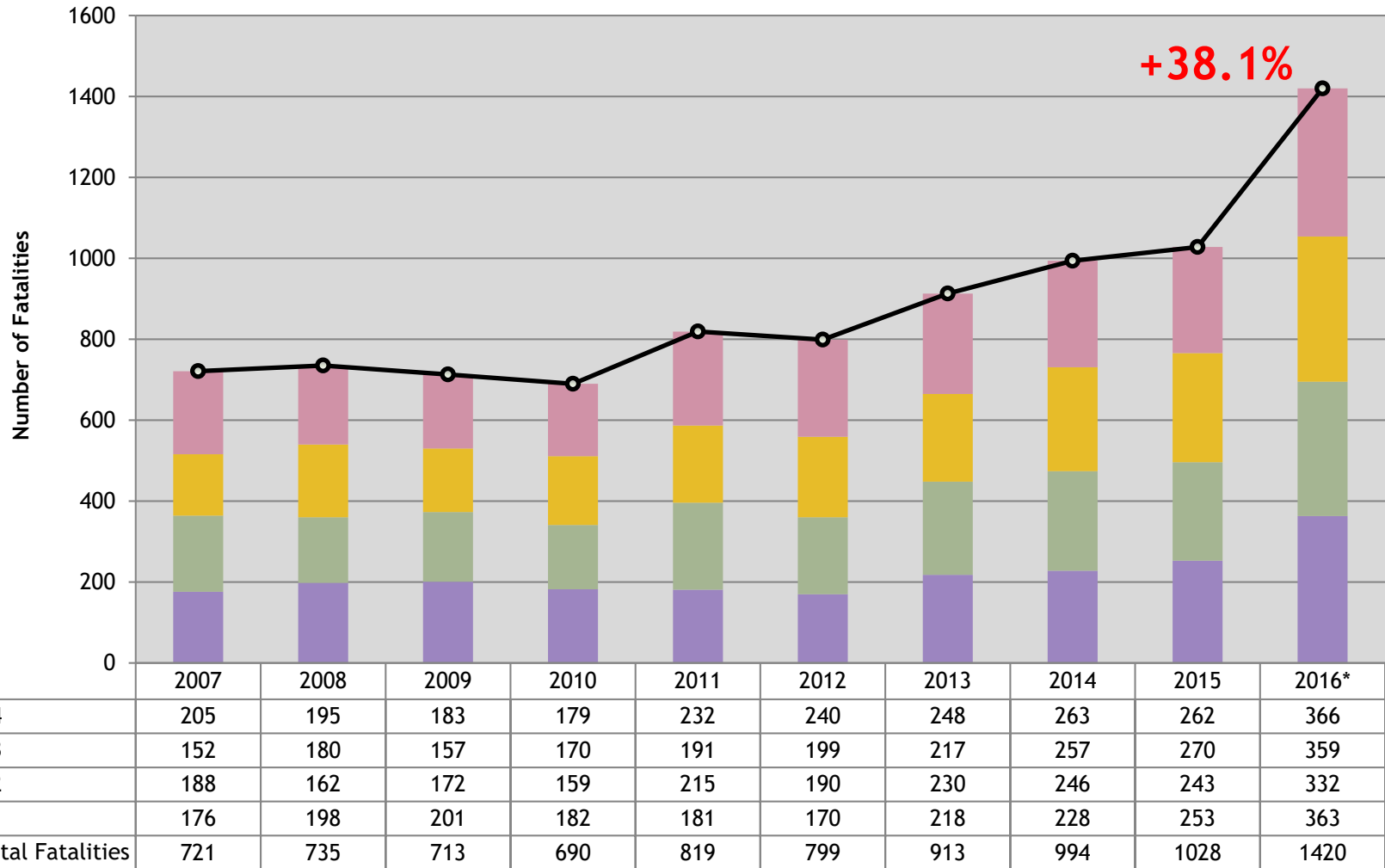


	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Motor Vehicle Related	1124	928	841	823	878	877	832	808	879	889
Gun Related	836	818	843	868	863	835	852	901	940	1057
Fatal Drug Overdose	721	735	713	690	819	799	913	994	1028	1420

¹ Top 3 methods of death (motor vehicles, guns, and drugs) include all manners of death (accident, homicide, suicide, and undetermined)

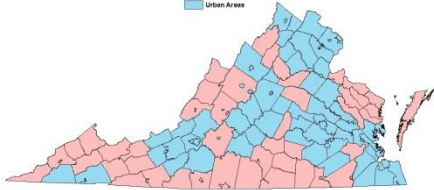
ALL FATAL DRUG OVERDOSES

Total Number of Fatal Drug Overdoses by Quarter and Year of Death, 2007-2016

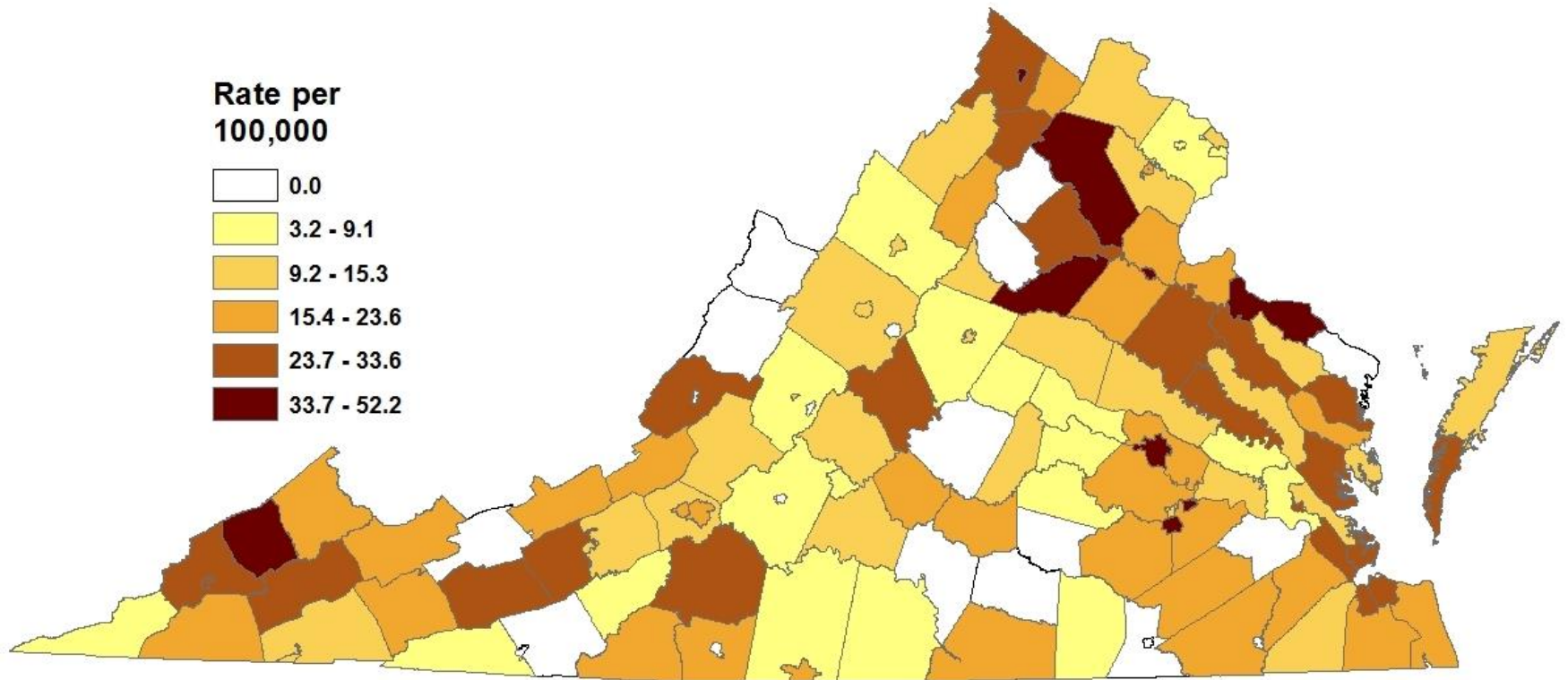


Rural vs. Urban Localities of Virginia

Rural Areas
Urban Areas

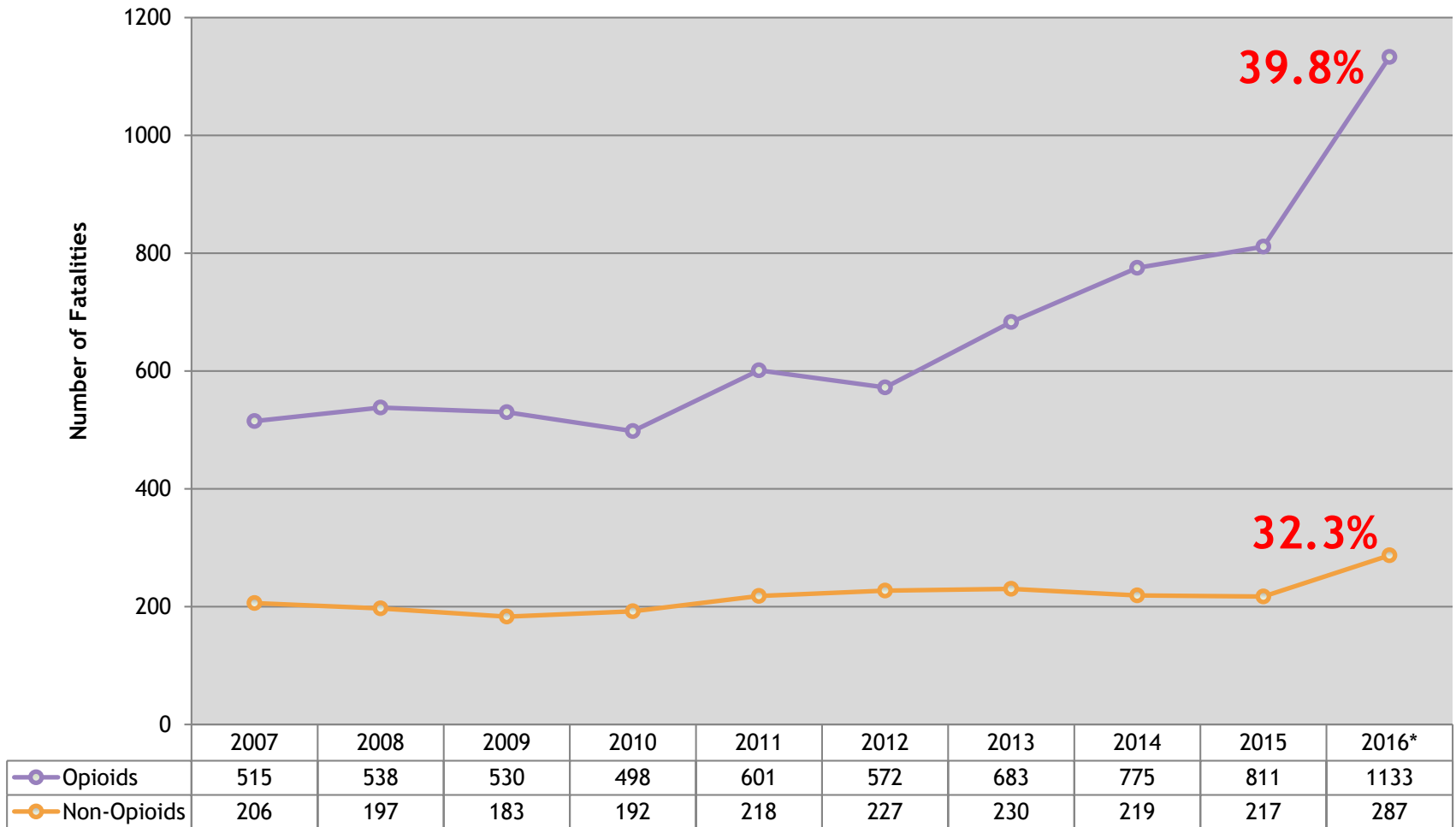


Rate of All Fatal Drug Overdoses by Locality of Overdose, 2016



OPIOIDS VS. NON-OPIOIDS

Total Number of Fatal Opioid Overdoses vs. Non-Opioid Overdoses by Year of Death, 2007-2016



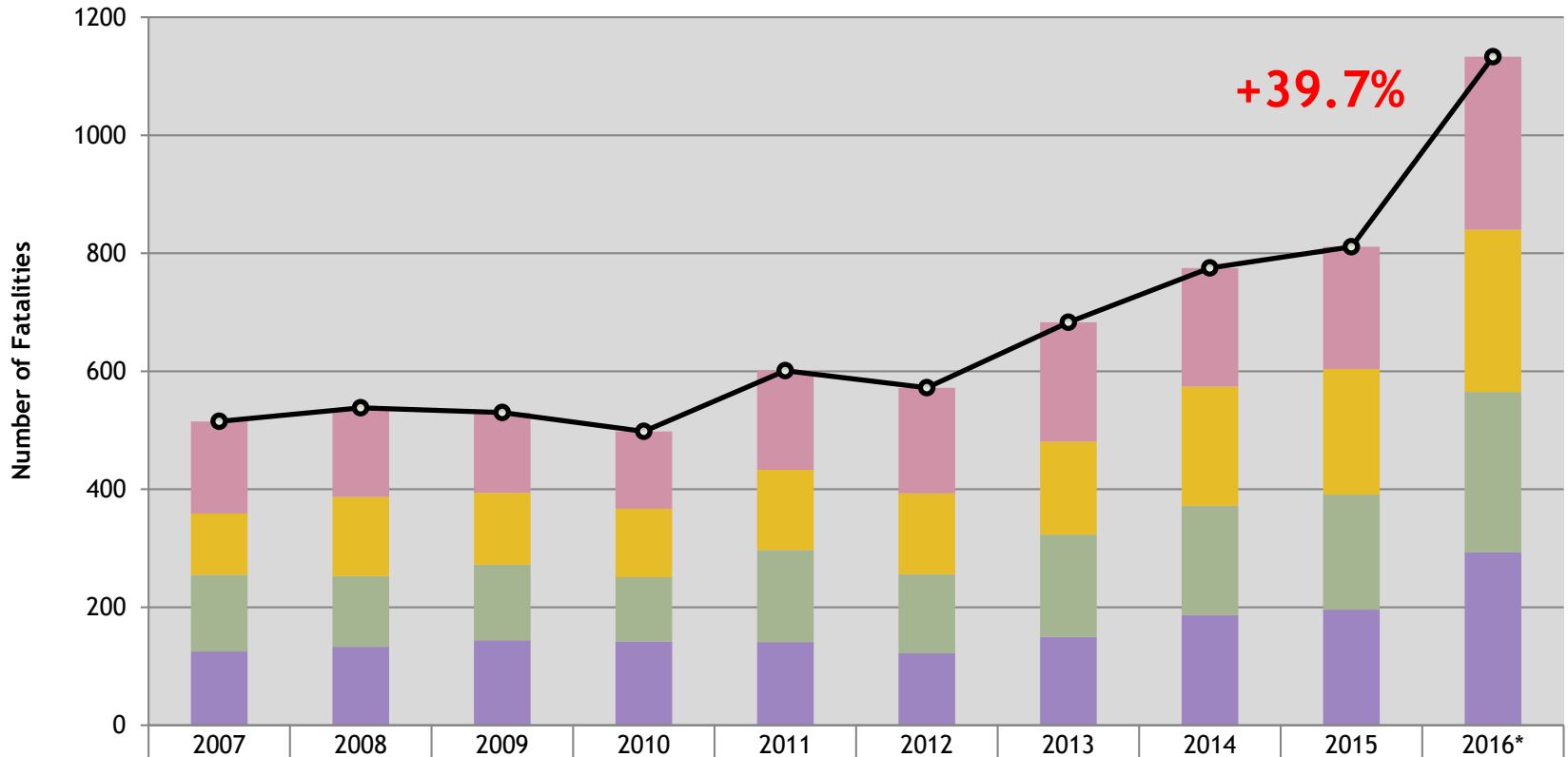
¹ 'All Opioids' include all versions of fentanyl, heroin, prescription opioids, and opioids unspecified

² 'Opioids Unspecified' are a small category of deaths in which the determination of heroin and/or one or more prescription opioids cannot be made due to specific circumstances of the death. Most commonly, these circumstances are a result of death several days after an overdose, in which the OCME cannot test for toxicology because the substances have been metabolized out of the decedent's system.

³ Fatal opioid numbers have changed slightly from past reports due to the removal of fentanyl from the category of prescription opioids, as well as the addition of buprenorphine, levorphanol, meperidine, pentazocine, propoxyphene, and tapentadol added to the list of prescription opioids.

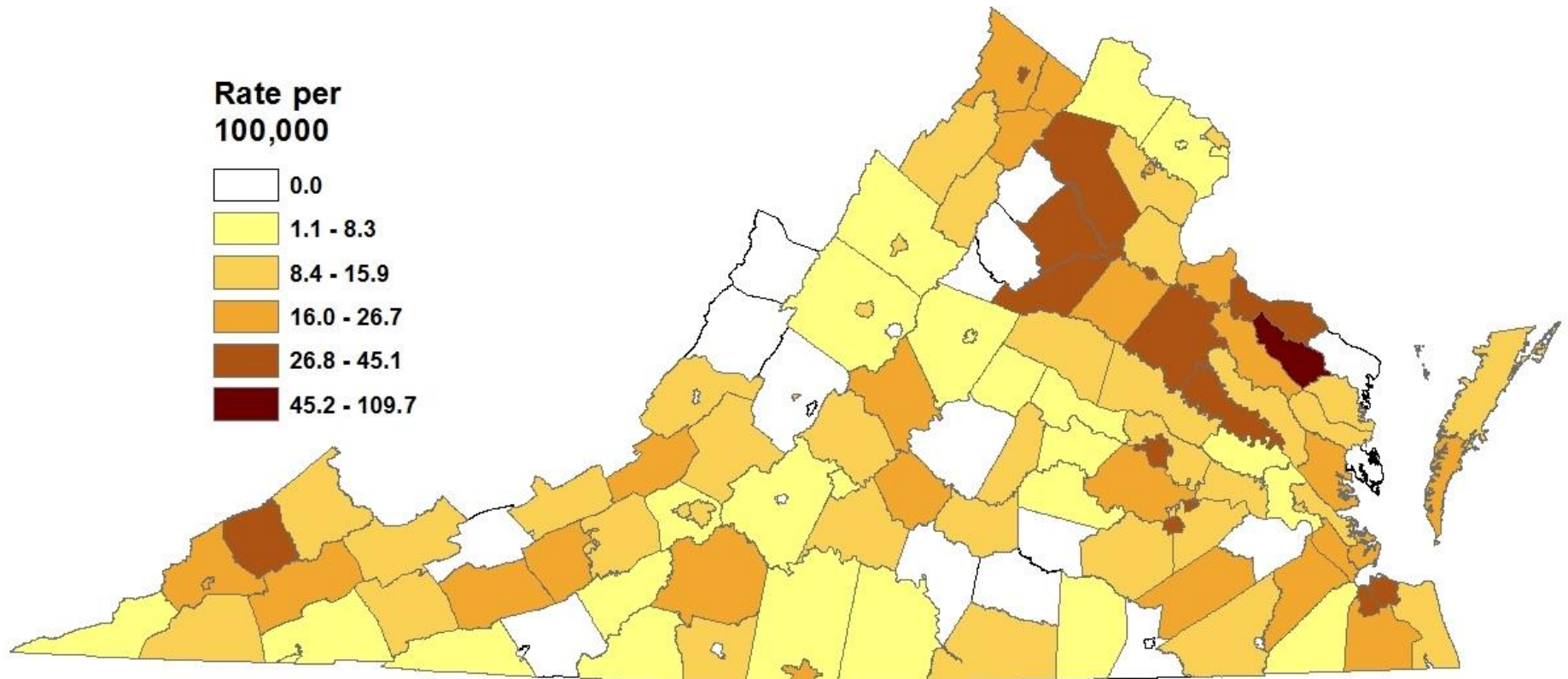
ALL OPIOIDS

Total Number of Fatal Opioid Overdoses by Quarter and Year of Death, 2007-2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Q4	156	151	136	131	168	179	202	201	207	293
Q3	104	134	122	116	136	137	158	202	213	275
Q2	130	120	128	109	156	134	173	185	195	272
Q1	125	133	144	142	141	122	150	187	196	293
Total Fatalities	515	538	530	498	601	572	683	775	811	1133

Rate of All Fatal Opioid Overdoses by Locality of Overdose, 2016



Opioid Categories

Prescription (Rx) Opioids

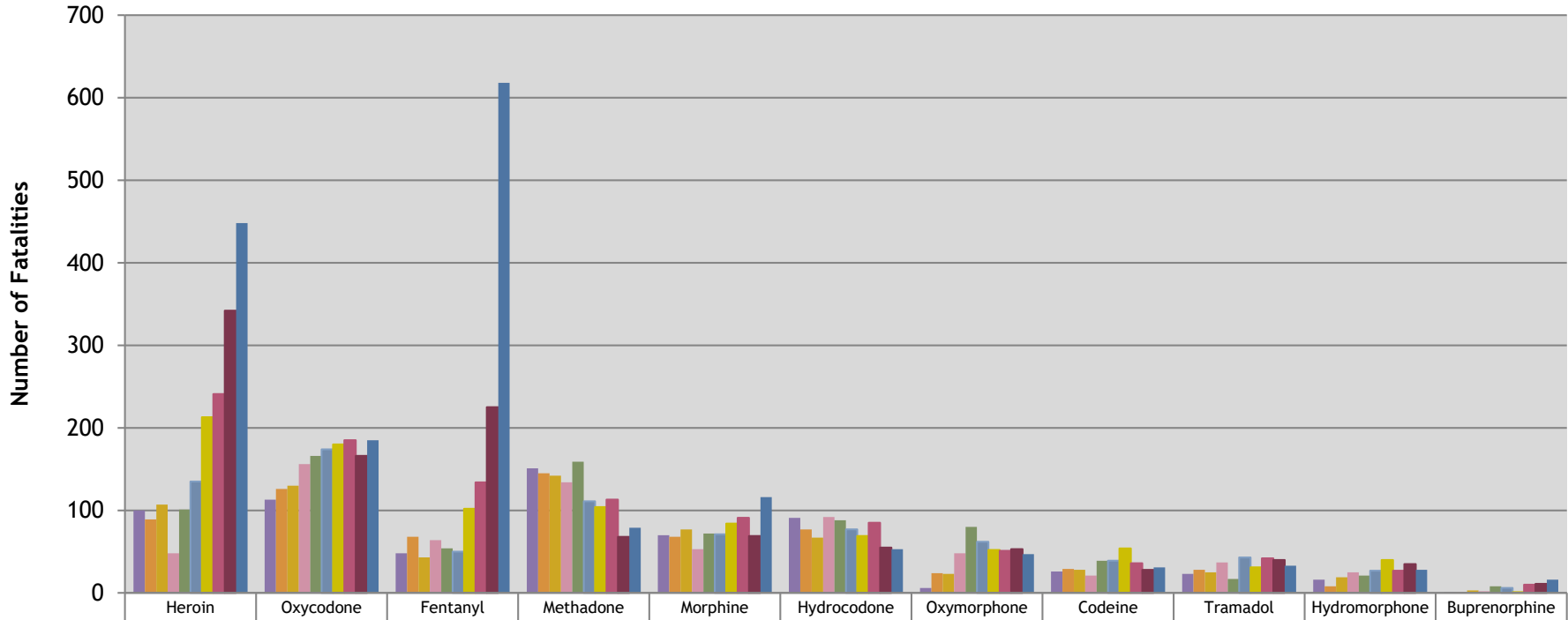
- Buprenorphine
- Codeine
- Fentanyl (also illicit)
- Hydrocodone
- Hydromorphone
- Levorphanol
- Meperidine
- Methadone
- Morphine
- Oxycodone
- Oxymorphone
- Pentazocine
- Propoxyphene
- Tapentadol
- Tramadol

Illicit Opioids

- Fentanyl (can also be Rx)
- Fentanyl analogs
- Heroin
- Illicit synthetic opioids

ALL OPIOIDS

Total Number of Fatal Opioid Overdoses by Drug Name and Year of Death, 2007-2016



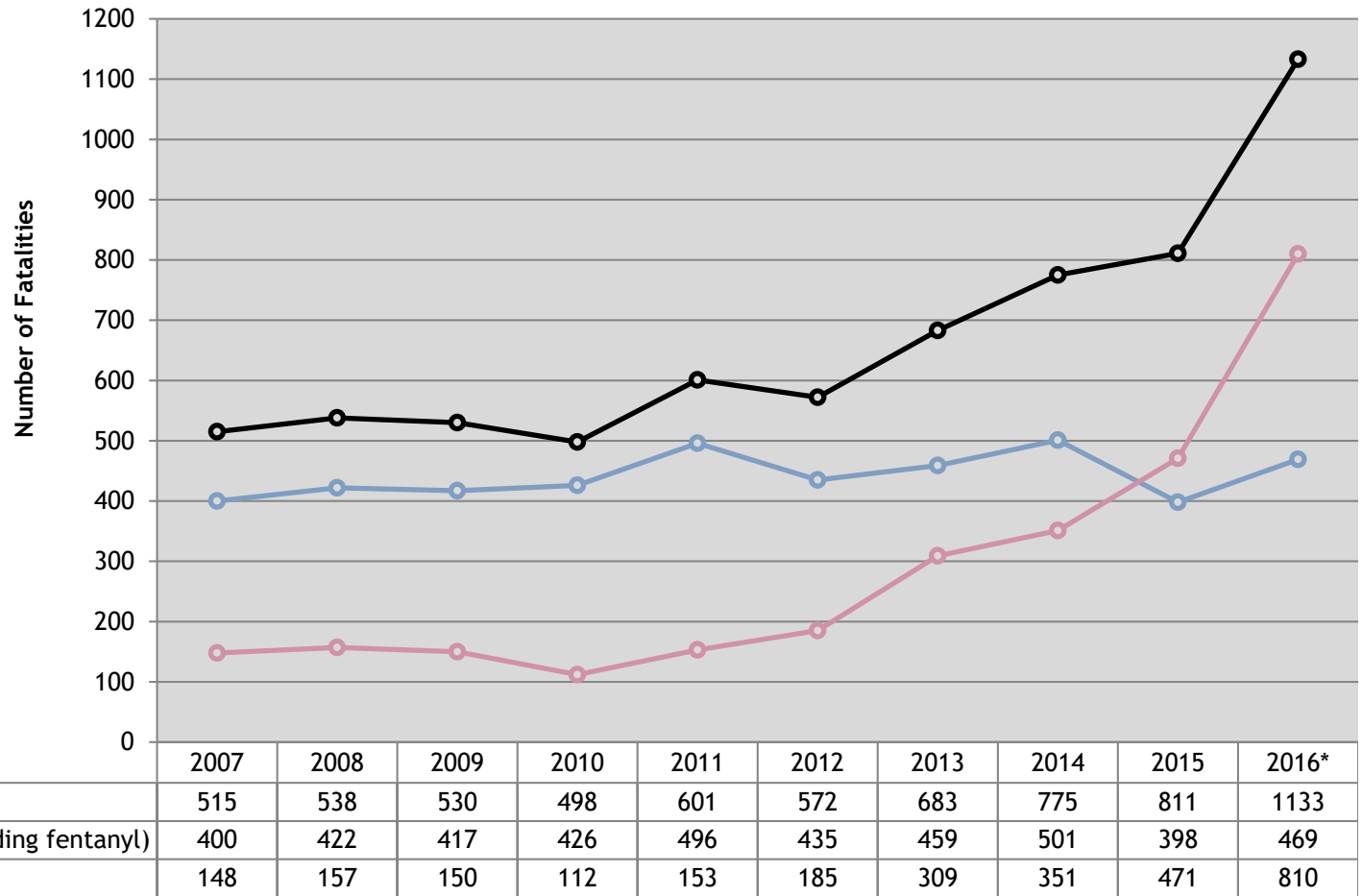
	Heroin	Oxycodone	Fentanyl	Methadone	Morphine	Hydrocodone	Oxymorphone	Codeine	Tramadol	Hydromorphone	Buprenorphine
■ 2007	100	113	48	151	70	91	6	26	23	16	1
■ 2008	89	126	68	145	68	77	24	29	28	8	1
■ 2009	107	130	43	142	77	67	23	28	25	19	3
■ 2010	48	156	64	134	53	92	48	21	37	25	2
■ 2011	101	166	54	159	72	88	80	39	17	21	8
■ 2012	135	174	50	111	71	77	62	39	43	27	6
■ 2013	213	180	102	104	84	69	52	54	31	40	1
■ 2014	241	185	134	113	91	85	51	36	42	27	10
■ 2015	342	166	225	68	69	55	53	28	40	35	11
■ 2016*	448	185	618	79	116	53	47	31	33	28	16

¹ Illicit and pharmaceutically produced fatal fentanyl overdoses are represented in this analysis. This includes all different types of fentanyl analogs (acetyl fentanyl, furanyl fentanyl, etc.)

² Levorphanol, meperidine, pentazocine, propoxyphene, and tapentadol were excluded from this analysis due low annual case counts (<20 deaths)

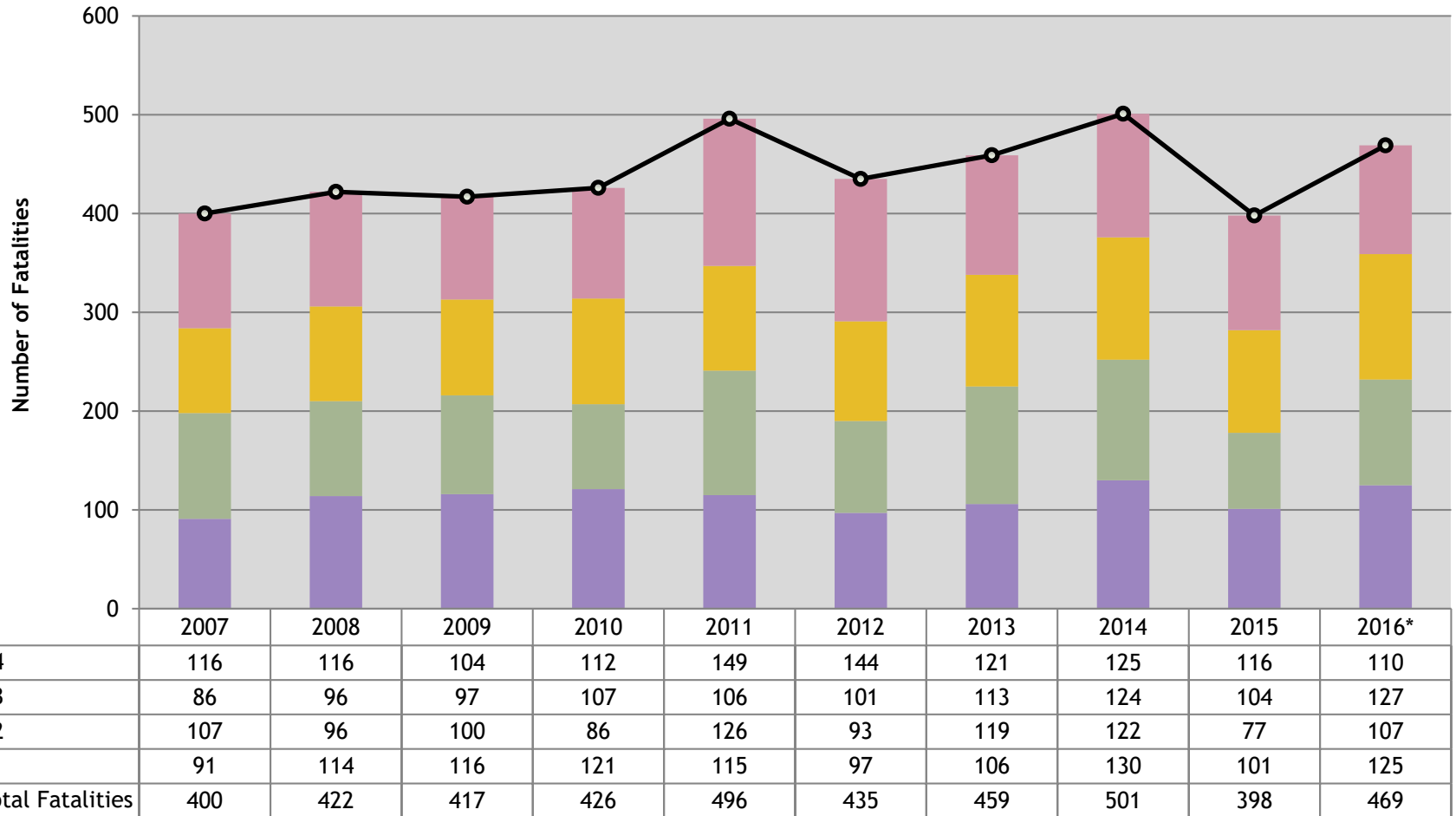
OPIOIDS- A DIFFERENT PERSPECTIVE

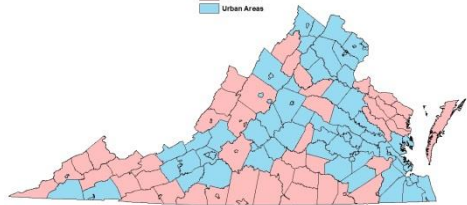
Total Number of Prescription Opioid (excluding Fentanyl), Fentanyl and/or Heroin, and All Opioid Overdoses by Year of Death, 2007-2016



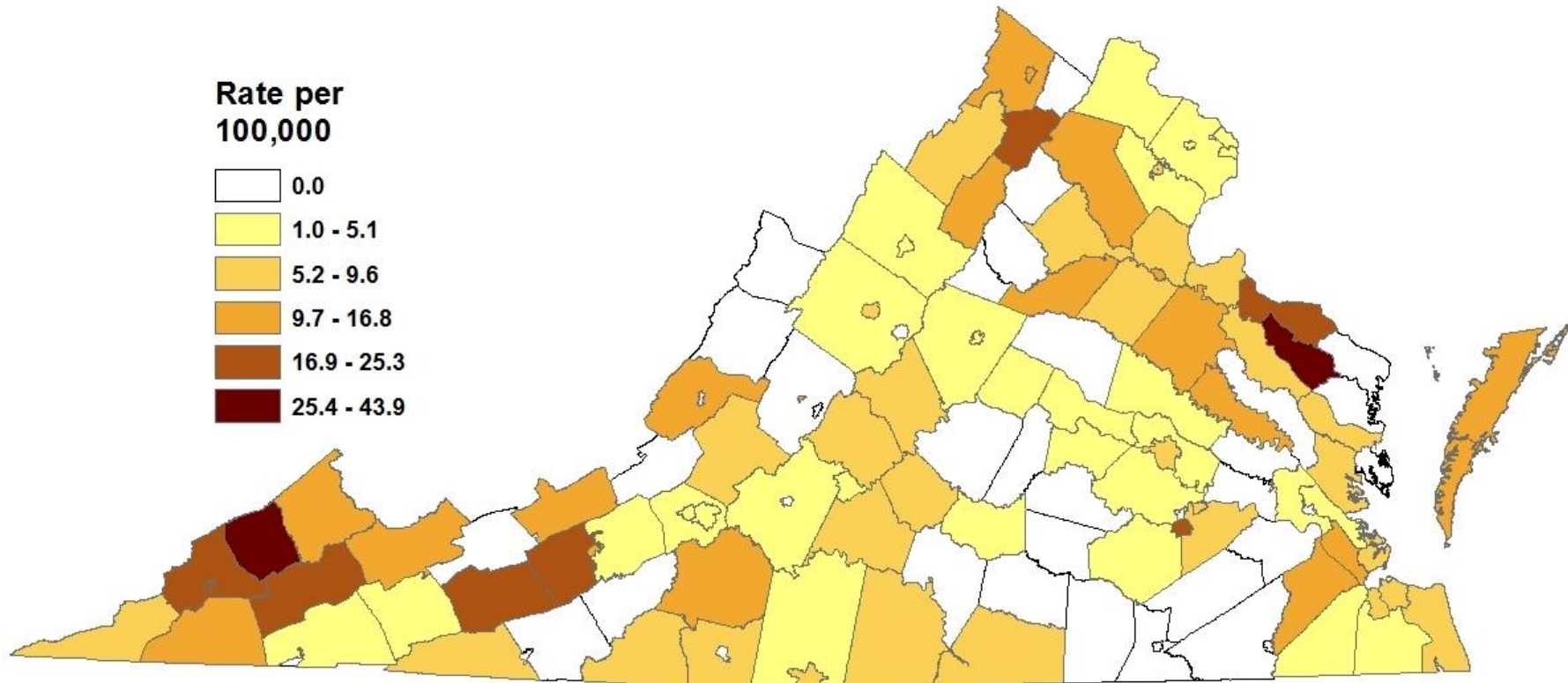
PRESCRIPTION OPIOIDS (EXCLUDING FENTANYL)

Total Number of Fatal Prescription Opioid Overdoses (Excluding Fentanyl) by Quarter and Year of Death, 2007-2016





Rate of Fatal Prescription Opioid (Excluding Fentanyl) Overdoses by Locality of Overdose, 2016



Rate per
100,000

- 0.0
- 1.0 - 5.1
- 5.2 - 9.6
- 9.7 - 16.8
- 16.9 - 25.3
- 25.4 - 43.9

FATAL DRUG OVERDOSES OF SPECIAL INTEREST

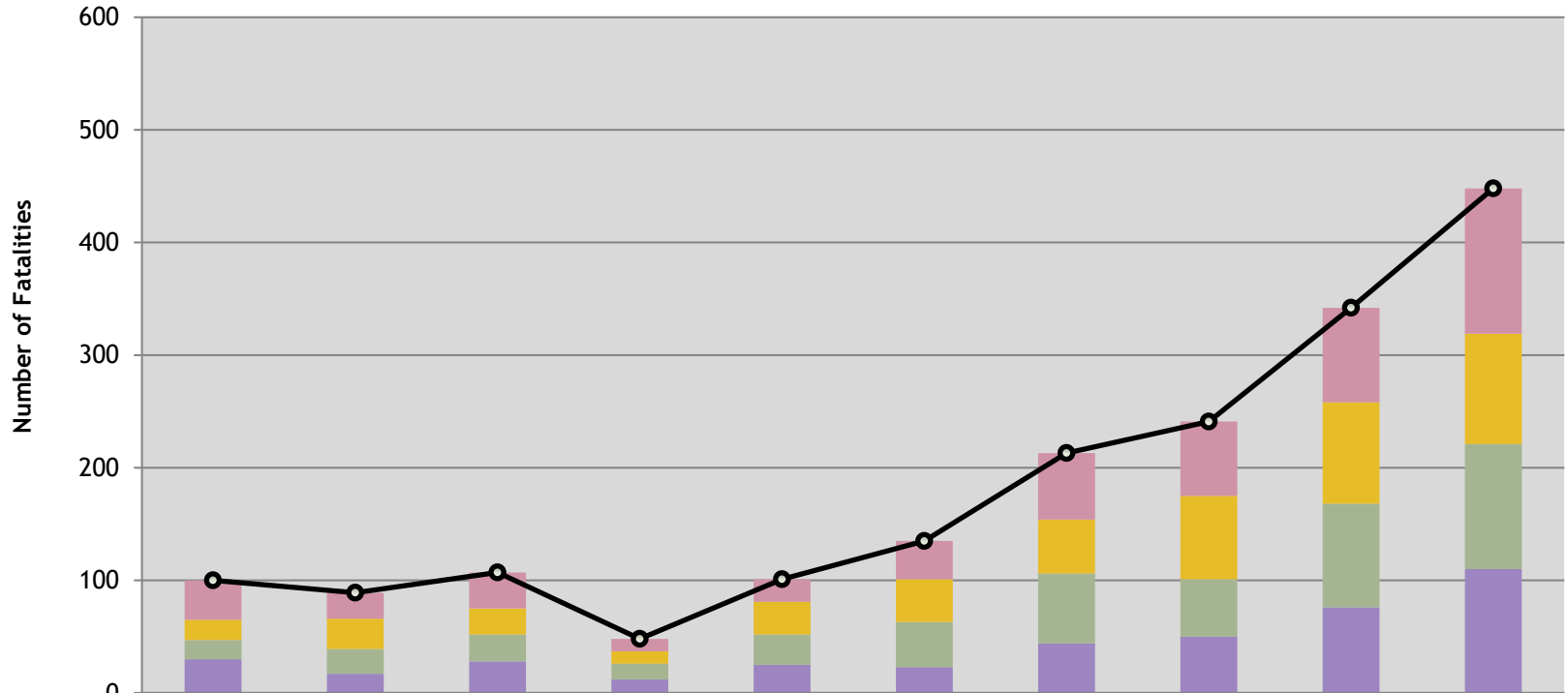


Illicit Opioids

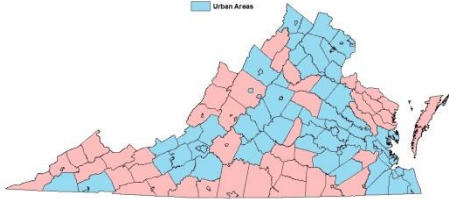
- Heroin and/or Fentanyl
- Fentanyl and Fentanyl Analogs
- Synthetic Opioids and Fentanyl Analogs

HEROIN

Total Number of Fatal Heroin Overdoses by Quarter and Year of Death, 2007-2016

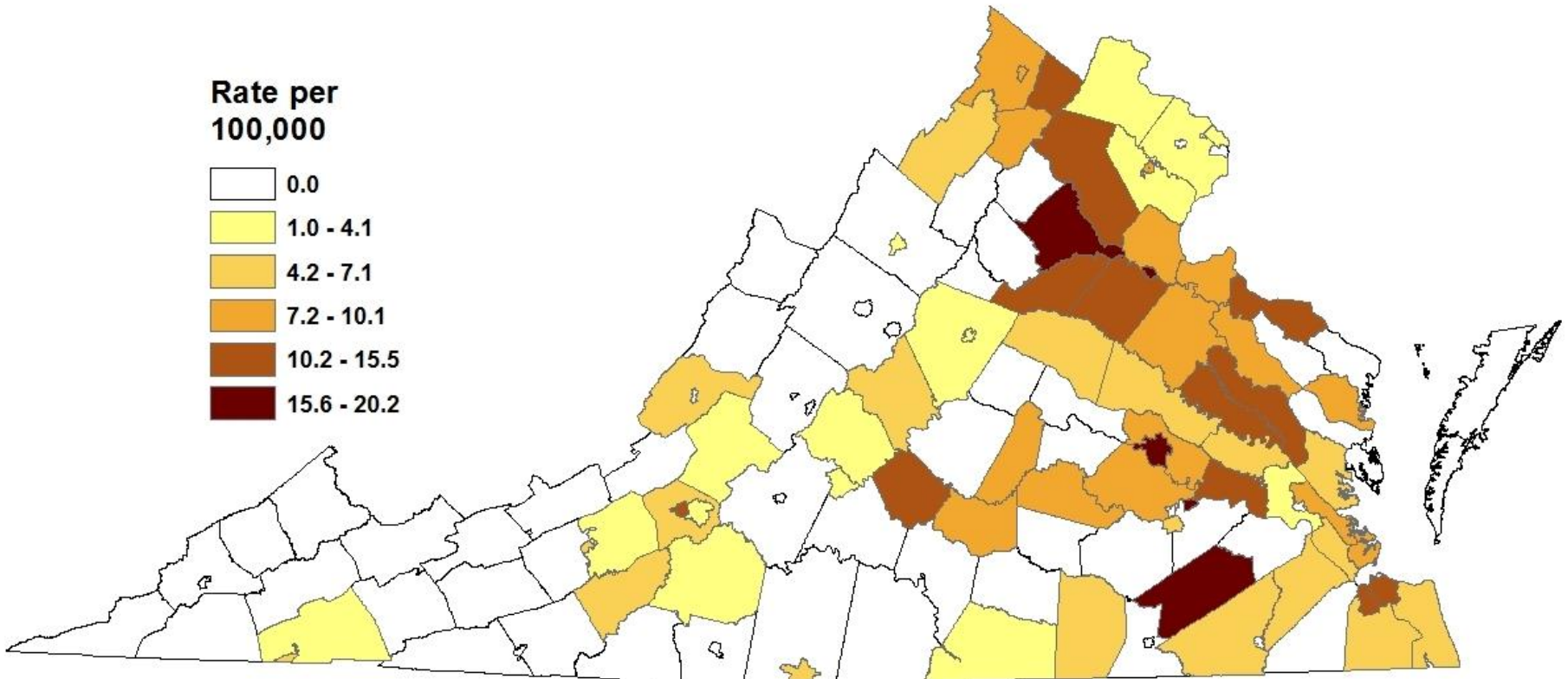
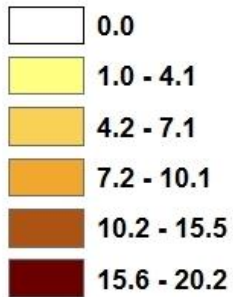


	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Q4	35	23	32	11	20	34	59	66	84	129
Q3	18	27	23	11	29	38	48	74	90	98
Q2	17	22	24	14	27	40	62	51	92	111
Q1	30	17	28	12	25	23	44	50	76	110
Total Fatalities	100	89	107	48	101	135	213	241	342	448



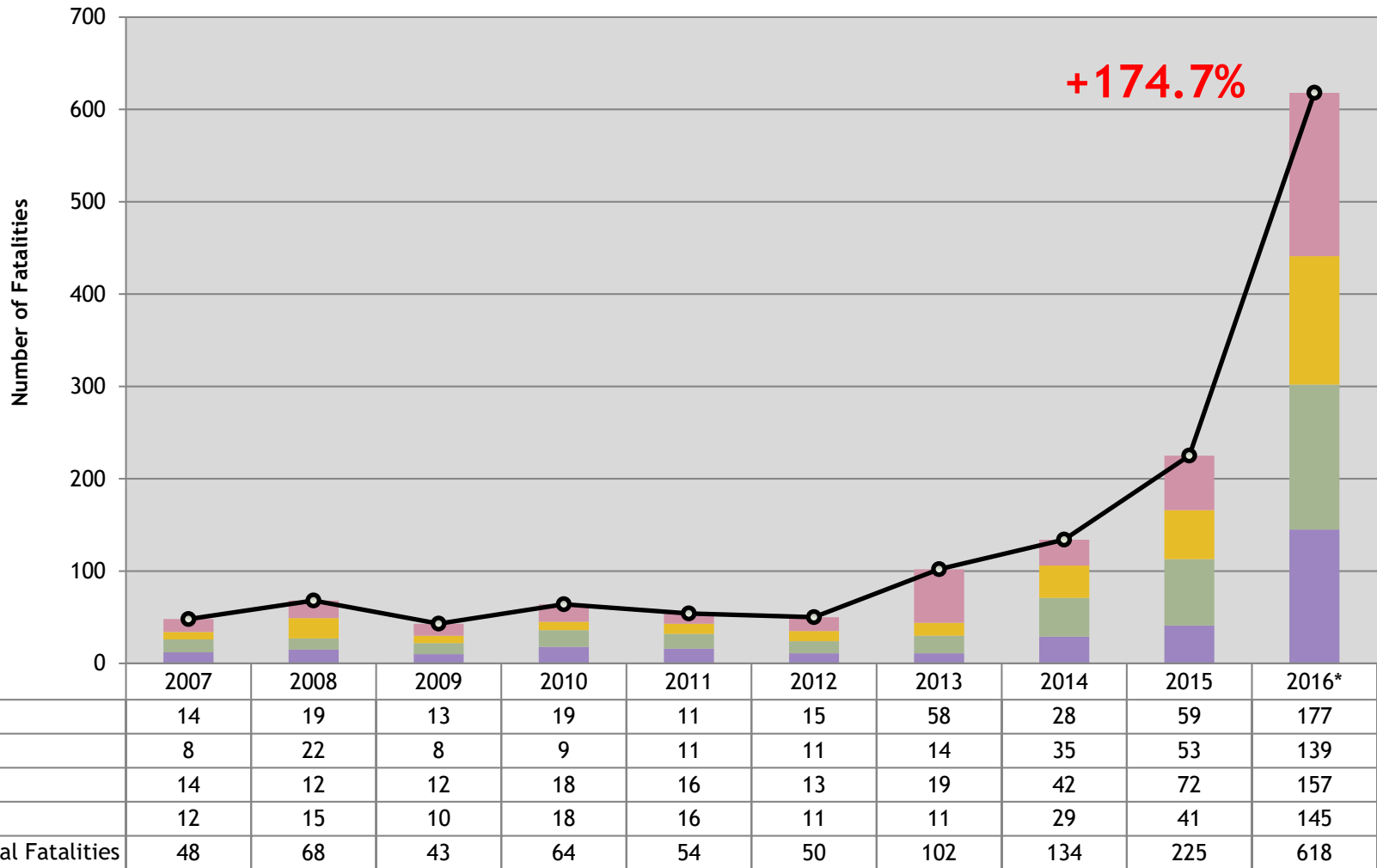
Rate of Fatal Heroin Overdoses by Locality of Overdose, 2016

Rate per
100,000



FENTANYL (RX, ILLICIT, AND ANALOGS)

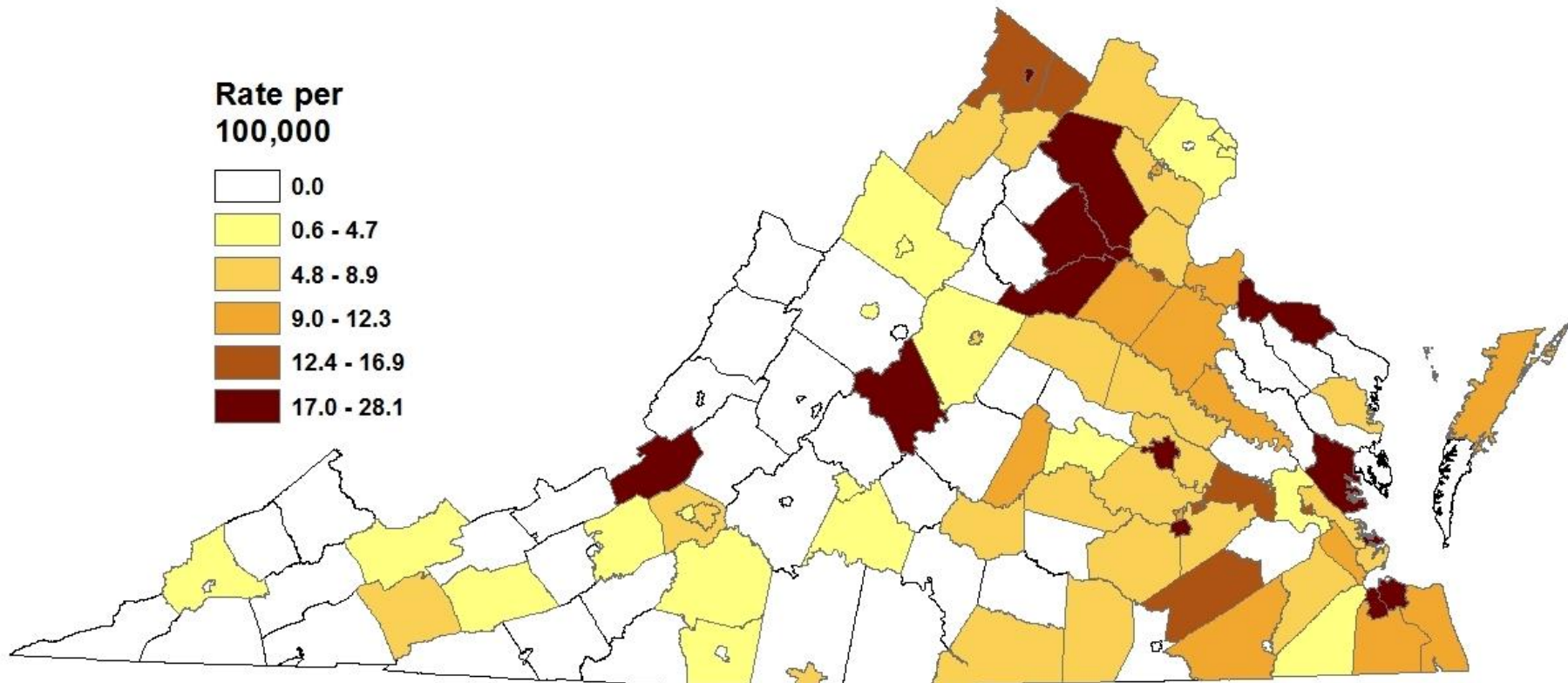
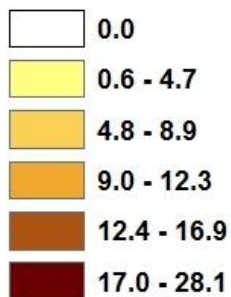
Total Number of Fatal Fentanyl Overdoses by Quarter and Year of Death, 2007-2016





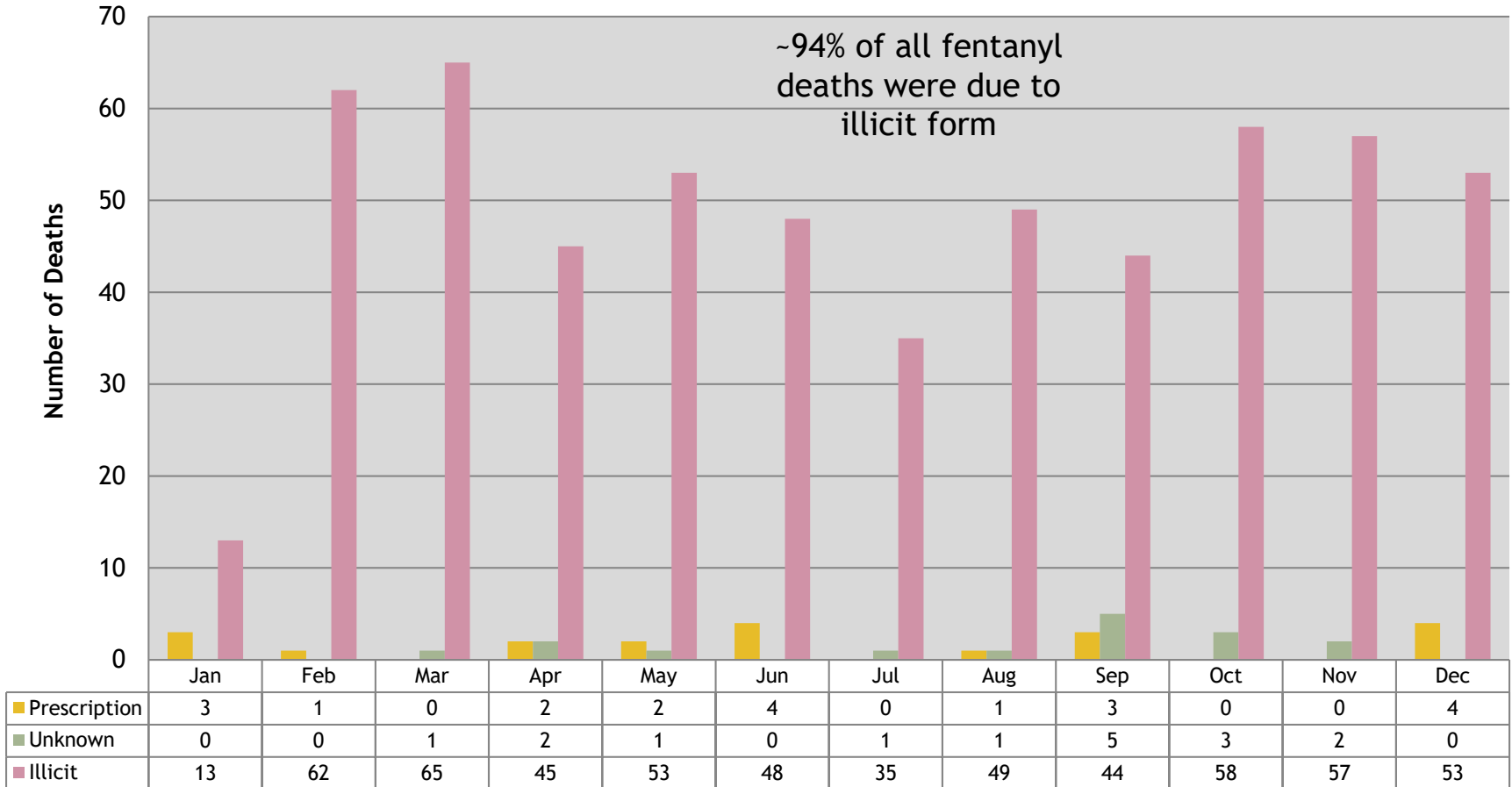
Rate of Fatal Fentanyl (Rx, Illicit, and Analog) Overdoses by Locality of Overdose, 2016

Rate per
100,000



FENTANYL ORIGIN (RX OR ILLICIT/ANALOG)

Total Number of Fatal Fentanyl Overdoses by Fentanyl Origin and Month of Death, 2016



¹ Historically, fentanyl has been categorized as a prescription opioid because it is mass produced by pharmaceutical companies. However, recent law enforcement investigations and toxicology results have demonstrated that several recent fentanyl seizures have not been pharmaceutically produced, but illicitly produced. This illicit form of fentanyl is produced by international drug traffickers who import the drug into the United States and often, mix it into heroin being sold. This illicitly produced fentanyl, especially fentanyl mixed with heroin, has been the biggest contributor to the significant increase in the number of fatal opioid overdoses in Virginia.

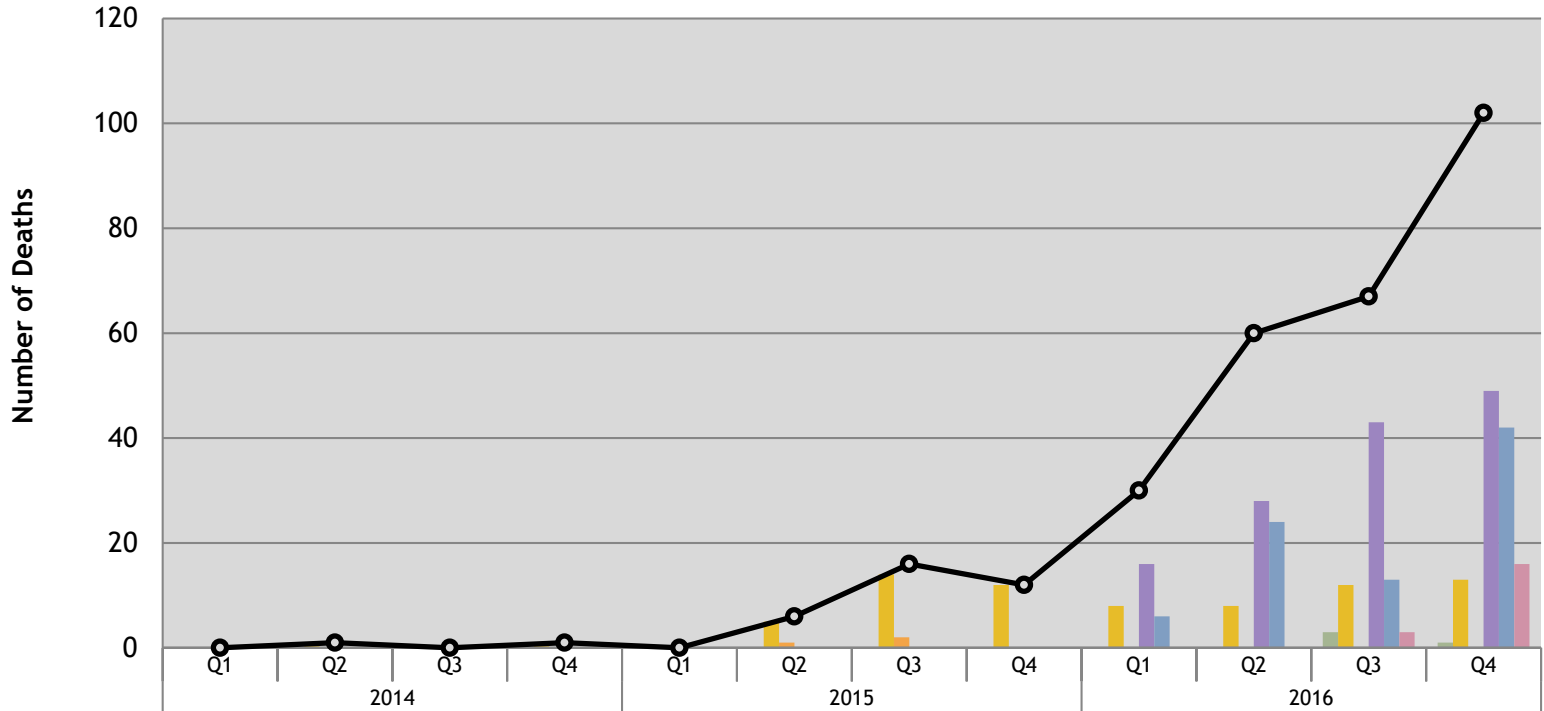
² Illicit and pharmaceutically produced fatal fentanyl overdoses are represented in this analysis. This includes all different types of fentanyl analogs (acetyl fentanyl, furanyl fentanyl, etc.)

Fentanyl Analogs

- Illicitly produced opioids very similar to fentanyl, but slightly different in their chemical structure
- Began appearing in Virginia in 2014 and have risen dramatically since the beginning of 2016
- Fatal overdoses commonly mixtures of fentanyl (often several analogs), heroin and/or cocaine
- Some fatal fentanyl analog overdoses have also been due to the analog itself, without other drugs detected in toxicology
- Illicitly produced, may be extremely potent and probably contribute to the significant rise in fatal opioid overdoses

FENTANYL ANALOGS

Total Number of Fatal Fentanyl Analog Overdoses by Quarter and Year of Death, 2014-2016



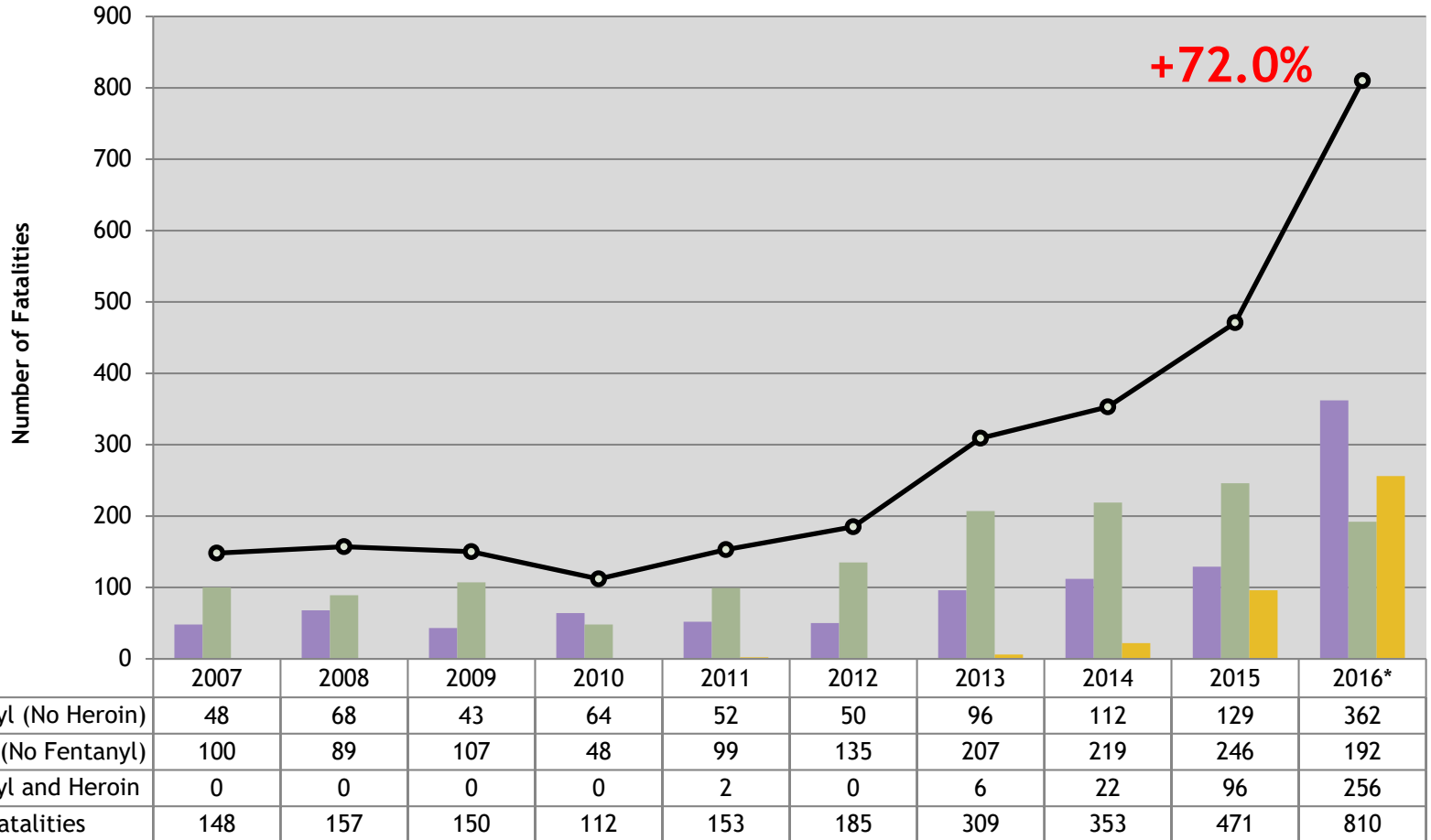
	2014				2015				2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
3-Methyl Fentanyl	0	0	0	0	0	0	0	0	0	0	3	1
Acetyl Fentanyl	0	1	0	1	0	5	14	12	8	8	12	13
Butyryl Fentanyl	0	0	0	0	0	1	2	0	0	0	0	0
Despropionyl Fentanyl***	0	0	0	0	0	0	0	0	16	28	43	49
Furanyl Fentanyl	0	0	0	0	0	0	0	0	6	24	13	42
Para-Fluoroisobutyryl Fentanyl	0	0	0	0	0	0	0	0	0	0	3	16
Total Fatalities	0	1	0	1	0	6	16	12	30	60	67	102

¹ Each fentanyl analog is tallied by each time it caused or contributed to death (analyzed from either toxicology or the cause of death statement) and therefore the total number of analogs will far exceed the actual number of fatalities

² Despropionyl fentanyl is a major metabolite of furanyl fentanyl. Therefore, numbers presented in the 'despropionyl fentanyl' category control for furanyl fentanyl (despropionyl deaths without furanyl fentanyl).

FENTANYL AND/OR HEROIN

Total Number of Fatal Fentanyl and/or Heroin Overdoses by Year of Death, 2007-2016



¹ Illicit and pharmaceutically produced fatal fentanyl overdoses are represented in this analysis. This includes all different types of fentanyl analogs (acetyl fentanyl, furanyl fentanyl, etc.)

Synthetic Opioids

Synthetic opioids are a large group of chemically manufactured drugs typically used as narcotic analgesics (fentanyl, and methadone are examples of synthetic opioids)

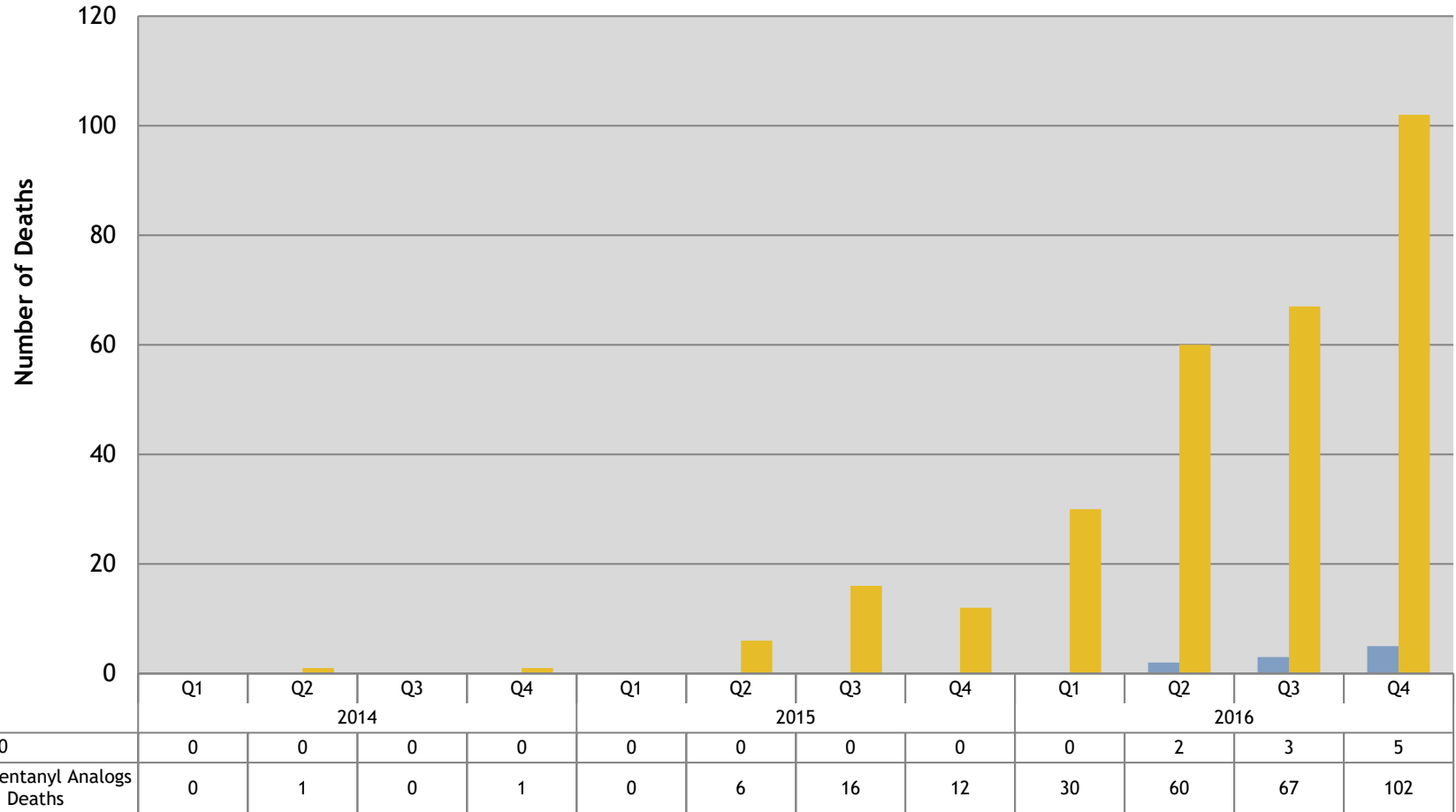
Opiates like heroin, oxycodone, and morphine are made from opium poppy plants

Fentanyl analogs and U-47700, while different, are synthetic opioids that are made illegally.

- Novel synthetic opioids monitored
- State and federal processes to schedule novel drugs
- Ahead of the law by synthesizing and introducing novel synthetic opioids

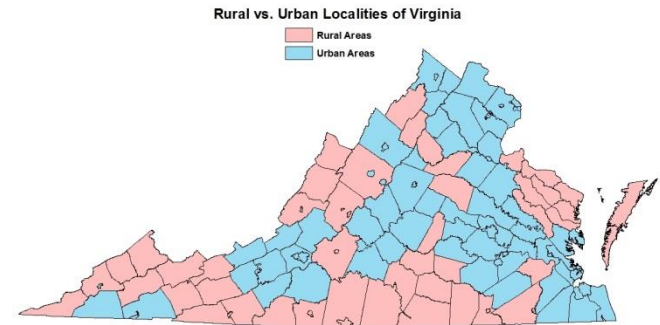
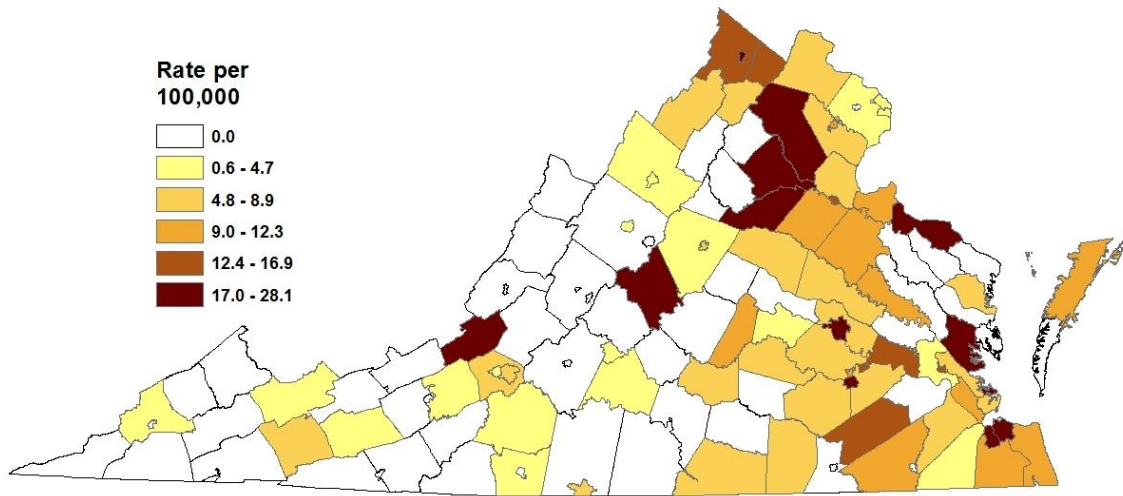
NOVEL SYNTHETIC OPIOIDS AND FENTANYL ANALOGS

Total Number of Fatal Fentanyl Analog Overdoses by Quarter and Year of Death, 2014-2016

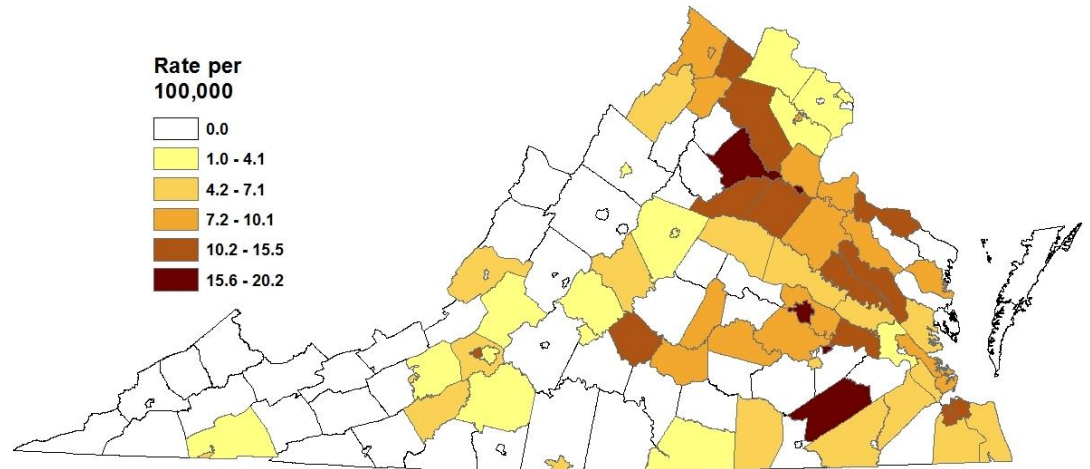


¹ Each fentanyl analog is tallied by each time it caused or contributed to death (analyzed from either toxicology or the cause of death statement) and therefore the total number of analogs will far exceed the actual number of fatalities

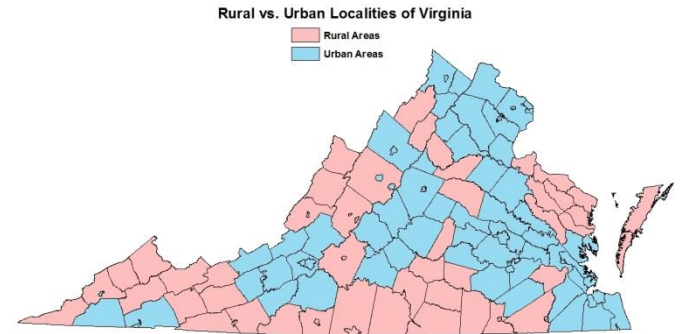
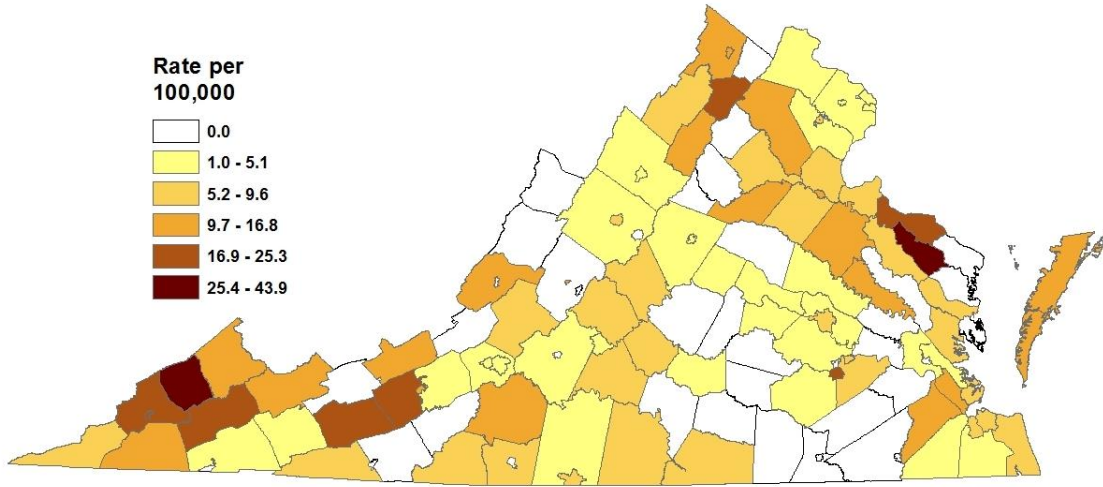
Rate of Fatal Fentanyl (Rx, Illicit, and Analog) Overdoses by Locality of Overdose, 2016



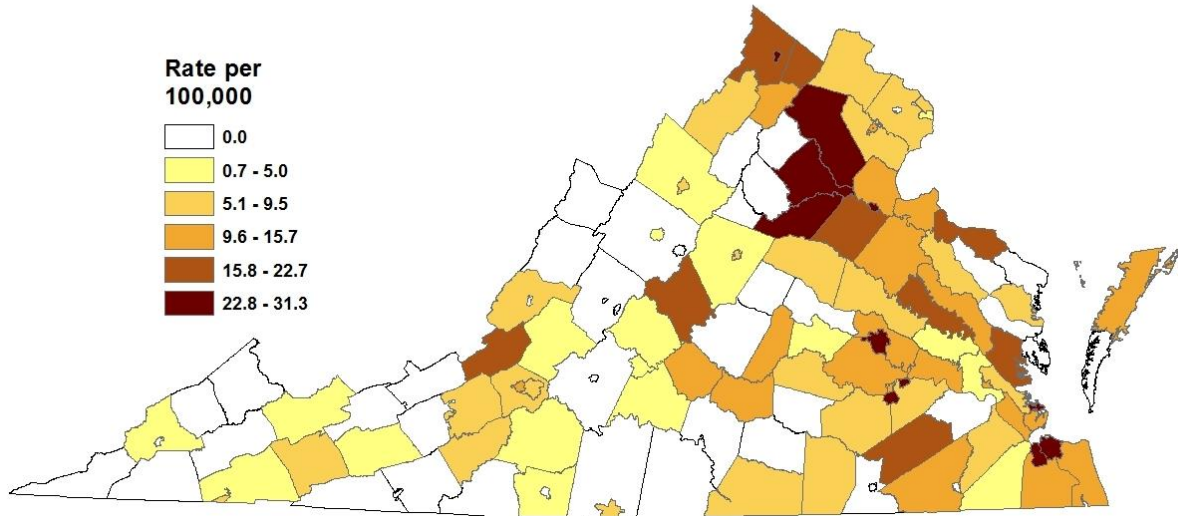
Rate of Fatal Heroin Overdoses by Locality of Overdose, 2016



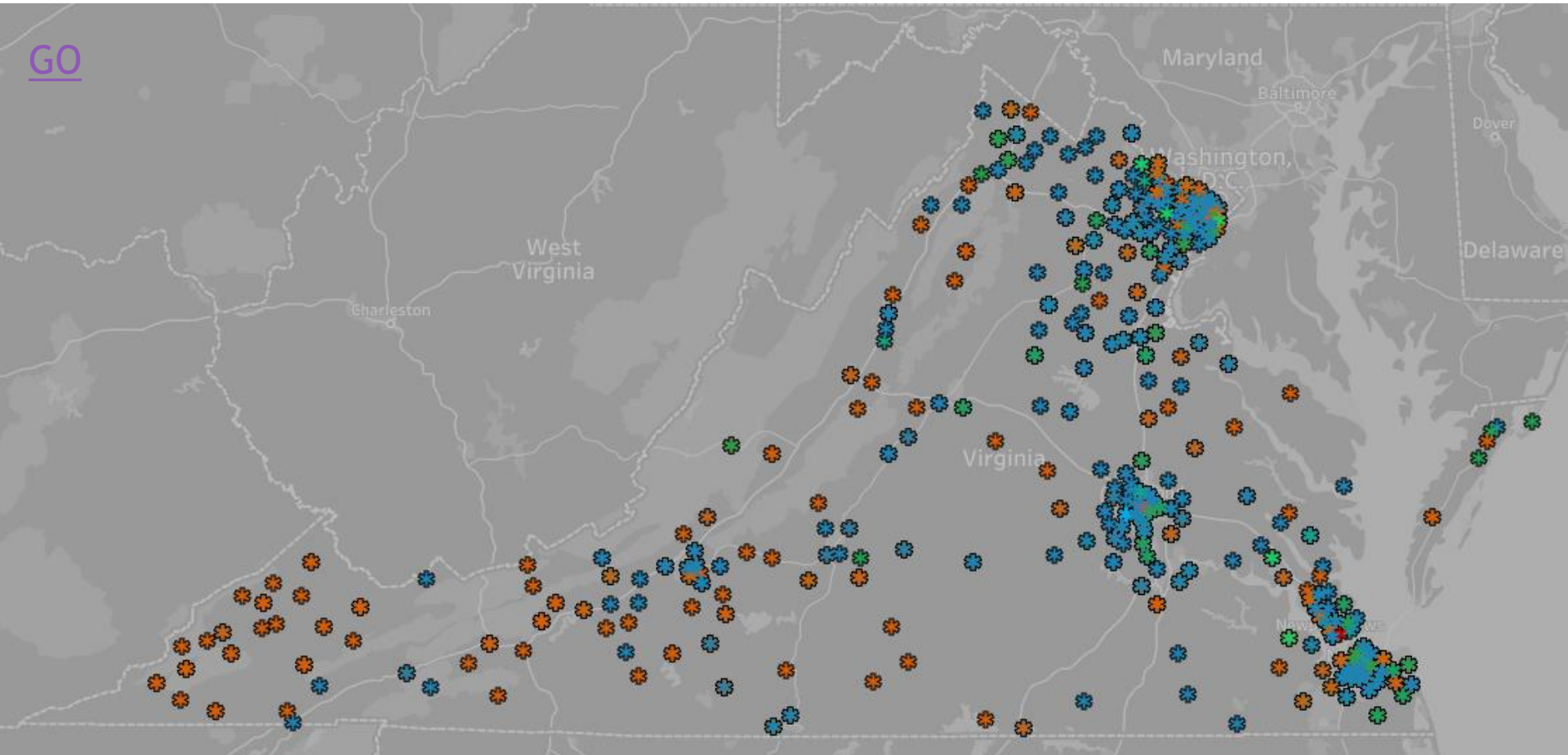
Rate of Fatal Prescription Opioid (Excluding Fentanyl) Overdoses by Locality of Overdose, 2016



Rate of Fatal Fentanyl (Rx, Illicit, and Analogs) and/or Heroin Overdoses by Locality of Overdose, 2016



All Opioid Deaths, 2016



* 46 deaths were excluded due to unknown, out of state, or unmatchable locality variables

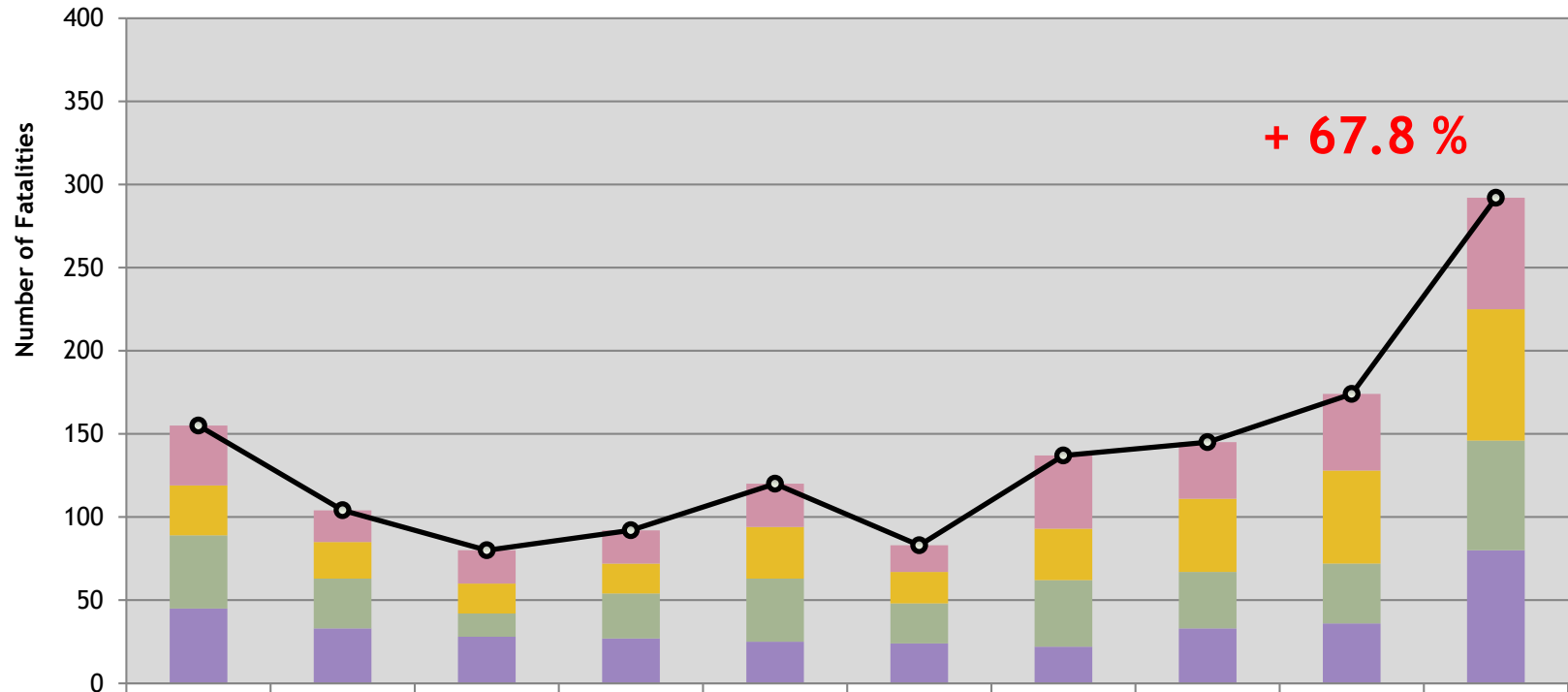
OTHER FATAL ILLICIT DRUG DEATHS



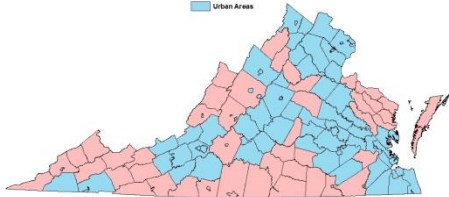
- Cocaine
- Methamphetamine

COCAINE

Total Number of Fatal Cocaine Overdoses by Quarter and Year of Death, 2007-2016

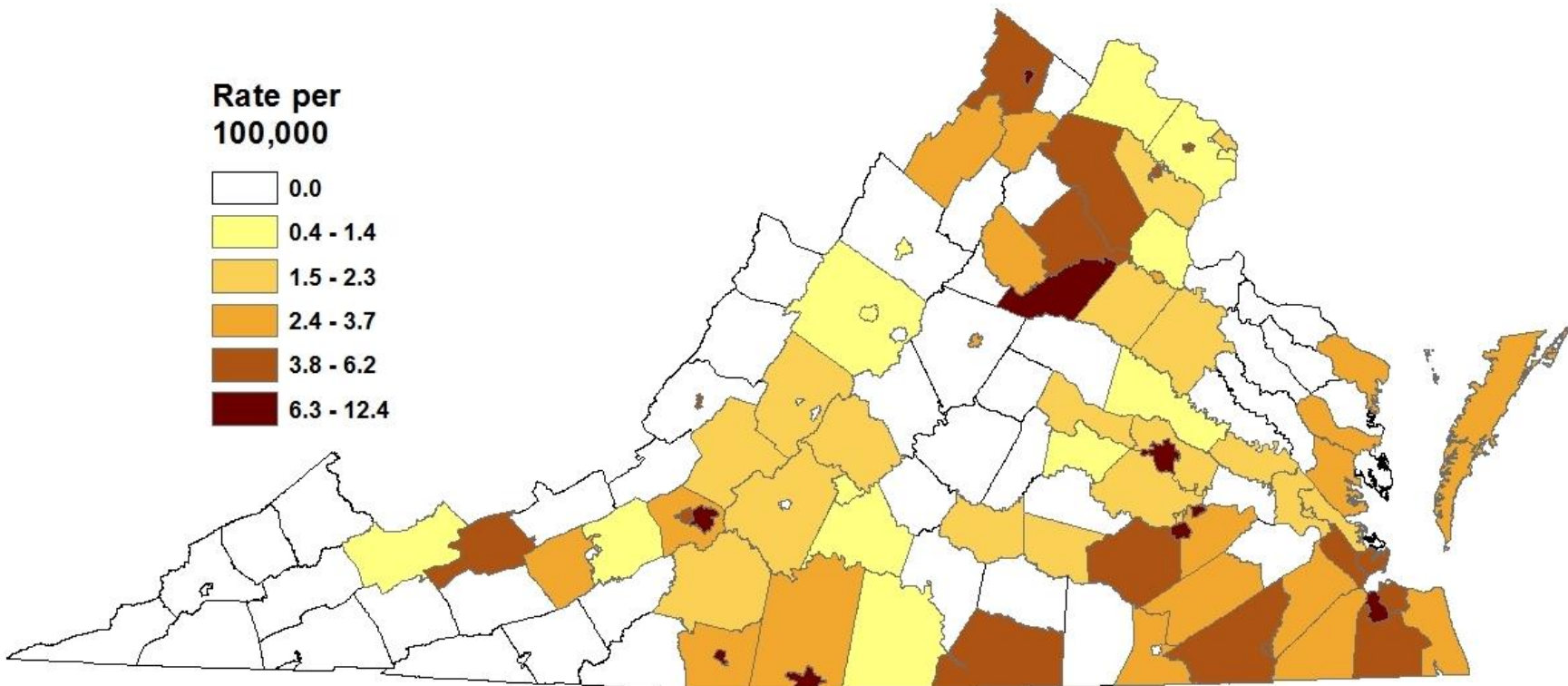
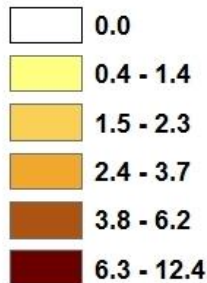


	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Q4	36	19	20	20	26	16	44	34	46	67
Q3	30	22	18	18	31	19	31	44	56	79
Q2	44	30	14	27	38	24	40	34	36	66
Q1	45	33	28	27	25	24	22	33	36	80
—●— Total Fatalities	155	104	80	92	120	83	137	145	174	292



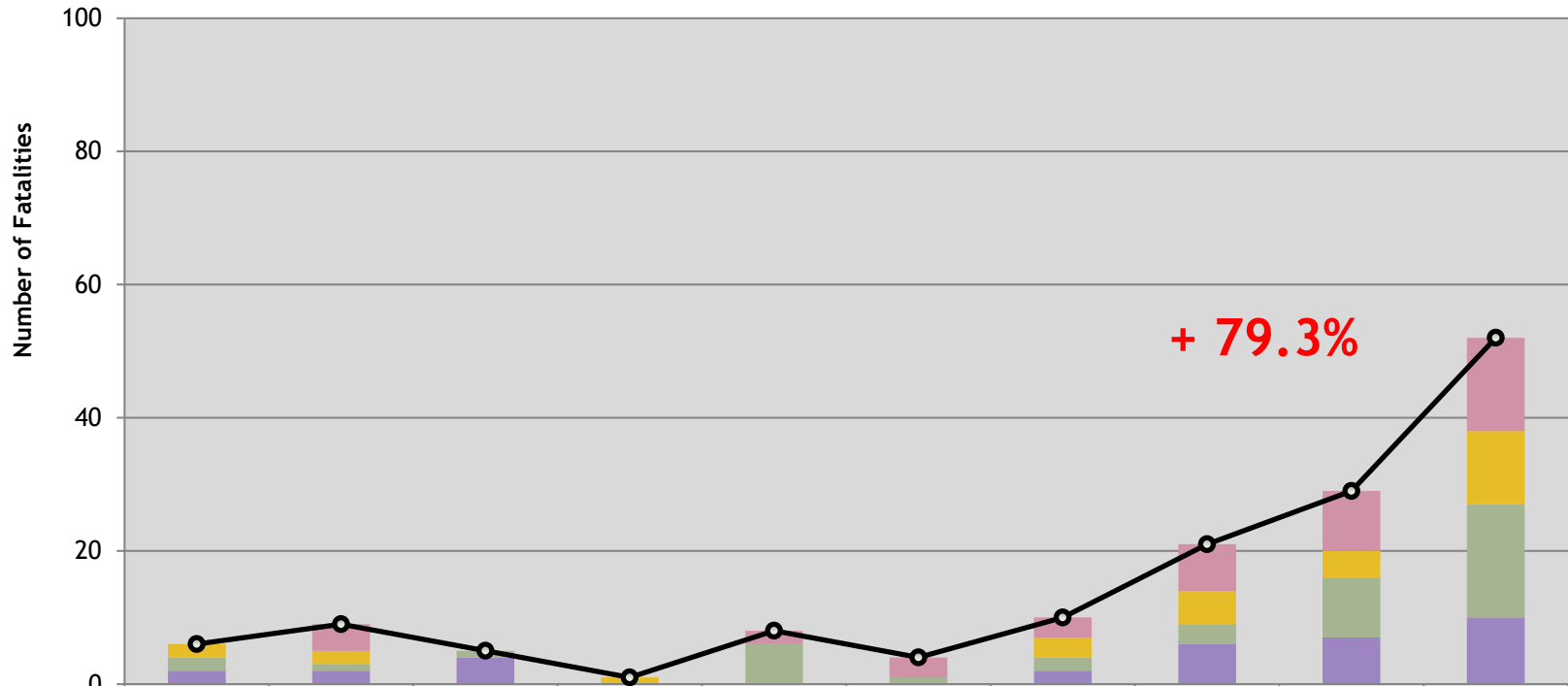
Rate of Fatal Cocaine Overdoses by Locality of Overdose, 2014 - 2016

Rate per
100,000



METHAMPHETAMINE

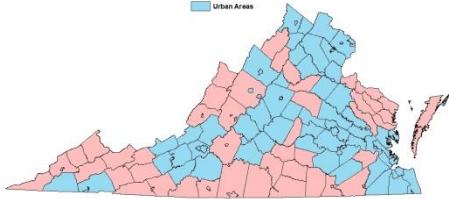
Total Number of Fatal Methamphetamine Overdoses by Quarter and Year of Death, 2007-2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Q4	0	4	0	0	2	3	3	7	9	14
Q3	2	2	0	1	0	0	3	5	4	11
Q2	2	1	1	0	6	1	2	3	9	17
Q1	2	2	4	0	0	0	2	6	7	10
Total Fatalities	6	9	5	1	8	4	10	21	29	52

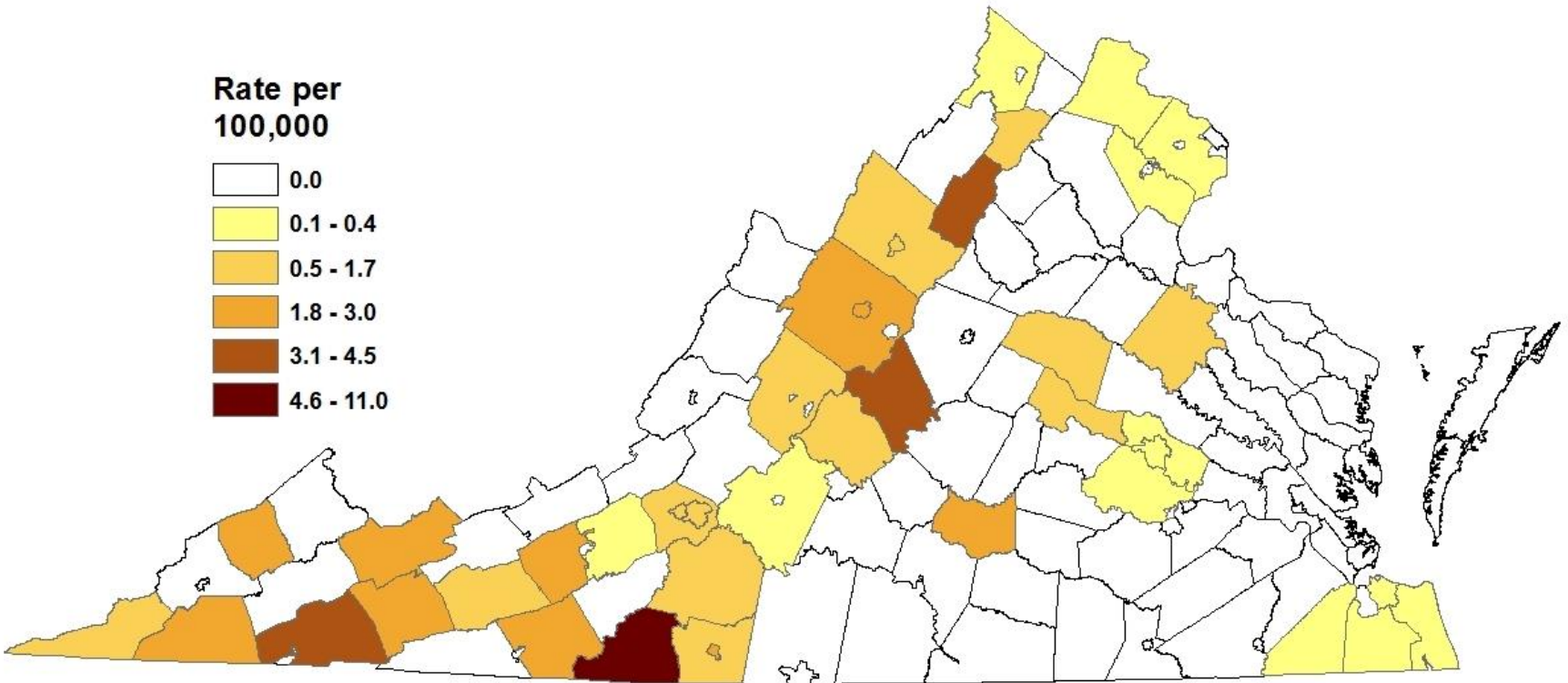
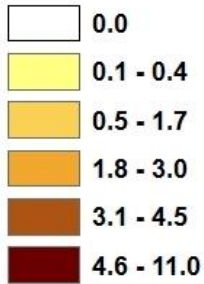
Rural vs. Urban Localities of Virginia

Rural Areas
Urban Areas



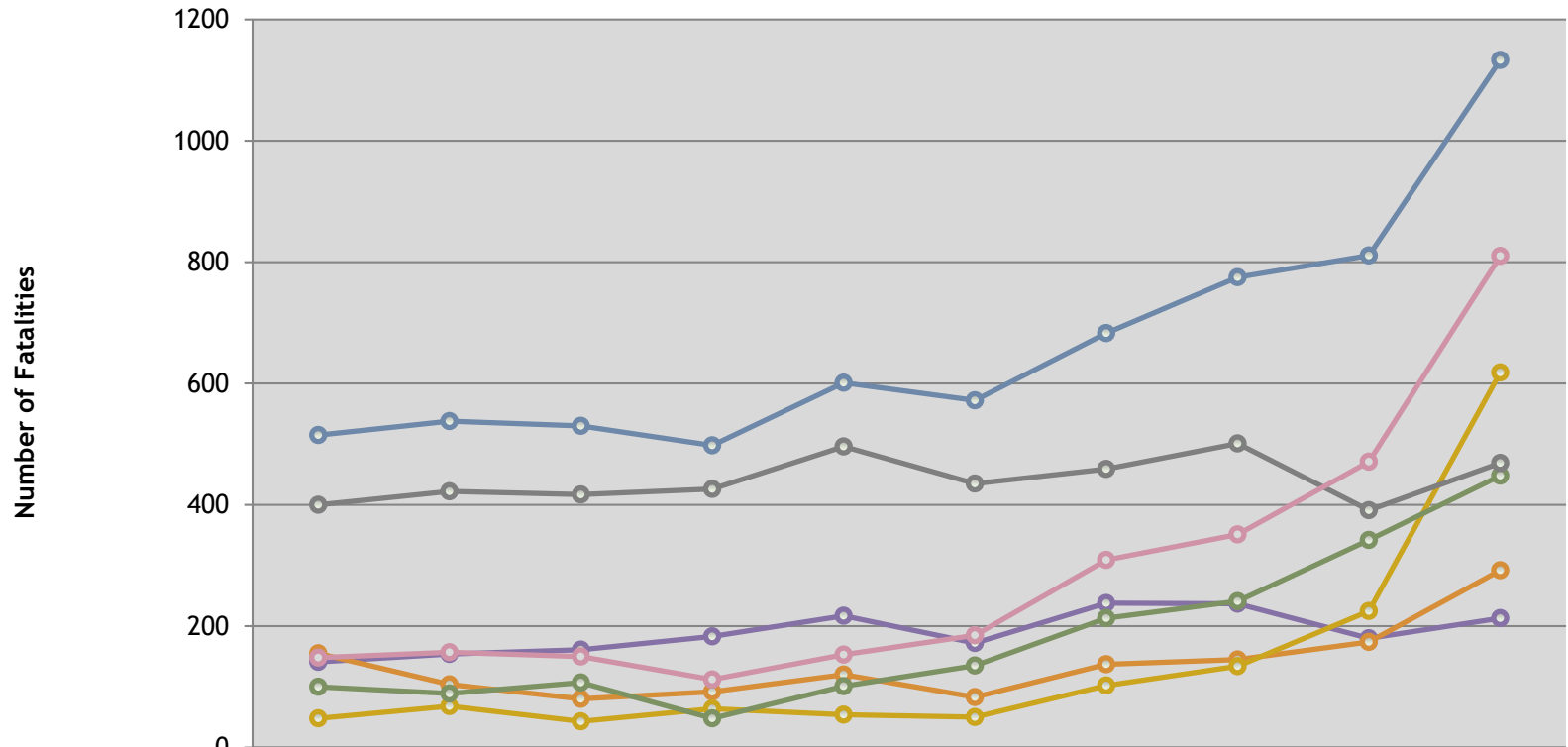
Rate of Fatal Methamphetamine Overdoses by Locality of Overdose, 2014 - 2016

Rate per
100,000



MOST FREQUENT DRUGS/DRUG CATEGORIES

Total Number of Fatal Drug Overdoses Drug Name/Category and Year of Death, 2007-2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
— Benzodiazepines	141	154	161	183	217	172	238	237	180	213
— Cocaine	155	104	80	92	120	83	137	145	174	292
— Fentanyl	48	68	43	64	54	50	102	134	225	618
— Heroin	100	89	107	48	101	135	213	241	342	448
— Prescription Opioids (excluding Fentanyl)	400	422	417	426	496	435	459	501	391	469
— All Opioids	515	538	530	498	601	572	683	775	811	1133
— Heroin and/or Fentanyl	148	157	150	112	153	185	309	351	471	810

Fatal Overdose Death Change 2016 vs. 2015

All Drug deaths	+38.1%
All Opioid deaths	+39.7%
Cocaine deaths	+ 67.8%
Fentanyl	+ 174.7%
Heroin	+ 31.0%
Methamphetamine	+ 38%

Conclusion

From 2007 to 2016, fatal prescription opioid (excluding fentanyl) deaths varied slightly from year to year, but overall remain consistent

Fentanyl (Rx, illicit, and analogs) increased by nearly 175% between 2015 and 2016

Of the 1133 opioid deaths in 2016, 71% were illicit heroin and/or fentanyl

Illicit synthetic opioids are a growing concern

Prescription opioid deaths remain a major problem in rural and southwest Virginia, whereas illicit opioid deaths (illicit fentanyl and/or heroin) have the highest rates of death in urban areas of the state

Other illegal drugs-not opioids- are also on the rise. Cocaine and methamphetamine deaths increased by more than 65% in 2016