

Prescription Drug and Substance Abuse Change Approach for Delaware

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by

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DELAWAREPMP

UNIVERSITY OF
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Research Project Questions

- How are prescription drug (Rx) patterns related to neighborhood demographics, disadvantage, health, crime and disorder?
- How is prescription drug use patterned across neighborhoods and communities in Delaware?
- How can merged data be used to inform policies and best practices?
- How can first responders, law enforcement and community members help us interpret the results so we can improve the use of the findings?

Goals, Strategies, and Activities

- **Geocode address data in Delaware PMP to Census Tract (advantage over Zip Code geocodes)**
 - Reorganize individual records
 - 140,000 (approximate) monthly prescriptions
 - PMP data to date best from January 2013 – March 2015
 - Recently received 6 quarters of data (April 1, 2015 – September 30, 2016)
- **Merge PMP data with external data:**
 - Neighborhood demographics (U.S. Census Data 2010, and American Community Survey 2012)
 - Crime – arrests and offenses-- data (DELJIS)
 - Health data (DFS Overdose deaths and toxicology reports)

Geocoding and Census Tracts

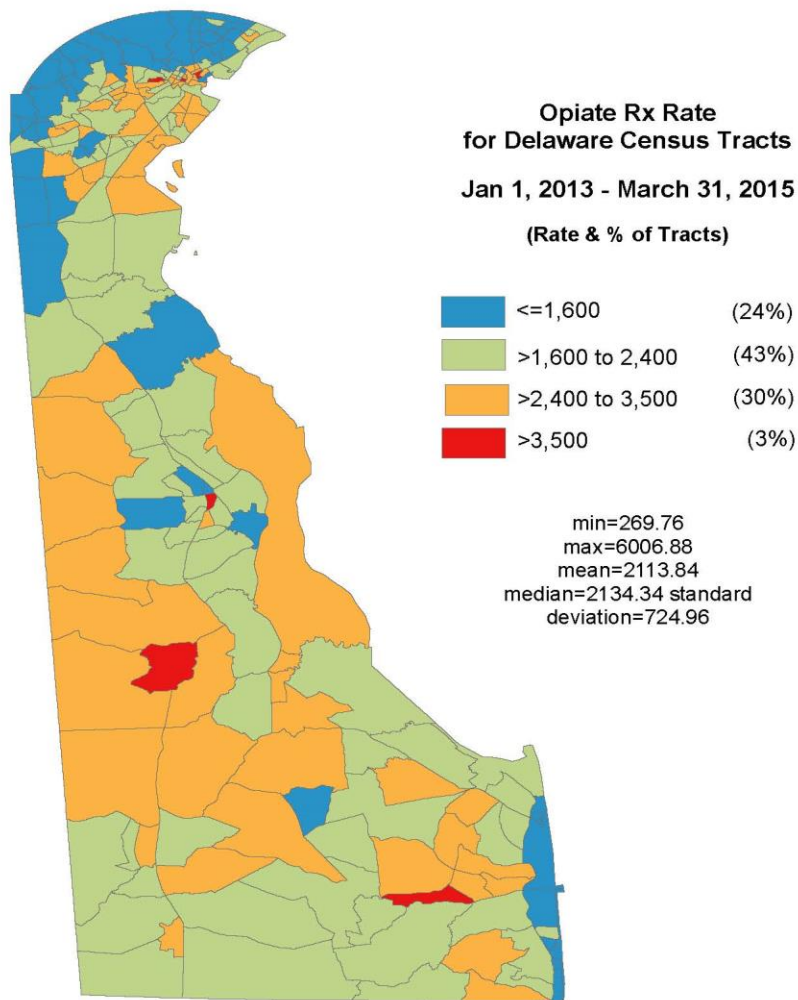
- Geocoding –coding the Earth by providing geographic reference information that can be used for computer mapping.
- Census Tracts – small, neighborhood level subdivisions measured in each decennial census.
 - Smaller than zip codes* (i.e., 214 versus 68 in DE)
 - Census Tracts: contain 2,500 – 8,000 people.

*Zip codes were developed by the Postal Service for the purpose of delivering mail, but were never intended to define coherent neighborhoods. In addition, Zip Codes can have as many as 10 distinctly different census tracts contained within them. When distinct census tracts are blended together in a single Zip Code, the data reflects their average conditions and often gives a false sense of the area.

Top Opiate Drugs Prescribed by DE Prescribers to DE Patients –

Jan 1, 2013 – March 31, 2015

Drugname	Freq	Percentage
OXYCODONE-ACETAMINOPHEN	372,731	21.89
HYDROCODONE-ACETAMINOPHEN	269,874	15.85
OXYCODONE HCL	254,898	14.97
ACETAMINOPHEN-CODEINE	91,208	5.36
SUBOXONE	83,826	4.92

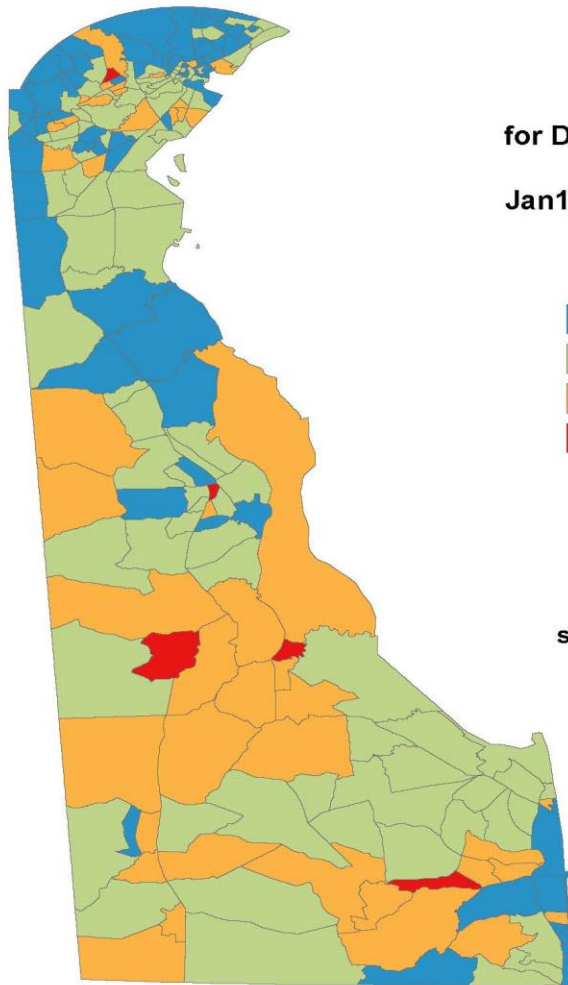


Opiate Rx/Census Tract Population*1,000

Between 2013 and the 1st quarter of 2015, Delaware neighborhoods averaged 2,113.8 opiate prescriptions per 1,000 residents.

These opiate prescription rates were not evenly distributed across Delaware's neighborhoods.

The map shows 3% of the neighborhoods – shaded red- where opiate prescription rates were 50% to 300+% larger than the state average.

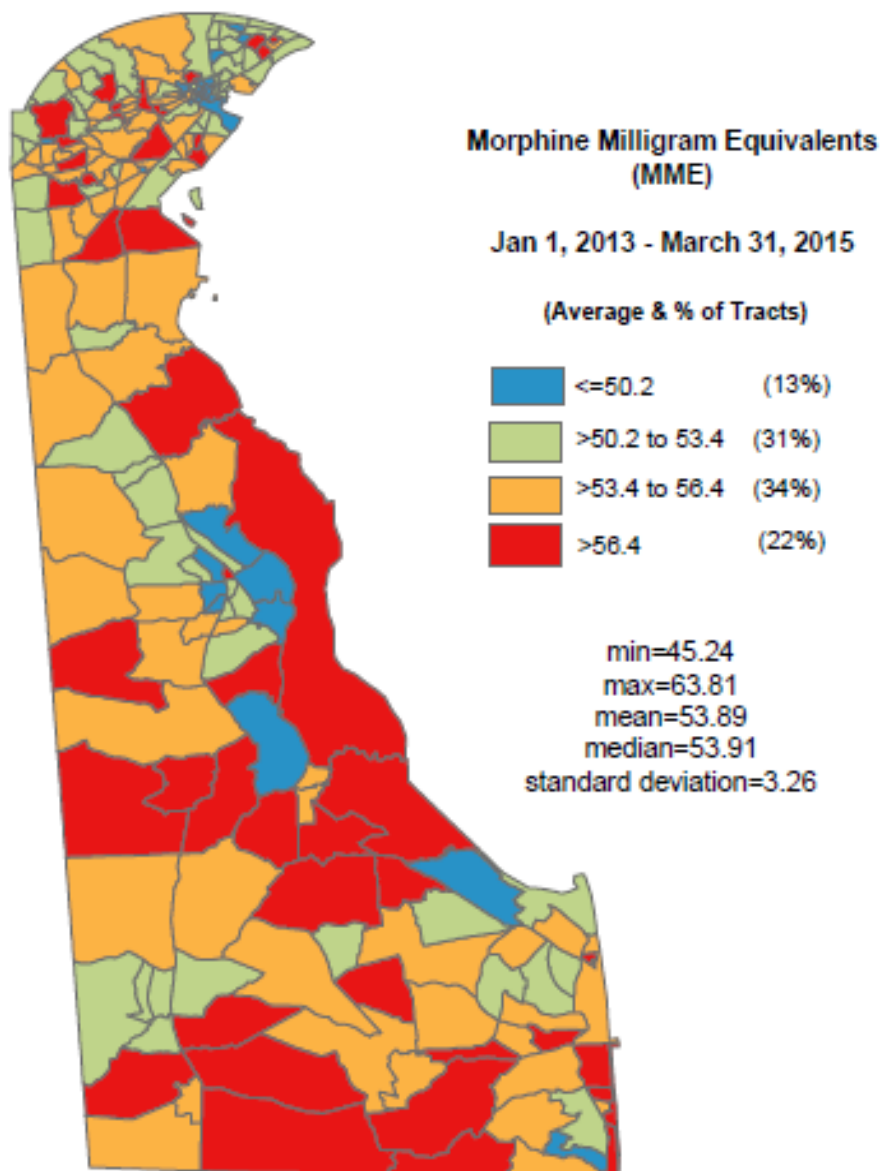


Fentanyl Rx/Census Tract Population*1,000

Between Jan 1, 2013 and the March 31, 2015, Delaware neighborhoods averaged 70.8 fentanyl prescriptions per 1,000 residents.

These fentanyl prescription rates were not evenly distributed across Delaware's neighborhoods.

The map shows 2% of the neighborhoods – shaded red – where fentanyl prescription rates were 100+ % larger than the state average.



Average MME for 2013 - 2015

Between 2013 and 1st quarter of 2015, Delaware neighborhoods averaged opiate Rx Morphine Milligram Equivalents (MMEs) of 53.89.

MME averages are uneven across Delaware's neighborhoods (with no clear regional pattern), the distribution is normal with a modest range of 45.24 – 63.81. BUT, CDC data showed Delaware 2nd highest MME averages among select states.

22% of the neighborhoods – shaded red- where MME averages were larger than the state neighborhood average or between 56.4 and 63.81.

Table 1.

**Census Tracts with Highest Opiate Rx Rates
(January 1, 2013- March 31, 2015)**

Census Tract	Census Tract 1st	Census Tract 2nd	Census Tract 3rd	Census Tract 4th	Census Tract 5th	Census Tract 6th
Total Rx Rate (\bar{x} = 4,346.6)	10,581.0 507.03 (Riverdale/Warwick, Millsboro, SC)	9,686.2 413.00 (City Center, Dover, KC)	8,045.2 123.00 (Lancaster Village, Elsmere, NC)	7,798.5 134.00 (Hyde Park, Wilmington, NC)	6,841.9 126.00 (Gordy Estates, Newport, NC)	6,559.0 141.00 (Christiana, NC)
Opiate Rx Rate (\bar{x} = 1,897.2)	5,678.8 507.03 (Riverdale/Warwick, Millsboro, SC)	4,319.2 413.00 (City Center, Dover, KC)	3,588.7 123.00 (Lancaster Village, Elsmere, NC NC)	3,428.3 006.02 (Fairfax/Deerhurst, Wilmington, NC)	3,142.1 507.06 (Long Neck, SC)	3,104.1 430.00 (Harrington City Center, KC)
MME Rate (\bar{x} = 202.8)	307.5 430.00 (Harrington City Center, KC)	304.7 420.00 (Camden Wyoming, KC)	300.7 432.02 (Bowers Beach, Millford)	295.1 502.00 (Ellendale, SC)	292.4 507.06 (Longneck, SC)	288.3 503.02 (St. Johnston/ Oakley, Bridgeville, SC)
Fentanyl Rx Rate (\bar{x} = 70.8)	263.8 507.03 (Riverdale/Warwick, Millsboro, SC)	261.8 430.00 (Harrington City Center, KC)	196.0 425.00 (Woods Haven, Millford, Dover, KC)	175.5 413.00 (City Center, Dover, KC)	155.5 134.00 (Hyde Park, Wilmington, NC)	151.4 130.00 (Stanton, NC)

\bar{x} = Average Rx rate for Delaware, First number in cell is the Rx rate, Second number in the cell is the census tract number.

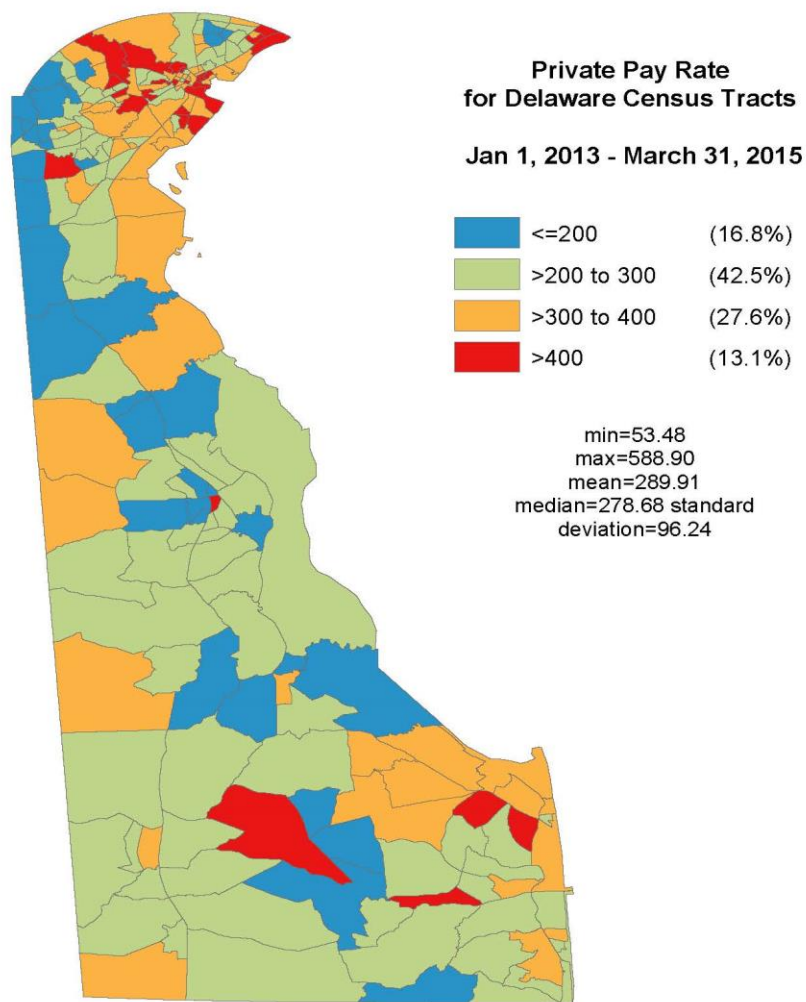
Location: Neighborhood Name (neighborhoodscout.com), City, County (NC= New Castle County, KC= Kent County, SC= Sussex County).

Top Opiates Paid Privately (no insurance)

(Delaware Patients and Prescribers)

Jan 2013 – March 2015

Opiates by Private Pay		
Drugname	Freq	Percentage
OXYCODONE HCL	21990	18.56
OXYCODONE-ACETAMINOPHEN	20780	17.54
HYDROCODONE-ACETAMINOPHEN	13084	11.04
PROMETHAZINE-CODEINE	9618	8.12
SUBOXONE	8419	7.11
ENDOCET	6677	5.64
METHADONE HCL	5495	4.64
ACETAMINOPHEN-CODEINE	5078	4.29
TRAMADOL HCL	4595	3.88
MORPHINE SULFATE ER	3335	2.82



Private Pay for Rx/Census Tract Population*1,000

Private payment (cash or credit card) for prescriptions can be viewed as an indicator of doctor shopping.

Between 2013 and March 31, 2015, an average of 209 prescriptions per 1,000 neighborhood residents were paid for privately, i.e., not by insurance.

The map shows private pay rates uneven across the state, with 13% (red shaded tracts) reporting 2 standard deviations greater than the average.

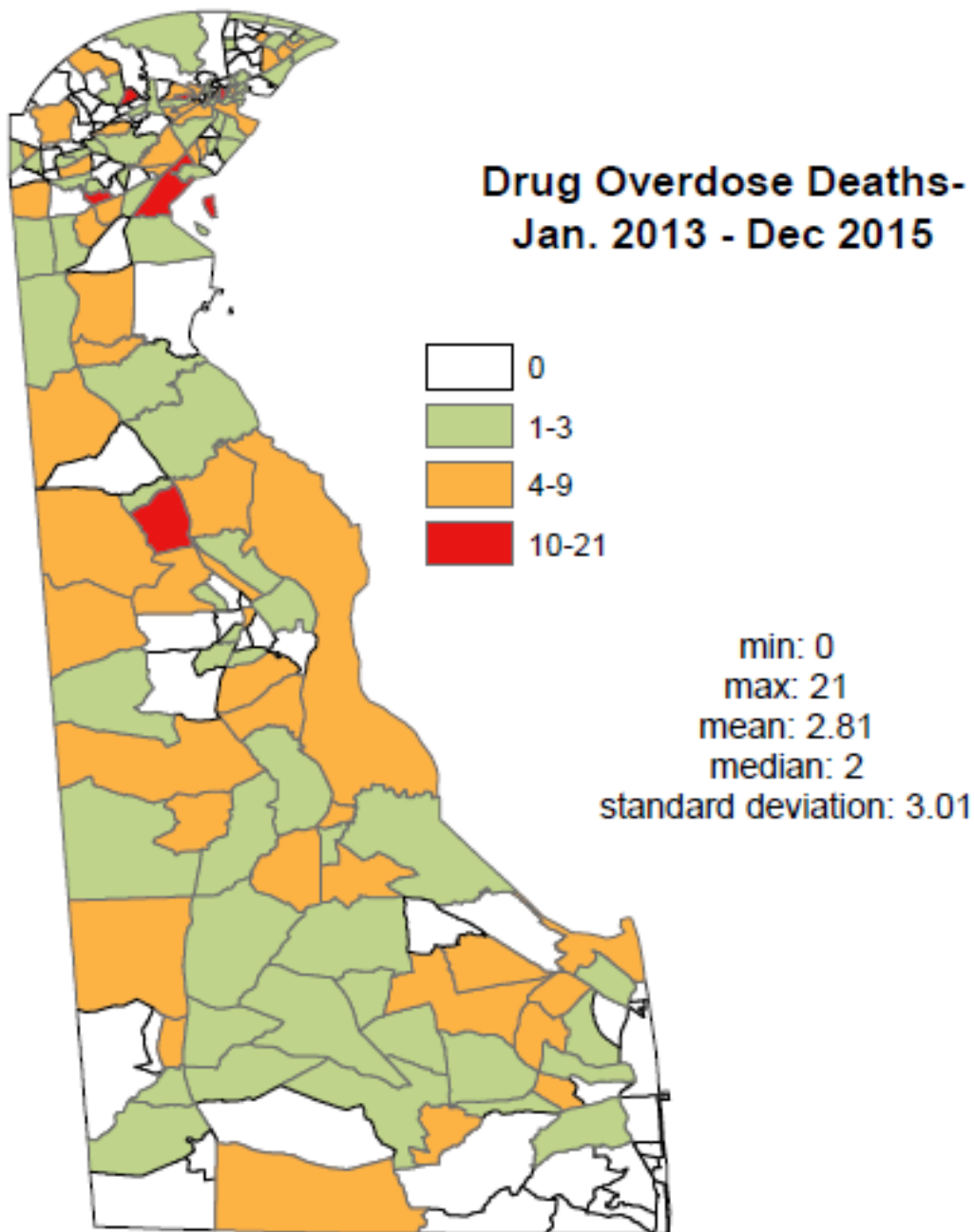
Drug Overdose Deaths¹ in Delaware for 2013-2015 by Selected Demographic Characteristics

	2013	2014	2015 ²	2013-2015 Total
Total	188 (29%)	225 (35%)	234 (36%)	647 (100%)
Kent	38 (20%)	40 (18%)	38 (16%)	116 (18%)
New Castle	103 (55%)	127 (56%)	137 (59%)	367 (57%)
Sussex	34 (18%)	41 (18%)	43 (13%)	118 (18%)
Other³	13 (7%)	17 (8%)	16 (7%)	46 (7%)
Male	114 (61%)	144 (64%)	143 (61%)	401 (62%)
Female	74 (39%)	81 (36%)	91 (39%)	246 (38%)
White	156 (83%)	191 (85%)	194 (83%)	541 (84%)
Black	27 (14%)	26 (12%)	30 (13%)	83 (13%)
Hispanic	5 (3%)	7 (3%)	8 (3%)	20 (3%)
Other	0 (0%)	1 (<1%)	2 (<1%)	3 (<1%)
<40 years old	81 (43%)	101 (45%)	113 (48%)	295 (46%)
40-50 years old	51 (27%)	63 (28%)	49 (21%)	163 (25%)
51 and older	56 (30%)	61 (27%)	71 (30%)	188 (29%)

¹ Data provided by the Office of the Chief Medical Examiner, Division of Forensic Medicine, Department of Safety and Homeland Security, State of Delaware.

² Data available for 1st quarter only.

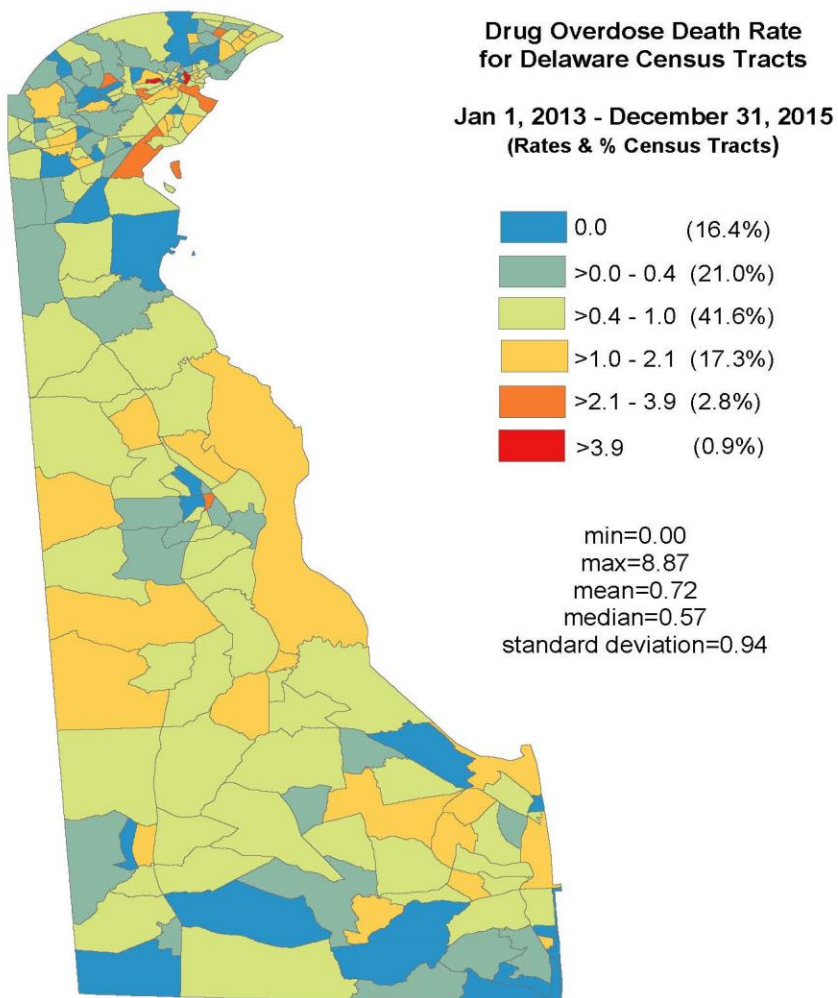
³ County determined by decedent's home address at time of death. "Other" are those with addresses outside of Delaware.



Drug overdose deaths vary by neighborhood across the state.

New Castle County neighborhoods report significantly more deaths than neighborhoods in Kent or Sussex Counties. This holds up when we adjust for population size.

NOTE: The map and distribution for 2015 alone has a similar pattern.



Overdose Deaths / Tract Population*1,000

The 2013-2015 neighborhood average # of overdose deaths per 1,000 residents in Delaware is less than 1 (.7).

However, a few neighborhoods (about 1%)– shaded red– had an overdose death rate 4 times the state average.

The map, and our analyses show, the highest death rates are in New Castle County.

Table 2. Ranking of Top 10 Census Tracts on Selected Risk Indicators

<u>PDMP</u>		<u>US Census</u>		<u>Death Report</u>			
<i>Opiate Rate¹</i>	<i>Opiate w/o Fentanyl Rate</i>	<i>Fentanyl Rate</i>	<i>Private Pay Rate²</i>	<i>% Pop <9th Grade Educ.</i>	<i>% Pop in Poverty</i>	<i>Lowest Home Values (median)</i>	<i>Drug Overdose Death Rate³</i>
507.03 (SC)	507.03 (SC)	507.03 (SC)	507.03 (SC)	505.03	145.02	507.06	028.00 (NC)
413.00 (KC)	413.00 (KC)	430.00 (KC)	505.01 (SC)	022.00	145.01	009.00	123.00 (NC)
006.02 (NC)	006.02 (NC)	425.00 (KC)	123.00 (NC)	502.00	029.00	022.00	413.00 (KC)
123.00 (NC)	123.00 (NC)	413.00 (KC)	134.00 (NC)	425.00	030.02	006.02	134.00 (NC)
021.00 (NC)	021.00 (NC)	134.00 (NC)	413.00 (KC)	021.00	413.00	006.01	113.00 (NC)
430.00 (KC)	029.00 (NC)	130.00 (NC)	029.00 (NC)	025.00	022.00	030.02	126.00 (NC)
401.00 (KC)	401.00 (KC)	501.05 (SC)	103.00 (NC)	505.04	021.00	155.02	019.02 (NC)
029.00 (NC)	430.00 (KC)	133.00 (NC)	006.02 (NC)	514.00	006.02	019.02	163.05 (NC)
507.06 (SC)	507.06 (SC)	502.00 (SC)	131.00 (NC)	026.00	504.06	023.00	016.00 (NC)
126.00 (NC)	126.00 (NC)	416.00 (KC)	158.02 (NC)	137.00	016.00	410.00	149.03 (NC)

¹All rates computed as #prescriptions written between Jan 1, 2013 through March 31, 2015 divided by tract population multiplied by 1,000

²Private pay rate equals the total number of prescriptions paid 100% by patients' cash (currency or credit card) resources between Jan 1, 2013 through March 31, 2015 divided by tract population multiplied by 1,000

³Drug overdose death rate equals the number of deaths per tract associated with legal and illegal drugs between 2013 – 2015 divided by divided by tract population multiplied by 1,000.

NC = New Castle County, KC = Kent County, SC = Sussex County

Relationships:

Opiate Rx, SES, & Overdose Deaths

(Jan 2013 – March 2015)

- Table 2 (shown) earlier indicates the top ten (highest) tracks on selected indicators.
- The color coding provides some support of a relationship between opiate Rx rates, private payment and overdose deaths, several tracts with high opiate Rx rates are also high in overdoses. There is also a SES relationship with opiates but it differs by population subgroup (separate analysis ongoing now by UD).
- However, more sophisticated analyses with the larger data set now available are required since the pattern is uneven.

Drug Type by Gender- April 2015 - September 2016

	Gender			
	Female	Male	Unknown	Total
Opioid	278,291	212,183	785	491,259
	28.0%	22.0%	<1%	
Benzos	143,722	75,840	504	220,066
	14.0%	8.0%	<1%	
Stimulant	81,589	83,462	3	165,054
	8.0%	8.0%	<1%	
Others	73,580	49,820	73	123,473
	8.0%	5.0%	<.1%	
Total	577,182	421,305	1,365	999,852
	58.0	42.0	<1%	

Drug Type by Age Group: April 2015 - September 2016							
	Age Group						
	60+	50-59	40-49	30-39	21-29	<21	Total
Opioid	165,999	129,611	84,200	65,096	33,099	13,273	491,278
	17.0%	13.0%	8.0%	7.0%	1.0%	3.0%	49.0%
Benzos	85,617	54,392	34,432	25,127	12,150	8,359	220,077
	9.0%	5.0%	3.0%	3.0%	1.0%	1.0%	22.0%
Stimulant	7,759	16147	18380	24940	23,805	74,023	165,054
	1.0%	2.0%	2.0%	3.0%	7.0%	2.0%	17.0%
Others	46,835	36162	22920	11891	4,320	1,345	123,473
	5.0%	4.0%	2.0%	1.0%	<1%	<1%	12.0%
Total	306,210	236312	159932	127054	73,374	73374	999,882
	31.0%	24.0%	16.0%	13.0%	10.0%	7.0%	100.00%

Delaware Arrests (DELJIS)- January 1, 2013 – November 30, 2016

Selected Demographic Chars

	Number	Percent*
Arrest Type**		
V. of Probation	51,249	11%
Possession Drug Paraphernalia	21,422	4%
Theft under \$1,500	19,822	4%
Offensive Touching	18,512	4%
Criminal Mischief <\$1,000 damage	14,076	3%
<i>Total*** (N = 482,310)</i>		
Gender		
Male	357,869	74%
Female	121,882	25%
<i>Total (N=479,751)</i>		
Race		
White	270,078	56%
Black	205,112	43%
Other	7,120	2%
<i>Total (N=482,310)</i>		
Age		
<21 years old	95,934	20%
21-29	168,232	35%
30-39	111,656	23%
40-49	61,089	13%
50+	43,035	9%
<i>Total (N=479,946)</i>		
Top 10 ZIP Codes of Arrestee Residence		
19720	33,603	7%
19805	31,747	7%
19901	27,145	6%
19802	24,121	5%
19801	21,886	5%
19702	18,913	4%
19973	18,110	4%
19904	15,762	3%
19966	14,912	3%
19947	13,561	2%

*Percentages may not equal 100 due to rounding.

**Close to 3,300 unique entries for arrest statute description. Must be recoded.

***Totals may differ due to missing data.

Violation of probation dominates but data need further coding.

3:1 Male to Female arrests. Reflects illegal drug rates and OD rates but not Rx drug rates.

Blacks over-represented compared DE population and all DE opiate indicators.

Age-Crime distribution flatter than expected. More arrests (than expected) at older age groups.

Top zip code locations for arrests in NCC and SCC, with some correspondence to Rx opiate rates. Preliminary!

Contact Information



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