



**Public Health**  
Prevent. Promote. Protect.  
Dayton & Montgomery County

# Emergency Department (ED) Visits due to Drug Overdose

Montgomery County, OH

January 1, 2016 – December 31, 2016

## Introduction

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EpiCenter is Ohio's statewide syndromic surveillance system that collects Emergency Department (ED) information from hospitals and urgent care centers in near real-time. This system is used by state and local public health agencies to detect, track and characterize health events and then alert public health when an unusual pattern or trend is occurring. Although traditionally used to monitor pandemic influenza, outbreaks, environmental exposures and potential bioterrorism, Epi-Center has been enhanced to include the ability to monitor drug-related ED visits. An anomaly, or unexpected increase, in the number of drug-related ED visits may be indicative of a powerful or lethal batch of drugs circulating in the area or an increase in usage of a particular drug. EpiCenter serves as an early warning system.

EpiCenter gathers de-identified demographic information (i.e. age, sex) along with the patient's chief complaint (the patient's stated reason for the visit) or if unable to communicate, a second hand account of the chief complaint.

### Limitations of this report

**This report only represents an estimate of the number of overdose ED visits. Chief complaint narratives are completed when a patient is first registered in the ED and may change with laboratory results or a final diagnosis. Diagnosis ICD codes were used when available. Additionally, the estimated number of visits is not limited to overdoses due to opioid use due to the fact that the information provided in the chief complaint narrative often excludes drug type.**

# Record Selection Process

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ED visits considered for this report were classified in Epicenter as a “Traumatic Injury – Drug” and occurred between January 1, 2016 and December 31, 2016 in Montgomery County, OH. The purpose of this report was to focus on drug-related overdoses.

Records were included in this analysis if:

- the chief complaint contained the terms “overdose” or “OD,”
- the discharge ICD code was related to poisoning by heroin, opioids, unspecified drugs, opium, narcotics, etc. (ex. T50.90, T40.1, T40.6), or
- the narrative of the chief complaint indicated that an overdose had occurred.

Records were excluded if:

- the chief complaint mentioned an accidental overdose of an over the counter medication such as Tylenol/acetaminophen or ibuprofen/Motrin,
- the chief complaint was mentioned an adverse reaction to normal medications such as insulin, or
- the record indicated that the overdose was due to an attempted suicide.

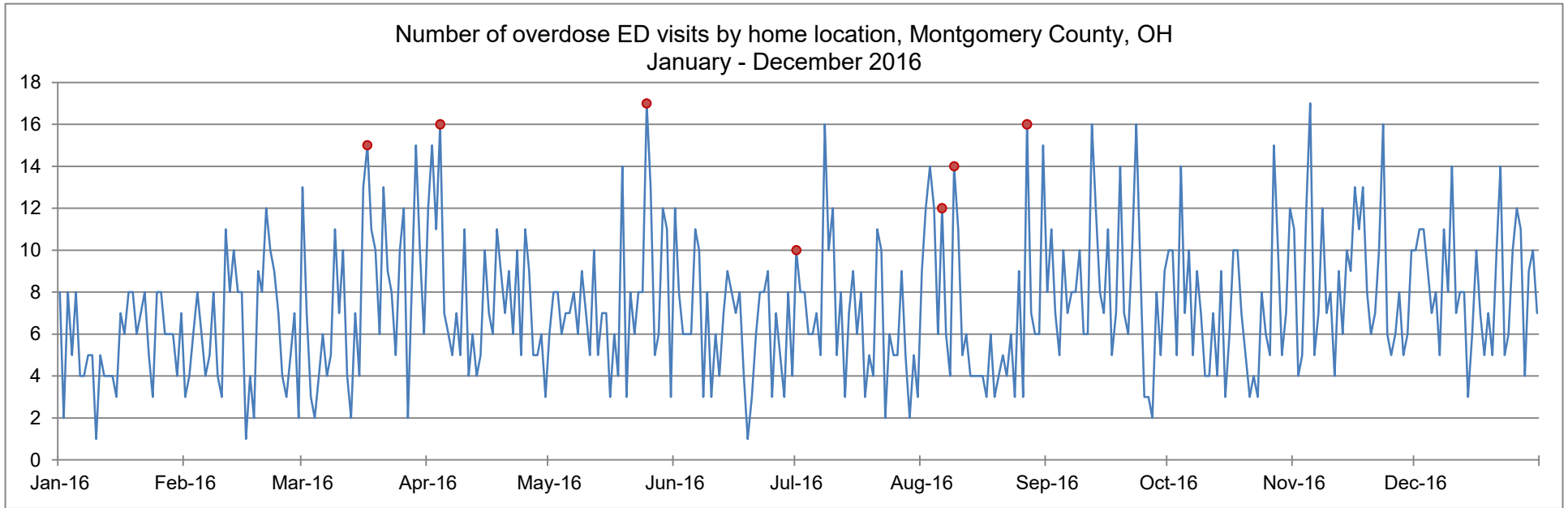
Report completed by:

Public Health – Dayton & Montgomery County

Epidemiology Section

1/9/2017 dle

Figure 1



From January 1, 2016 to December 31, 2016, there were 2,657 overdose visits to the ED by Montgomery County residents (Figure 1).

This is an average of 7 overdose visits per day.

The number of visits fluctuated, but the greatest percentage of visits occurred in the months of March through May, September, November, and December (Figure 2).

In 2016, there were 7 occasions where the predicted number of hospital visits for drugs (traumatic injury) exceeded the calculated threshold value (indicated by red markers on Figure 1).

Figure 2

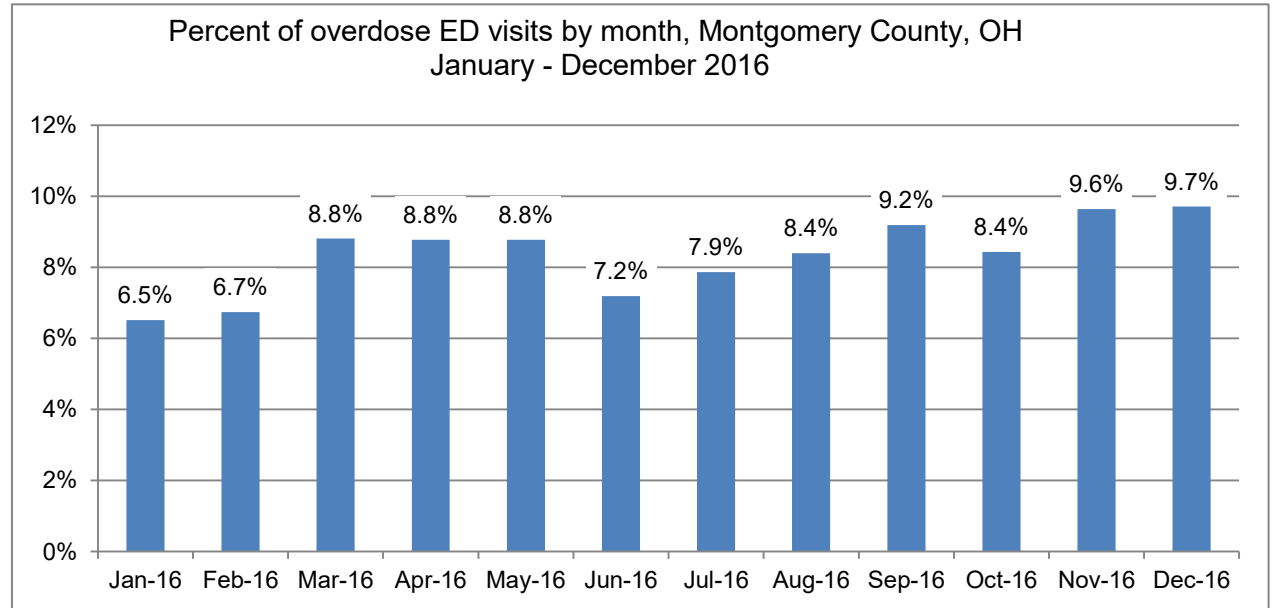
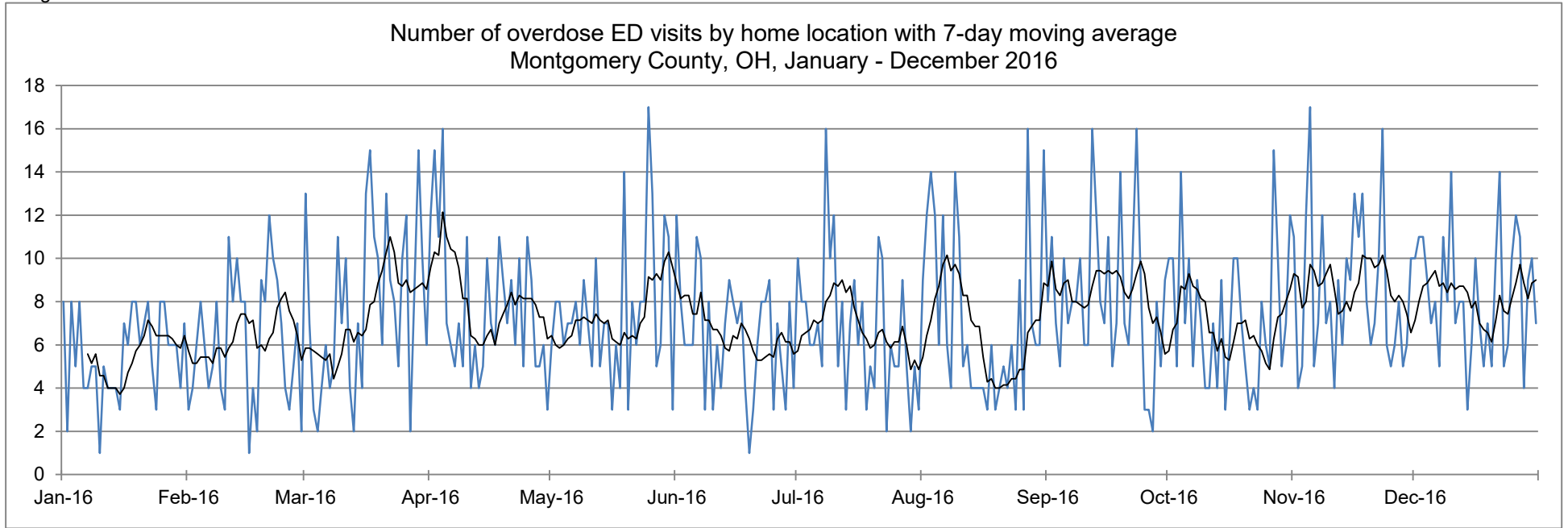
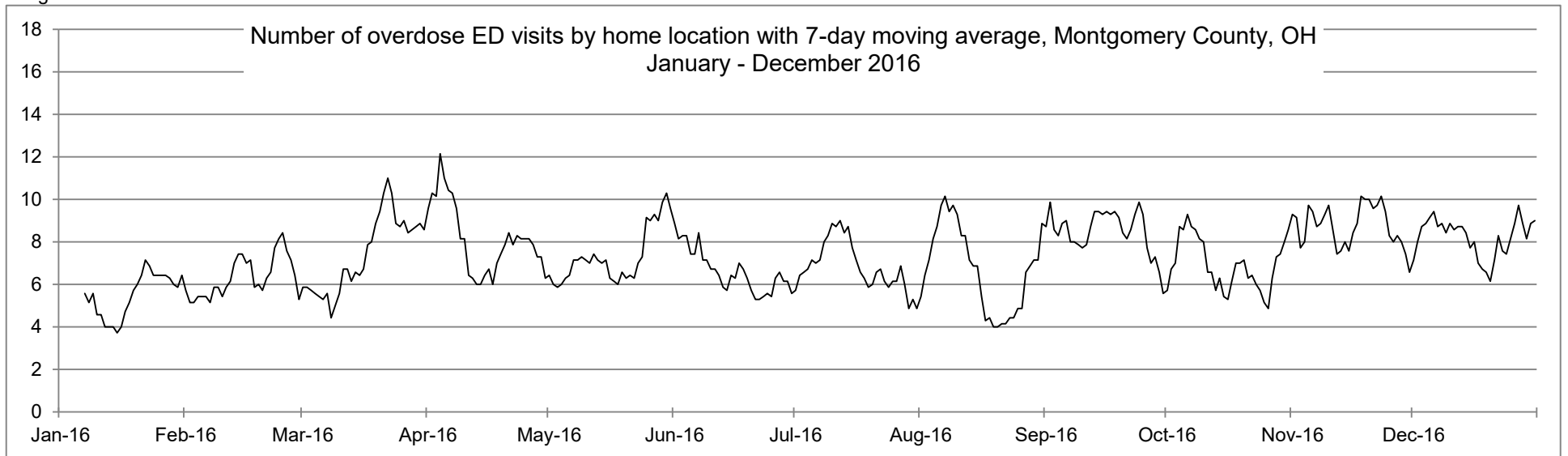


Figure 3



Calculating a 7-day moving average of the visits (see technical notes), eliminates daily fluctuations in visits and should reveal any directional trends. There were no consistent directional trends in the number of overdose visits from January through December of 2016.

Figure 4



By organizing drug-related ED visits by the day and time, a heat map shows that most of these visits occurred in the early mornings (1AM to 2AM), early afternoon (11AM to 12PM), and evenings (8PM to 10PM)

According to the heat maps and Figures 5 and 6, the peak time for drug-related overdose ED visits occurred on Fridays from 8PM to 9PM.

Heat Map - Percent of overdose ED visits by time of day and day of week  
Montgomery County, OH, January - December 2016

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Total
12 AM	0.5%	0.4%	0.5%	0.5%	0.3%	0.6%	0.8%	3.5%
1 AM	0.5%	0.7%	0.7%	0.9%	0.5%	1.1%	1.0%	5.3%
2 AM	0.8%	0.6%	0.5%	0.5%	0.5%	0.6%	0.5%	4.0%
3 AM	0.5%	0.4%	0.8%	0.5%	0.6%	0.6%	1.1%	4.3%
4 AM	0.3%	0.5%	0.6%	0.5%	0.2%	0.2%	0.8%	3.1%
5 AM	0.5%	0.2%	0.4%	0.5%	0.8%	0.5%	0.6%	3.5%
6 AM	0.3%	0.7%	0.7%	0.5%	0.4%	0.5%	0.5%	3.5%
7 AM	0.5%	0.5%	0.6%	0.3%	0.6%	0.6%	0.4%	3.5%
8 AM	0.5%	0.5%	0.5%	0.4%	0.6%	0.5%	0.5%	3.4%
9 AM	0.5%	0.7%	0.6%	0.8%	0.8%	0.6%	0.5%	4.4%
10 AM	0.5%	1.0%	0.7%	0.9%	0.7%	0.3%	0.7%	4.8%
11 AM	0.4%	0.6%	0.8%	0.7%	1.0%	0.9%	0.6%	4.9%
12 PM	0.5%	1.0%	0.9%	0.5%	0.8%	0.8%	0.7%	5.2%
1 PM	0.6%	0.3%	0.3%	0.5%	0.8%	0.8%	0.5%	3.7%
2 PM	0.6%	0.3%	0.5%	0.5%	0.6%	0.2%	0.4%	3.1%
3 PM	0.4%	0.6%	0.5%	0.9%	0.7%	0.5%	0.5%	4.1%
4 PM	0.8%	0.5%	0.5%	0.5%	0.5%	0.7%	0.6%	4.1%
5 PM	0.5%	0.7%	0.5%	0.8%	0.6%	0.8%	0.6%	4.4%
6 PM	0.5%	0.6%	0.9%	0.6%	0.8%	0.8%	0.4%	4.6%
7 PM	0.6%	0.8%	0.7%	0.6%	0.4%	0.8%	0.5%	4.4%
8 PM	0.6%	0.8%	0.8%	0.8%	0.7%	1.2%	0.5%	5.3%
9 PM	0.6%	0.7%	0.9%	0.8%	0.8%	0.6%	0.9%	5.3%
10 PM	0.5%	0.7%	0.6%	0.6%	0.6%	0.5%	0.5%	4.1%
11 PM	0.5%	0.5%	0.5%	0.5%	0.6%	0.6%	0.4%	3.5%
Total	12.4%	14.3%	14.7%	14.3%	14.9%	15.2%	14.2%	100.0%

Heat Map - Number of overdose ED visits by time of day and day of week  
Montgomery County, OH, January - December 2016

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Total
12 AM	13	11	12	14	9	15	20	94
1 AM	12	19	19	23	13	29	27	142
2 AM	22	17	12	13	14	16	13	107
3 AM	12	10	20	13	15	15	29	114
4 AM	9	13	15	12	6	6	22	83
5 AM	13	6	11	13	20	14	15	92
6 AM	9	19	18	12	11	12	13	94
7 AM	13	14	16	7	17	16	10	93
8 AM	12	13	14	11	16	12	13	91
9 AM	13	18	15	21	20	16	13	116
10 AM	13	26	18	25	18	8	19	127
11 AM	11	15	21	18	27	24	15	131
12 PM	14	26	24	13	20	21	19	137
1 PM	17	7	7	12	22	21	12	98
2 PM	17	9	14	12	15	5	10	82
3 PM	10	17	14	23	19	13	12	108
4 PM	20	14	13	14	14	19	16	110
5 PM	14	19	13	20	16	21	15	118
6 PM	12	17	23	16	22	20	11	121
7 PM	15	20	19	17	10	22	14	117
8 PM	16	21	20	20	19	31	13	140
9 PM	17	18	23	20	22	17	23	140
10 PM	14	18	17	16	17	13	13	108
11 PM	12	12	13	14	15	17	11	94
Total	330	379	391	379	397	403	378	2,657

Figure 5

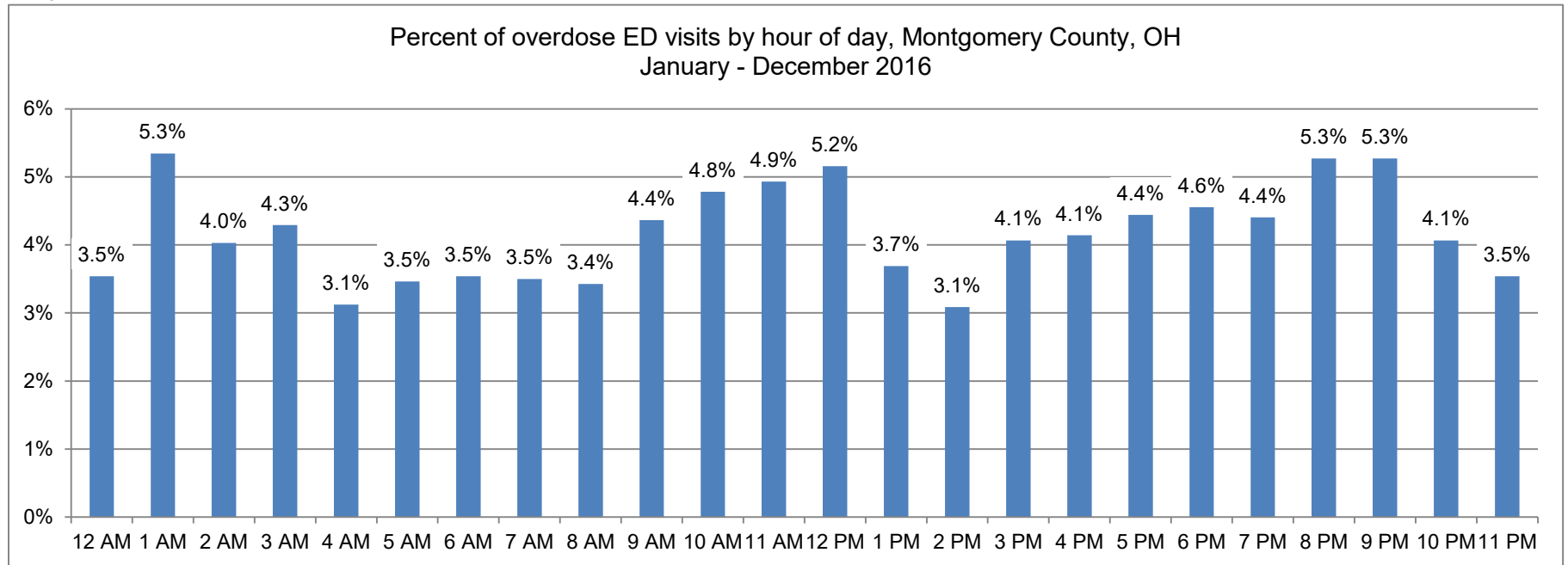
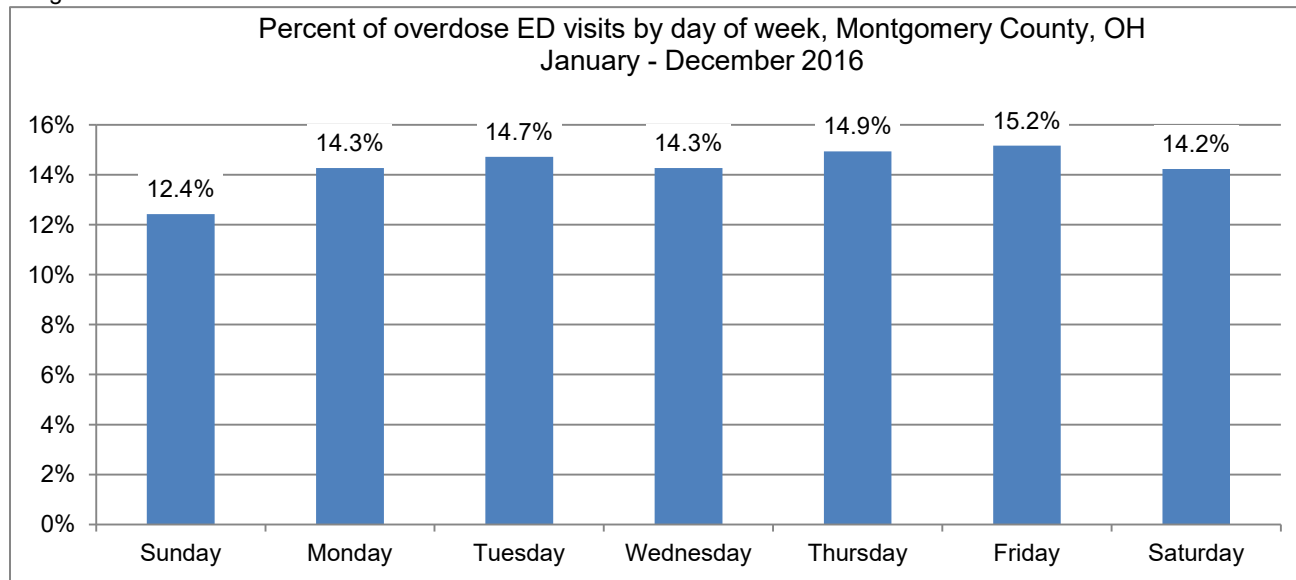


Figure 6



Hospital and County of overdose ED visit per patient, Montgomery County, OH  
January – December 2016

Miami Valley Hospital had the majority overdose visits to their ED (34%).

Only 112 (4%) of the overdose ED visits by Montgomery County residents were made to hospitals outside of the county.

Number of overdose ED visits per patient  
Montgomery County, OH  
January – December 2016

Number of Visits	Number of Patients	Percent
1	1,968	87.3%
2	214	9.5%
3	49	2.2%
4	15	0.7%
5	4	0.2%
6	2	0.09%
7	2	0.09%
8	1	0.04%
<b>Total</b>	<b>2,255</b>	

From January to December 2016, 287 out of 2,255 patients were seen in the ED for an overdose more than once.

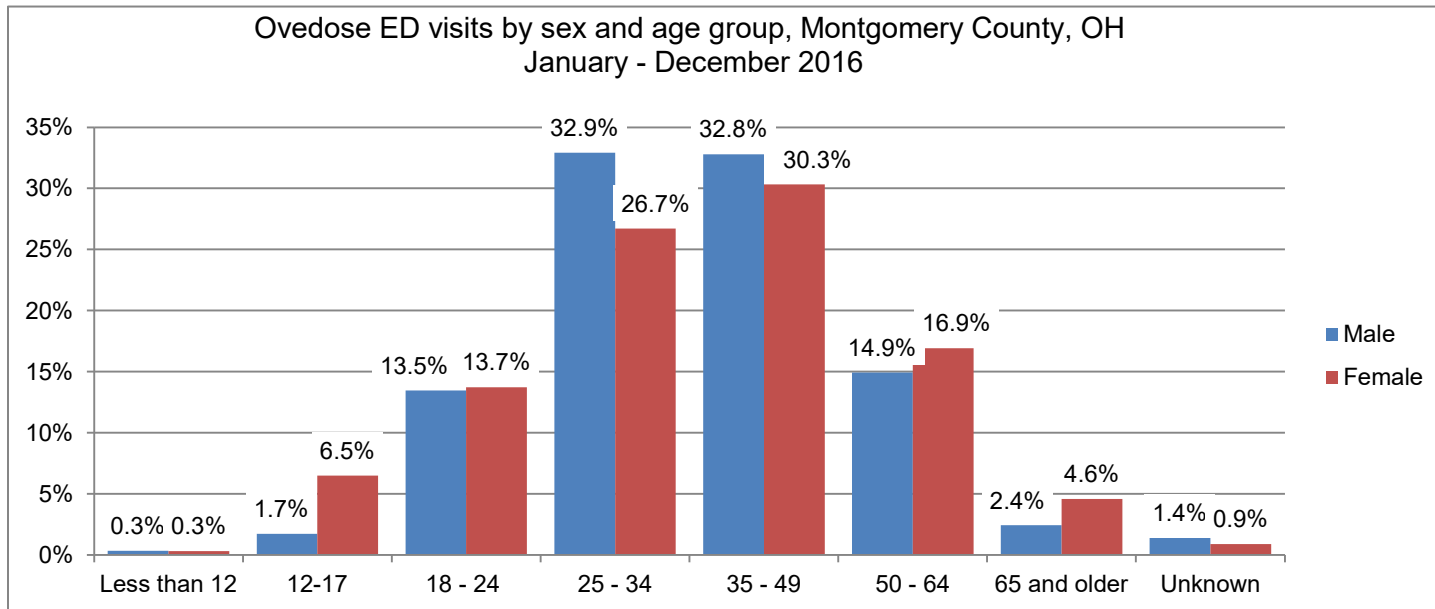
Eleven patients overdosed twice in same day.

Hospital	Number	Percent	County
Miami Valley Hospital	968	33.6%	Montgomery
Good Samaritan Hospital	588	20.4%	Montgomery
Grandview Medical Center	380	13.2%	Montgomery
Charles F. Kettering Memorial Hospital	239	8.3%	Montgomery
Sycamore Hospital	201	7.0%	Montgomery
Indu and Raj Soin Medical Center	51	1.8%	Greene
Miami Valley South Health Center	46	1.6%	Montgomery
Huber Heights Urgent Care	45	1.6%	Montgomery
Southview Hospital	43	1.5%	Montgomery
Dayton Children's Medical Center	27	0.9%	Montgomery
Atrium Medical Center	15	0.5%	Butler
Greene Memorial Hospital	10	0.3%	Greene
Upper Valley Medical Center	8	0.3%	Montgomery
University Hospital	7	0.2%	Cuyahoga
Springfield Regional Medical Center	5	0.2%	Clark
Fort Hamilton Hospital	3	0.1%	Butler
Bethesda Arrow Spring Hospital	2	0.1%	Warren
St. Vincent Mercy Medical Center	2	0.1%	Lucas
Clinton Memorial Hospital	2	0.1%	Clinton
Mercy Hospital Clermont	2	0.1%	Clermont
Southern Ohio Medical Center	1	0.0%	Scioto
Robinson Memorial Hospital	1	0.0%	Portage
Pennsylvania Hospital	1	0.0%	Out of State
Blanchard Valley Hospital	1	0.0%	Hancock
Bethesda North Hospital	1	0.0%	Hamilton
Holzer Medical Center - Gallipolis	1	0.0%	Gallia
Grant Medical Center	1	0.0%	Franklin
Fayette County Memorial Hospital	1	0.0%	Fayette
Grady Memorial Hospital	1	0.0%	Delaware
Wayne Healthcare Main Campus	1	0.0%	Darke
University of Cincinnati Medical Center	1	0.0%	Hamilton
Mercy Memorial Hospital - Urbana	1	0.0%	Champaign
Mercy Hospital Fairfield	1	0.0%	Butler

Overdose ED visits by sex and age group, Montgomery County, OH  
January – December 2016

Age Group	Male		Female		Total	
	Number	Percent of Males	Number	Percent of Females	Number	Percent of Total Visits
Under 1	5	0.3%	4	0.3%	9	0.3%
12 - 17	25	1.7%	79	6.5%	104	3.9%
18 - 24	194	13.5%	167	13.7%	361	13.6%
25 - 34	474	32.9%	325	26.7%	799	30.1%
35 - 49	472	32.8%	369	30.3%	841	31.7%
50 - 64	215	14.9%	206	16.9%	421	15.8%
65 and older	35	2.4%	56	4.6%	91	3.4%
Unknown	20	1.4%	11	0.9%	31	1.2%
<b>Total</b>	<b>1,440</b>	<b>100.0%</b>	<b>1,217</b>	<b>100.0%</b>	<b>2,657</b>	<b>100.0%</b>

Overdose ED visits were 54% male and 46% female.  
Over 60% of the visits were made by patients between the ages of 25 to 49.





Top 10 zip codes, percent overdose ED visits  
 Montgomery County, OH  
 January – December 2016

Rank	Zip Code	City	Number of Visits	Percent of Visits
1	45417	Dayton	256	9.6%
2	45403	Dayton	252	9.5%
3	45424	Huber Heights	170	6.4%
4	45410	Dayton	160	6.0%
5	45342	Miamisburg	155	5.8%
6	45420	Dayton	145	5.5%
7	45414	Dayton/Northridge	143	5.4%
8	45404	Dayton	132	5.0%
9	45405	Dayton	124	4.7%
10	45449	West Carrollton	120	4.5%

Top 10 zip codes, rate per 1,000 population of  
 overdose ED visits  
 Montgomery County, OH  
 January – December 2016

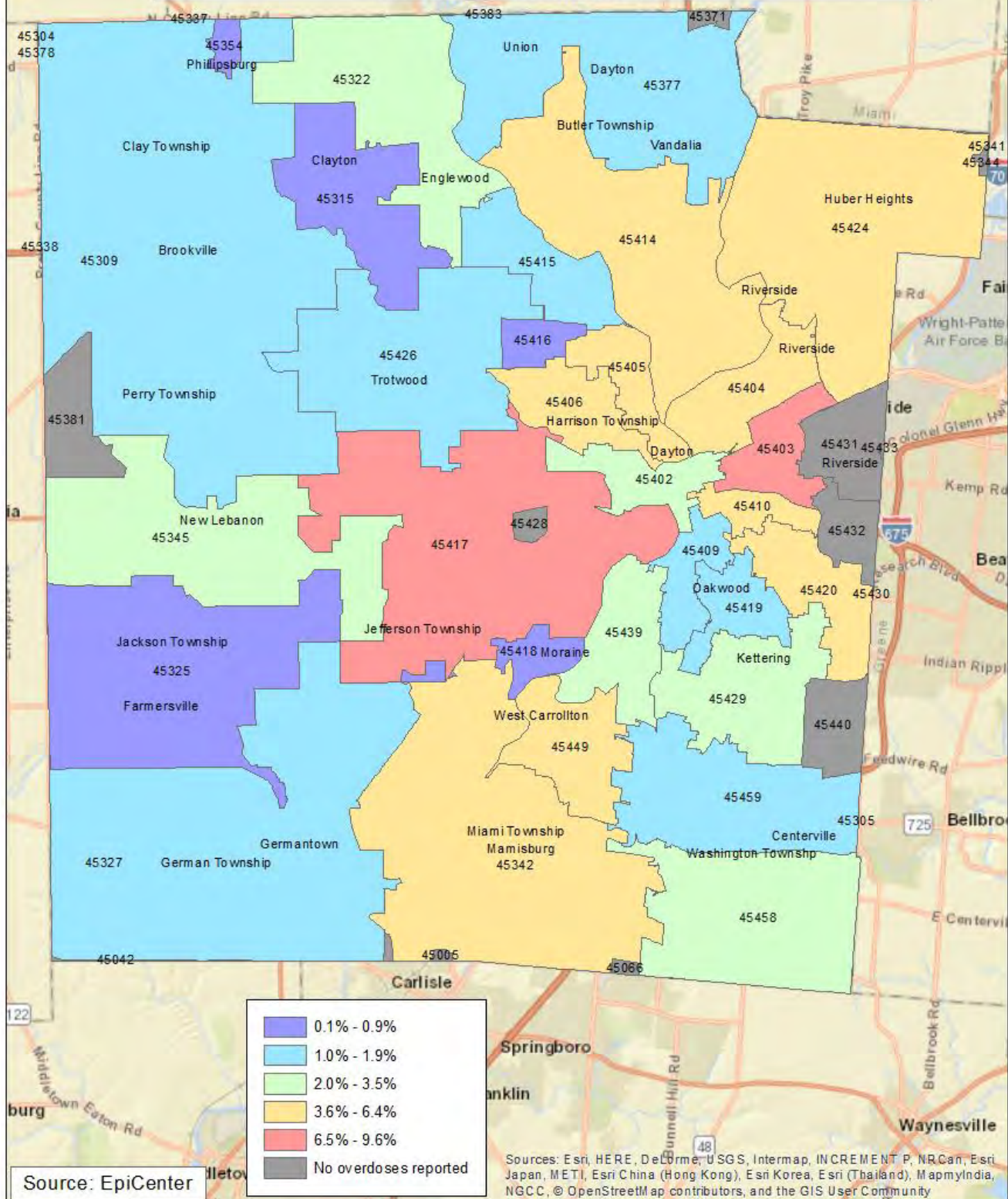
Rank	Zip Code	City	Number of Visits	Rate per 1,000
1	45403	Dayton	252	16.8
2	45404	Dayton	132	12.2
3	45345	New Lebanon	74	12.0
4	45410	Dayton	160	10.4
5	45402	Dayton	94	8.2
6	45439	Moraine	82	8.2
7	45417	Dayton	256	8.2
8	45414	Dayton/Northridge	143	6.8
9	45449	West Carrollton	120	6.6
10	45405	Dayton	124	6.5

The majority of drug overdose ED visits occurred among patients residing in zip code 45417.

The rate of overdose patients in zip code 45403, Dayton, was highest.

Although zip code 45417 had the highest number of patients with overdose visits, it falls to 7<sup>th</sup> when the population of the zip code is considered.

Percent overdose ED visits by home zip code  
 Montgomery County, OH  
 January - December 2016

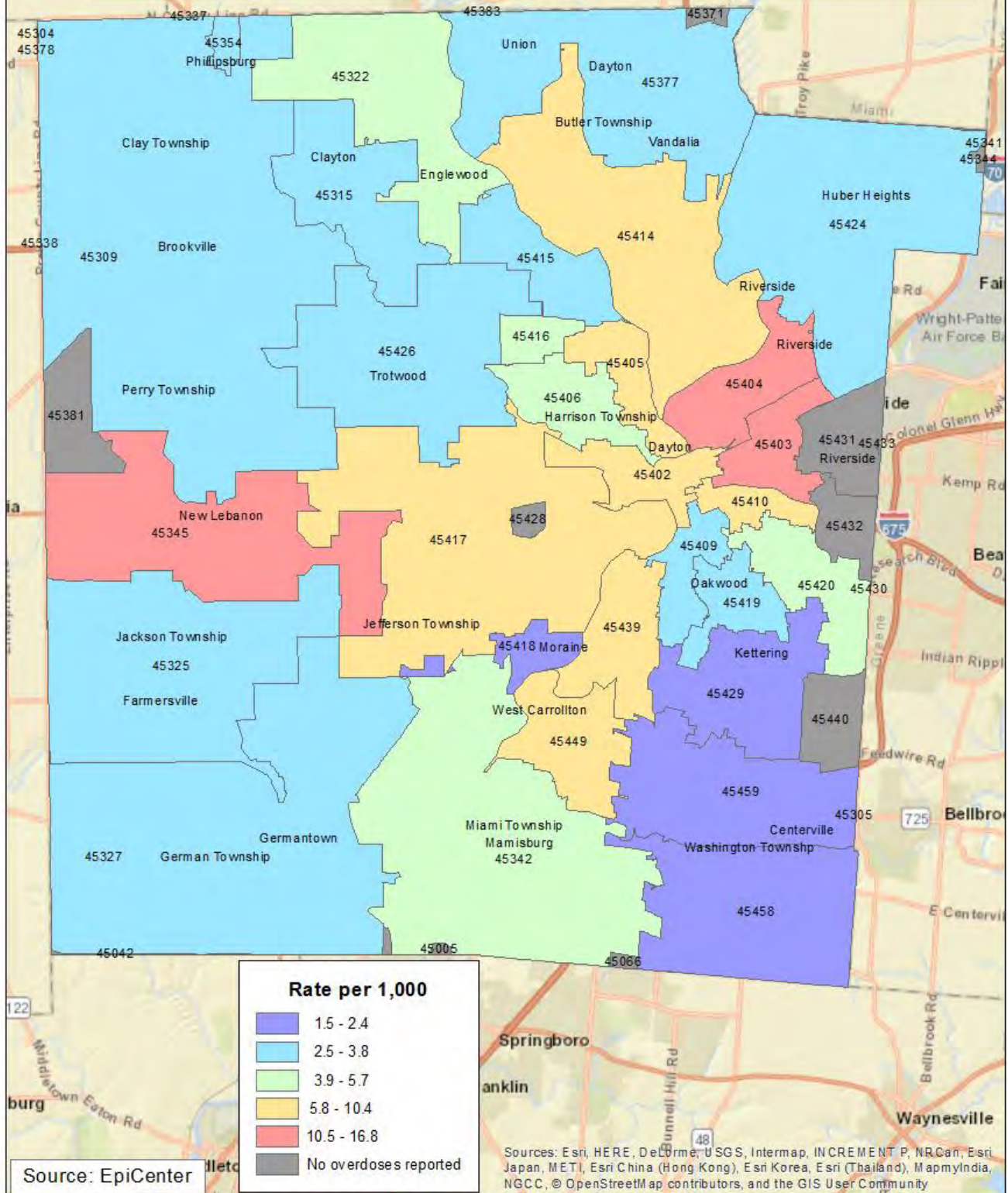


Source: EpiCenter

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community



Rate per 1,000 of overdose ED visits by home zip code  
 Montgomery County, OH  
 January - December 2016



# Technical Notes

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7 day moving average – A moving average is commonly used to smooth out short-term fluctuations and highlight longer term trends or cycle. A 7 day moving average is calculated by calculating the average using a span of seven days around a moving date.