Epidemiology Brief

Characterizing Opioid Use, Misuse, and Overdose in Chicago, IL, 2015

June 2017

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The United States has seen a dramatic increase in opioid pain reliever misuse in the last fifteen years.[1] Nationally, an estimated 11.5 million individuals aged 18 years and older (4.7%) used opioid pain relievers for non-medical purposes in 2015.[2] According to the CDC, the amount of opioid pain relievers sold in the United States is four times higher now than it was in 1999.[1]

Definitions

Common terms

Opioid: Broad term that includes naturally occurring opiates, semi-synthetic and synthetic opioids.

Opiate: Naturally occurring substances that are derived from opium.

Classes of opioids

Natural opiates: Drugs that are fully derived from opium; examples include *morphine* and *codeine.*

Semi-synthetic opioids: Drugs that are derived from a combination of natural and synthetic opioids; examples include *heroin, oxycodone, hydrocodone, hydromorphone,* and *oxymorphone*.

Synthetic opioids: Drugs that are created to work in a similar way as naturally occurring opiates but are completely man-made; examples include *fentanyl*, *tramadol* and *methadone*.

Specific opioids

Heroin: A highly addictive and illegally produced drug derived from morphine.

Fentanyl: A highly potent synthetic opioid that is prescribed to treat severe pain. In the US, there has been an increase in the development and distribution of illegally produced fentanyl. Most of the fentanyl involved in overdose deaths is thought to be from an illicit source. Fentanyl is a common adulterant in heroin – often without the user's knowledge.

Methadone: A synthetic opioid that is FDA-approved to treat both pain and opioid use disorder.

Opioid pain relievers: Often called prescription pain relievers or opioid analgesics, this class of drugs is prescribed to treat pain. Includes: buprenorphine, codeine, fentanyl, hydrocodone (e.g. Lorcet, Lortab, Norco, Vicodin), meperidine, methadone, morphine, oxycodone (e.g. OxyContin, Percocet) and tramadol. Buprenorphine and methadone are FDA-approved to treat pain, however are more commonly used for addiction treatment. While fentanyl is approved to treat pain, it is rarely prescribed.

Opioid pain reliever use among Chicago adults

According to the 2015 Healthy Chicago Survey[3], an estimated 261,000 (13%) adults in Chicago reported using an opioid pain reliever in the past year and 61,000 (3%) adults reported misuse (Table 1).

Table 1. Opioid pain reliever use among adults, Chicago 2015
Percentage of total population

	Population Estimate	Percentage (95% CI)
Never used opioid pain relievers	1,778,000	87.2% (85.4%, 88.9%)
Used opioid pain relievers	261,000	12.8% (11.1%, 14.6%)
Used as directed by physician	198,000	9.8% (8.2%, 11.3%)
Misused	61,000	3% (2.0%, 4.0%)
Used more than was prescribed*	18,000	0.9% (0.5%, 1.3%)
Used without prescription*	49,000	2.4% (1.5%, 3.3%)

**Some individuals were categorized into both misuse categories*

Among adults who used opioid pain relievers, the majority (76%) used opioid pain relievers as directed by their physician. However, a significant proportion (24%) reported misusing opioid pain relievers in two ways: (1) taking a higher dose or more frequently than was prescribed (2) taking opioid pain relievers without a prescription (Table 2).

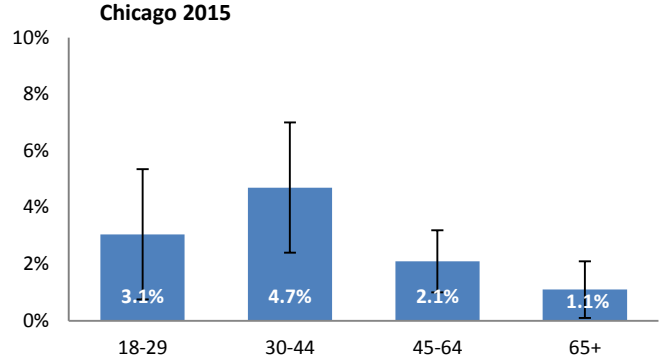
Table 2. Opioid pain reliever use among adults, Chicago 2015

	Percentage (95% CI)
Used opioid pain relievers (of the total population)	12.8% (11.1%, 14.6%)
Used as directed by physician (of those who used opioid pain relievers)	76% (69.7%, 83.0%)
Misused (of those who used opioid pain relievers)	24% (17.0%, 30.3%)
Used more than was prescribed (of those who misused*)	29% (16.1%, 42.3%)
Used without a prescription (of those who misused*)	79% (68.6%, 90.4%)

**Some individuals were categorized into both misuse categories*

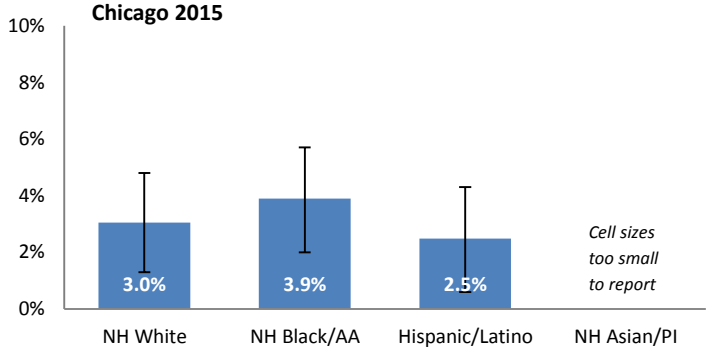
Individuals aged 30-44 reported the highest rates of opioid pain reliever misuse (Figure 1). There were no significant differences in rates of opioid pain reliever misuse by gender, race-ethnicity, or poverty level (Appendix A and Figure 2).

Figure 1. Opioid pain reliever misuse by age, Chicago 2015



Source: CDPH Health Chicago Survey
p-value: 0.0423 χ^2= 8.19

Figure 2. Opioid pain reliever misuse by race-ethnicity, Chicago 2015

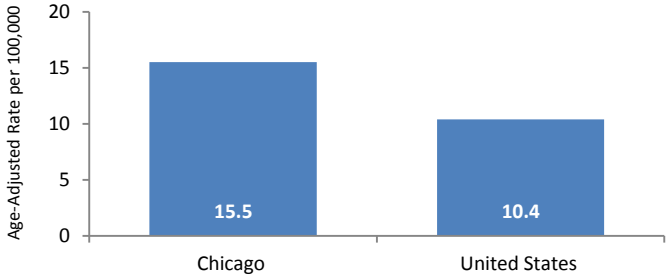


Source: CDPH Health Chicago Survey
NH = non-Hispanic, PI = Pacific Islander, AA = African American
p-value = 0.6679, χ^2= 2.37

Overdose deaths involving opioids in the United States

Over the last 15 years there has been a significant increase nationally in the rate of drug overdose deaths involving opioids[4]. According to the CDC, between 2014 and 2015 alone, this rate increased by 15.6% (from 9.0 to 10.4 deaths per 100,000). Death rates increased among all opioid classes, and specifically from 2014 to 2015 there was a 20.6% increase in overdose deaths involving heroin (from 3.4 to 4.1 deaths per 100,000)[4].

Figure 3. Overdose deaths involving opioids in 2015



Data Source: Cook County Medical Examiner
CDC, MMWR, *Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015, Dec 2016*

Overdose deaths involving opioids in Chicago[6]

In 2000, the medical examiner recorded 310 overdose deaths involving opioids[5]. A review of cases from the Cook County Medical Examiner's office showed that there were 426 overdose deaths involving opioids in Chicago in 2015. The rate of overdose deaths involving opioids in Chicago (15.5 per 100,000) was 50% higher than the national rate (10.4 per 100,000) in 2015 (Figure 3). Of those deaths, the majority (81%) involved heroin and were accidental (96.7%) (Table 3, Appendix B). The rate of overdose deaths involving heroin in Chicago (12.4 per 100,000) was three times the rate in the United States (4.1 per 100,000)[4]. Other opioid-related overdose deaths involved fentanyl (17%), opioid pain relievers excluding methadone (7.5%), and methadone (6.6%) (Table 3). Approximately 2% of the overdoses were due to suicide, and most suicides involved opioid pain relievers (Appendix B).

Table 3. Percentage of all opioid-related overdose deaths involving specific opioids (Chicago, 2015)

Drug Type*	Chicago (n=426)
All opioids	--
Heroin-involved	80.9%
Fentanyl-involved	16.7%
Opioid pain reliever-involved^	7.5%
Methadone-involved	6.6%

Data Source: Cook County Medical Examiner's Office
*Categories are not mutually exclusive as some deaths involved more than one type of opioid. Percentages will not add to 100%
^Opioid pain reliever: buprenorphine, codeine, hydrocodone, hydromorphone, meperidine, morphine, oxycodone, oxymorphone, or tramadol.

Table 4. Overdose deaths involving opioids (Chicago, 2015)

	Number	Rate**
Opioid Type*		
All opioids	426	15.5
Heroin-involved	345	12.4
Fentanyl-involved	71	2.7
Opioid pain reliever-involved^	32	1.1
Methadone-involved	28	1.0
Gender		
Male	322	23.8
Female	104	7.5
Age		
15-24	27	6.7
25-34	78	15.1
35-44	89	23.5
45-54	121	35.7
55-64	96	36.5
65-74	14	9.3+

Data Source: Cook County Medical Examiner's Office, US Census Bureau
*Categories are not mutually exclusive as some deaths involved more than one type of opioid.
**Rates express then number of overdoses per 100,000 people in the population. Denominators are based on the 2010 census population. Rates are age-adjusted to the 2000 US standard population.
^ Opioid pain reliever: buprenorphine, codeine, hydrocodone, hydromorphone, meperidine, morphine, oxycodone, oxymorphone, or tramadol.
+For counts less than 20, rates may be unstable and should be interpreted with caution.

Demographics and opioid type[7]

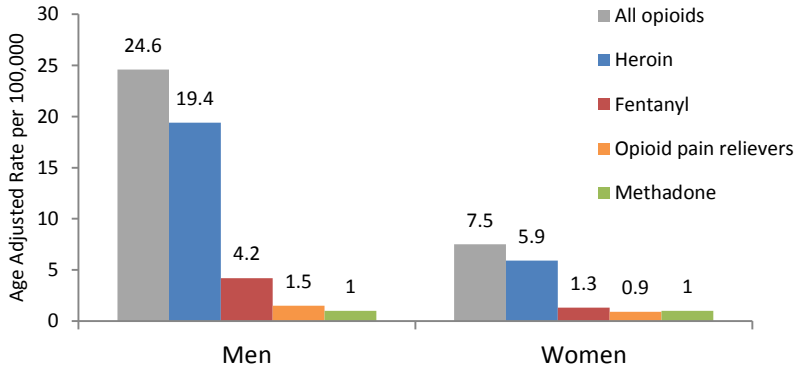
Age

- Rates of opioid-related overdose death were highest among individuals aged 55-64 years for all opioid types except fentanyl (the rate for fentanyl was highest among the 45-54 year old age group) (Table 4).

Gender

- Opioid-related overdose death rates were higher among men than women for all types of opioids.
- Opioid-related overdose death rates among men were approximately three times higher than rates among women for opioids overall, heroin and fentanyl.
- The rate of opioid pain reliever-involved overdose deaths was 1.5 times higher among men than among women.
- The rate of methadone-involved overdose was the same among men as among women (Figure 4).

Figure 4. Opioid-related overdose death rates by gender and opioid type* (Chicago, 2015)

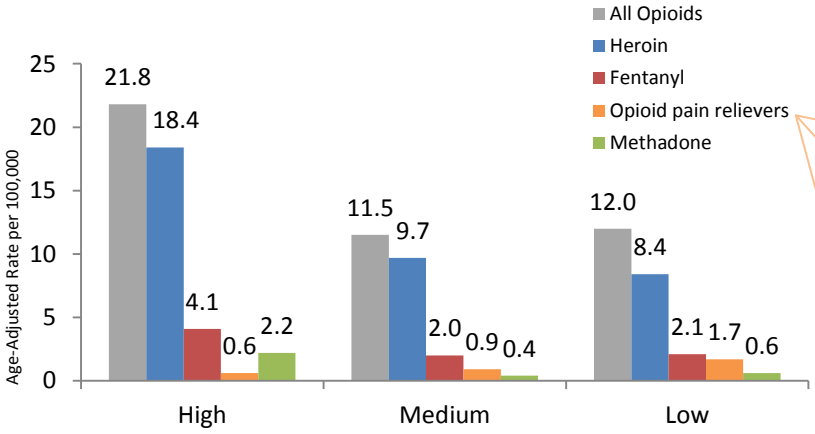


Data Source: Cook County Medical Examiner, US Census Bureau
*Categories are not mutually exclusive as deaths may involve more than one drug.
Opioid pain reliever: buprenorphine, codeine, hydrocodone, hydromorphone, meperidine, morphine, oxycodone, oxymorphone, or tramadol.

Economic hardship

- Economic hardship is measured at the community area level by combining six socioeconomic measures from the U.S. census (e.g. poverty and unemployment).
- Communities with high economic hardship experienced the highest rates of overdose deaths involving heroin, fentanyl and methadone (Figure 5).

Figure 5. Opioid-related overdose death rates by community economic hardship index and opioid type* (Chicago, 2015)



Data Source: Cook County Medical Examiner
*Categories are not mutually exclusive as deaths may involve more than one drug.
Opioid pain reliever: buprenorphine, codeine, hydrocodone, hydromorphone, meperidine, morphine, oxycodone, oxymorphone, or tramadol.

- Communities with low economic hardship experienced rates of overdose death involving prescription pain relievers that were more than double the rates in communities with high economic hardship (Figure 6). This may be due to disparities in cost of and access to opioid pain relievers versus illicit opioids (i.e. heroin and fentanyl).

Figure 6. A *closer look* at opioid pain relievers by community economic hardship

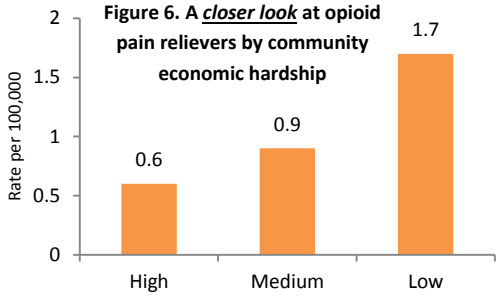


Figure 7. Heroin-involved overdoses Chicago, 2015 (n=345)

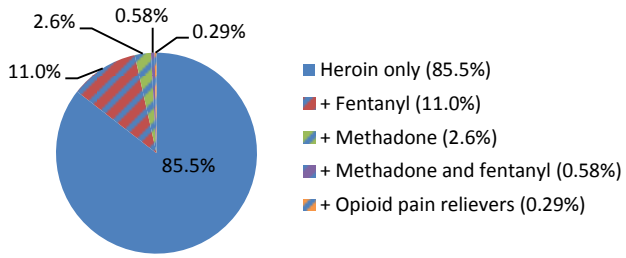


Figure 8. Fentanyl-involved overdoses Chicago, 2015 (n=71)

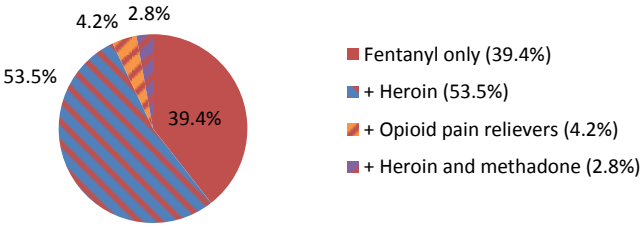
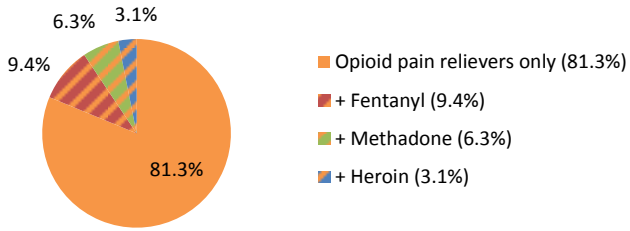


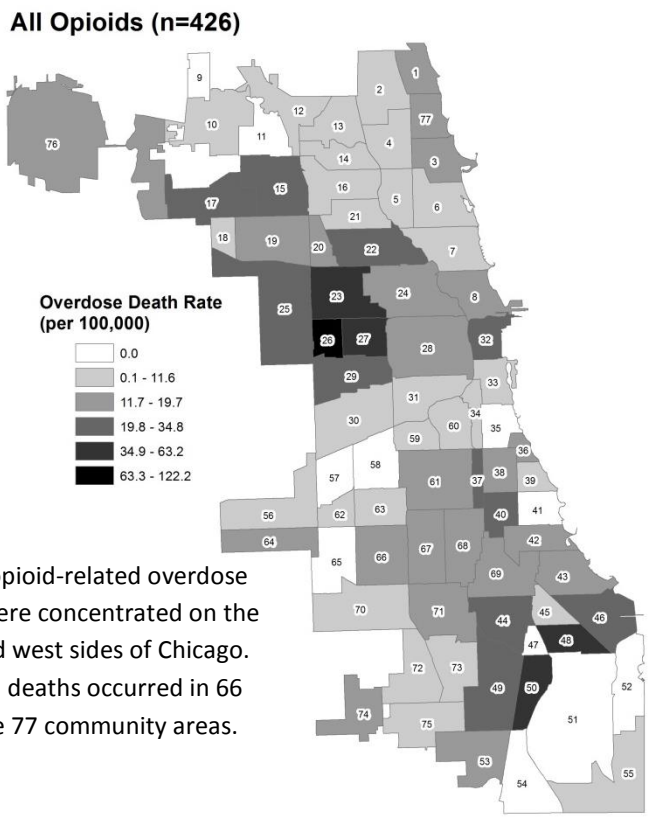
Figure 9. Opioid pain reliever-involved overdoses Chicago, 2015 (n=32)

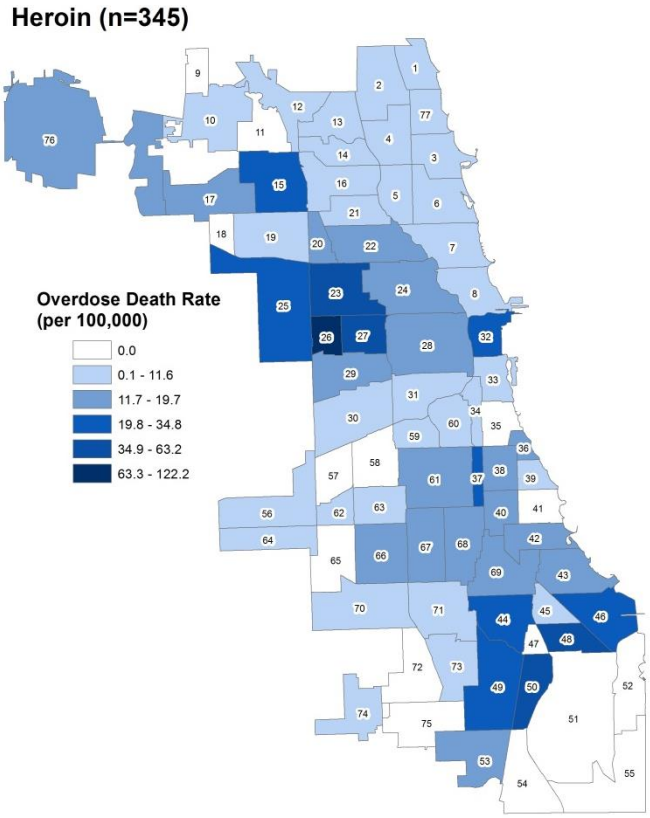


Understanding combinations of opioids involved in overdose deaths

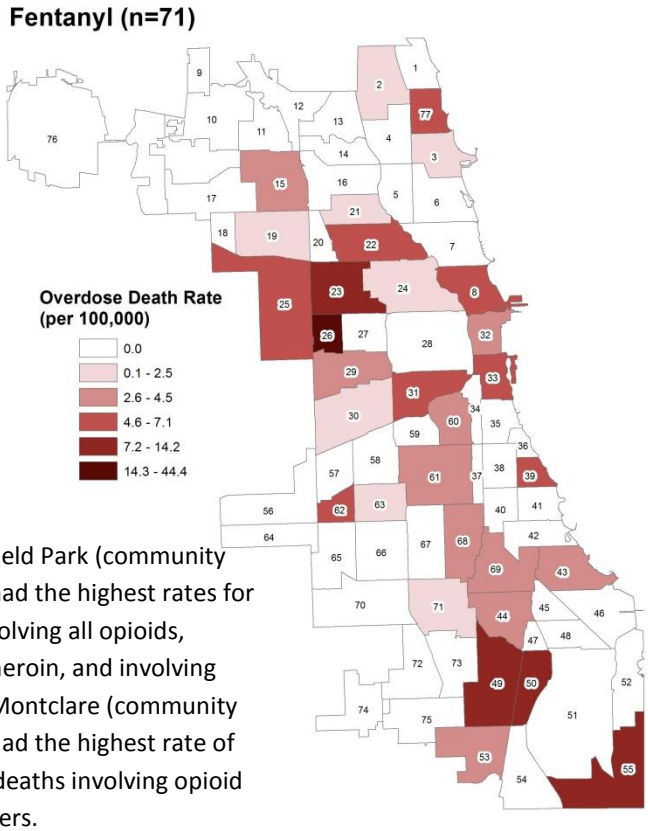
- When multiple opioids are combined, they have an additive effect and can increase risk for overdose, particularly when the drugs being added are more potent than the drug an individual is used to ingesting (for example when fentanyl is mixed into heroin).
- When people buy illicit drugs, they often do not know exactly what drug they are purchasing-- neither the purity of the purported drug, nor other drugs or adulterants that may have been added by drug traffickers.
- Among overdose deaths involving heroin, 85% of deaths did not involve any other drug, 11% involved fentanyl, 3.2% involved methadone or methadone mixed with fentanyl, and only 0.3% involved opioid pain relievers (Figure 7).
- Of overdose deaths involving fentanyl, over 50% involved fentanyl combined with heroin, and only 39.4% involved fentanyl alone (Figure 8).
- The majority of deaths involving opioid pain relievers were not in combination with other opioids (81.3%) (Figure 9).
- Deaths may have involved substances other than opioids (e.g. alcohol, cocaine, and/or benzodiazepines). This is not depicted in figures 7-9.

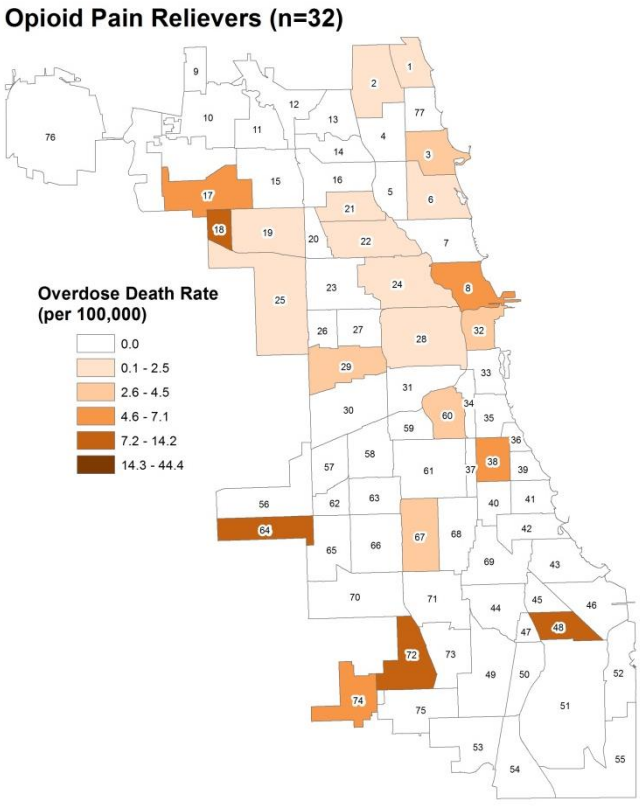
Opioid-related overdose death rates by opioid type and community area (Chicago, 2015)





- Overall, opioid-related overdose deaths were concentrated on the south and west sides of Chicago. However, deaths occurred in 66 out of the 77 community areas.





- West Garfield Park (community area: 26) had the highest rates for deaths involving all opioids, involving heroin, and involving fentanyl. Montclare (community area: 18) had the highest rate of overdose deaths involving opioid pain relievers.

1	Rogers Park	9	Edison park	17	Dunning	25	Austin	33	Near South Side	41	Hyde Park	49	Roseland	57	Archer Heights	65	West Lawn	73	Washington Heights
2	West Ridge	10	Norwood Park	18	Montclare	26	West Garfield Park	34	Armor Square	42	Woodlawn	50	Pullman	58	Brighton Park	66	Chicago Lawn	74	Mount Greenwood
3	Uptown	11	Jefferson Park	19	Belmont Cragin	27	East Garfield Park	35	Douglas	43	South Shore	51	South Deering	59	McKinley Park	67	West Englewood	75	Morgan Park
4	Lincoln Square	12	Forest Glen	20	Hermosa	28	Near West Side	36	Oakland	44	Chatham	52	East Side	60	Bridgeport	68	Englewood	76	O'Hare
5	North Center	13	North Park	21	Avondale	29	North Lawndale	37	Fuller Park	45	Avalon Park	53	West Pullman	61	New City	69	Greater Grand Crossing	77	Edgewater
6	Lakeview	14	Albany Park	22	Logan Square	30	South Lawndale	38	Grand Blvd	46	South Chicago	54	Riverdale	62	West Elston	70	Ashburn		
7	Lincoln Park	15	Portage Park	23	Humboldt Park	31	Lower West Side	39	Kenwood	47	Burnside	55	Hegewisch	63	Gage park	71	Auburn Gresham		
8	Near North Side	16	Irving Park	24	West Town	32	Loop	40	Washington Park	48	Calumet Heights	56	Garfield Ridge	64	Clearing	72	Beverly		

Data Source: Cook County Medical Examiner, US Census Bureau. Community area overdose death rates are crude rates.
Deaths are geocoded to location of incident. Location of 12 deaths could not be accurately identified. (1 fentanyl-involved death and 11 heroin-involved deaths)

What Chicago is doing to address the crisis:

In addition to the important ongoing work by community based organizations, hospitals, clinicians, researchers, volunteers, and many others to address the opioid crisis, Chicago and Cook County are pursuing the following initiatives:

In Chicago:

- CDPH is planning a community awareness campaign to increase awareness about opioid risk, opioid use disorder treatment, overdose response, and naloxone administration.
- CDPH provides educational events for medical professionals. These focus on safe opioid prescribing practices for pain management, practical strategies for working with patients with opioid use disorder, and evidence-based treatment. CDPH is launching a learning collaborative for health centers that want to build capacity for medication-assisted treatment for opioid use disorder.
- Since 2016, the City of Chicago has provided $250,000 annually for overdose reversal training and naloxone distribution in the community.
- In 2017, the City of Chicago added $700,000 annually to the $1.7 million that is already spent annually on substance use disorder prevention and treatment. The new funds will be awarded through a competitive process to agencies that provide medication-assisted treatment for opioid use disorder treatment.

Joint Efforts:

- The Chicago Department of Public Health (CDPH), Cook County Department of Public Health (CCDPH), Cook County Health and Hospital Systems (CCHHS) and Illinois Department of Public Health (IDPH) are working together to analyze available data sources, share information about opioid-related trends, and collaborate with the Cook County Medical Examiner's Office.
- Chicago and Cook County worked together to convene the Chicago-Cook Heroin Task Force, which engaged a variety of local leaders, community agencies and academic experts and developed a list of recommendations that was released in October 2016. The analysis completed in this report is a result of the recommendations set forth by the data section of the task force.
- CDPH and CCHHS jointly provide buprenorphine trainings to medical providers interested in prescribing this form of medication-assisted treatment.
- Naloxone is a medication that can reverse opioid overdose and save someone's life. CCHHS, CDPH, and CCDPH are working to make naloxone accessible to all family and friends of opioid users who may be at risk of overdosing, as well as to all patients prescribed opioids. Naloxone is available at all CCHHS pharmacies. Additionally, Cook County jail inmates with a history of opioid use are offered training and naloxone upon release.

For comparison between Suburban Cook County and Chicago click HERE.
An update on 2016 overdose deaths will be released in Fall 2017.
For additional information contact: CDPH Medical Director of Behavioral Health: *Elizabeth Salisbury-Afshar (Elizabeth.SalisburyAfshar@cityofchicago.org).*

General resources for opioid addiction:

- Substance Abuse and Mental Health Services Administration (SAMHSA) National Helpline: 800.622.HELP(4357)
- For SAMHSA's Behavioral Health Treatment Services Locator click HERE
- For questions about medications, call the Illinois Poison Center at 800.222.1222
- For information about safe disposal of medications click HERE
- IL Department of Human Services (DHS) Consumer Hotline: 866.213.0548

Data Sources

[1]Understanding the Epidemic June 21, 2016 (https://www.cdc.gov/drugoverdose/epidemic/index.html)
[2]Results from the 2015 National Survey on Drug Use and Health: Detailed Tables, SAMHSA, Sept 2015 (http://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015.htm#tab1-6a)
[3]Healthy Chicago Survey (2015): HCS is a random digit dial telephone survey conducted by the Chicago Department of Public Health and Abt SRBI of all non-institutionalized adults over age 18 in Chicago, IL. Data are weighted to represent the household population of adults 18 years of age and older who reside in the City of Chicago.
[4]CDC MMWR "Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015" December 16, 2016 (https://www.cdc.gov/mmwr/volumes/65/wr/mm655051e1.htm?s_cid=mm655051e1_e#T1_down).
[5]Scott, Greg et al. "Observed Patterns of Illicit Opiate Overdose Deaths in Chicago, 1999–2003." Journal of Urban Health 84.2 (2007): 292–306. PMC. Web. 11 May 2017.
[6]Cook County Medical Examiner (2015)
Data reflect all overdose deaths involving one or more opioids. Deaths may involve alcohol or other classes of drug. All rates are age adjusted to the 2000 U.S. census standard population except for rates by community area. Deaths are geocoded to location of incident. Location of four deaths could not be accurately identified.

[7]Due to limitations of available data, analysis of opioid overdose deaths by race-ethnicity was not possible.

Additional information about overdose death data and categories of opioids

Data were received directly from the medical examiner's office. All cases labeled "morphine," "opiate," or "opioid" were re-reviewed with the medical examiner. The medical examiner re-reviewed the toxicology report, the police review, and the case history to determine the specific opioids involved in the death. Ultimately, 125 cases were re-reviewed and about 75% were re-categorized as heroin. The remaining 25% were categorized as unknown opioid, unknown prescription opioid, morphine, heroin, fentanyl, codeine, or deemed not an opioid overdose and removed.

Heroin-involved Deaths: 345 deaths were categorized as heroin-related deaths. 9 deaths were categorized as toxicity from heroin and methadone, 2 from heroin, methadone and fentanyl, and 1 from heroin and an opioid pain reliever.
This category includes two types of deaths:

1) Deaths labeled heroin on the death certificate (confirmed by the presence of 6-monoacetylmorphine (6-MAM) in the toxicology report)
2) Deaths originally labeled "opiate" or "morphine" (morphine is a breakdown product of heroin) but determined to be likely due to heroin after re-reviewing the toxicology reports, circumstances of death, and history with the Cook County Medical Examiner.

Fentanyl-involved Deaths: 71 deaths were confirmed as fentanyl or fentanyl analogs by the Cook County Medical Examiner. 3 deaths were categorized as toxicity from fentanyl and an opioid pain reliever and 2 deaths from fentanyl, heroin and methadone.
Opioid Pain Reliever involved Deaths: 32 deaths included an opioid pain reliever in the cause of death. The drugs found were: buprenorphine, oxycodone, hydrocodone, hydromorphone, meperidine, morphine, tramadol, codeine, and unknown prescription opiates. The morphine-related deaths included in this category were determined by the medical examiner's office to be more likely related to an actual morphine overdose rather than a heroin metabolite. One death also involved heroin, 3 involved fentanyl, and 2 involved methadone.
Methadone-involved Deaths: 28 deaths were identified as methadone-related overdose. Nine of these deaths involved heroin, two involved heroin and fentanyl, and two also included other opioid pain relievers (1 oxycodone, 1 hydrocodone).
Unknown Opioid Involved Deaths: 7 deaths were identified as "opiate" deaths where no further information was available. Typically, these were cases where the individual died in a hospital setting and it was no longer possible for medical examiner's office to send out confirmatory toxicology testing to determine the type of opiate that had been used (because of the length of time between drug use and eventual death).

Additional Tables

Appendix A. Opioid pain reliever misuse demographics		
	Population Estimate	**Percent (95% CI)**
Age		
18-29	16189	3.1% (0.8%, 5.3%)
30-44	29545	4.7% (2.4%, 7.0%)
45-64	12568	2.1% (1.0%, 3.2%)
65+	3342	1.1% (0.1%, 2.2%)
Gender		
Male	31637	3.3% (1.7%, 4.8%)
Female	30007	2.8% (1.5%, 4.1%)
Poverty level		
<100%	16564	4% (1.6%, 6.4%)
100-199%	9329	2.8% (0.9%, 4.7%)
200-399%	16180	5.7% (1.8%, 9.5%)
400%+	13389	2.2% (0.6%, 3.8%)
Race-ethnicity		
NH White	21846	3% (1.3%, 4.8%)
NH Black/AA	23753	3.9% (2.0%, 5.7%)
Hispanic/Latino	13558	2.5% (0.6%, 4.3%)
NH Asian/PI	--[*]	--[*]

Source: CDPH Healthy Chicago Survey, 2015
[*]Data are suppressed due to low numbers

Appendix B. Overdose deaths involving opioids by manner of death (Chicago, 2015)		
Manner	**Number**	**Percent**
Accident	412	96.7%
Suicide	8[*]	1.9%
Undetermined	5[^]	1.2%
Homicide	1[+]	0.2%

Data Source: Cook County Medical Examiner's Office
[*]Heroin (n=1), Opioid Pain Relievers (n=7)
[^]Opioid Pain Relievers (n=3), Heroin(n=1), Opioid Pain Relievers + Fentanyl (n=1)
[+]Heroin (n=1)