Opiate-Related Overdose Deaths in Allegheny County

Risks and Opportunities for Intervention

Prepared by the Allegheny County Department of Human Services and the Allegheny County Health Department

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AUTHORS

Eric Hulsey, Dr.PH., M.A. | LuAnn Brink, Ph.D., M.P.H. | Erin Dalton
Latika Davis-Jones, Ph.D., M.P.H., M.S.W. | Catherine Jensen
Michelle Kurta, Ph.D., M.P.H. | Denise Macerelli, L.S.W., A.C.S.W. | Qitang Wang
Abby Wilson, J.D., LL.M. | Karen Hacker, M.D., M.P.H.

There is an opioid overdose epidemic in the U.S., and Allegheny County is not immune. Last year, Allegheny County experienced 422 overdose deaths — more than in any prior year — and the upward trend continues. All levels of government — federal, state and county — are involved in efforts to stem the rising tide of opioid abuse. Particularly concerning is the fact that a troubling number of overdose victims, who began their addiction using prescribed oral pain killers, transitioned to heroin as their access to pills decreased.

As the directors of the two county agencies most responsible for public health and human services, we are deeply concerned about the loss of life and the number of county residents who have suffered the loss of a loved one. Our ability to implement available evidence-based strategies is limited by the fact that much about the victims is unknown. Thus, we embarked upon a collaborative effort to examine existing data in the hope that these data could identify areas for improvement and potential missed opportunities for intervention. The results of this study, outlined in the following report, have helped us craft a series of recommendations designed to guide current and future efforts to reduce overdose mortality in the County. By examining current activities and redefining future strategies, we hope to reduce both opioid addiction and its related mortality.

We recognize that, as government departments, we are limited in our ability to stop the epidemic. Much of what is happening and what needs to happen falls outside our purview. Thankfully, Allegheny County is home to a large group of stakeholders committed to addressing opioid abuse. Our hope is that the data herein will be helpful to all who are focused on this issue and that this report will help us coalesce around pivotal priorities to reduce mortality as well as addiction.

It is our intent to utilize the data and recommendations outlined herein to continue our efforts to address the opioid epidemic and to engage others in efforts to prevent addiction, curtail abuse and decrease mortality. Our joint efforts are critical to improving the health and well-being of Allegheny County residents.

Marc Cherna, Director
Allegheny County
Department of Human Services

Karen Hacker, Director
Allegheny County Health Department

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ACRONYMS AND DEFINITIONS

ACHD: Allegheny County Health Department

ACJ: Allegheny County Jail

ACMEO: Allegheny County Medical Examiner's Office

Act 139 and the Good Samaritan Clause: Senate Bill 1164 was signed into law by Pennsylvania Governor Tom Corbett in late September 2014, as Act 139 of 2014. This legislation allows first responders (e.g., law enforcement, fire fighters, EMS and other organizations) the ability to administer naloxone. The law also allows individuals who may be in a position to assist a person at risk of experiencing an opioid-related overdose (e.g., friends or family members) to obtain a prescription for naloxone. Additionally, Act 139 provides immunity from prosecution for those responding to and reporting overdoses, otherwise known as the Good Samaritan provision.

Benzodiazepines: A class of drugs primarily used for treating anxiety; also known as tranquilizers (e.g., Valium, Xanax)

Buprenorphine: Generic name of Suboxone®, a treatment medication for opiate-use disorder used in MAT

Community Care Behavioral Health Organization: Allegheny County's Behavioral Health Managed Care Administrator; manages HealthChoices

Data Warehouse: DHS's electronic repository of information pertaining to publicly-funded human services utilization in Allegheny County. The Data Warehouse contains approximately 1.4 billion records representing more than 1.2 million distinct clients, and includes data from 29 sources representing human services program areas (both internal and external to DHS) ranging from behavioral health and aging to public benefits, housing, criminal justice and public schools. These data can be used to describe the encounters or service history of individuals over time across both internal and external service providers and systems.

DDAP: Pennsylvania Department of Drug and Alcohol Programs

DEA: U.S. Drug Enforcement Administration

DHS: [Allegheny County] Department of Human Services

EMS: Emergency Medical Services

Fentanyl: A narcotic that is sometimes abused for its heroin-like effect

HealthChoices: Pennsylvania's Medicaid Managed Care Program

MAT: Medication-assisted treatment, a combination of medication and clinical counseling treatment

Methadone: Treatment medication for heroin use disorder

MCO: Managed care organization

MMT: Methadone maintenance treatment

Naloxone Hydrochloride: Generic name for the opiate overdose antidote known as naloxone

Acronyms and Definitions
(continued)

Naltrexone: Brand name for treatment medication for opiate use disorder, used in MAT

Narcan: Brand name for naloxone hydrochloride (naloxone), an antidote to an opiate overdose

Opiates/Opioid: Highly addictive medications that relieve pain by reducing the intensity of pain signals reaching the brain

PPP: Prevention Point Pittsburgh, a nonprofit organization dedicated to providing health empowerment services to injection drug users

RCA: Root cause analysis

SCA: Single county authority, assigned by the Pennsylvania Department of Drug and Alcohol Programs to plan, coordinate, programmatically and fiscally manage, and implement the delivery of drug and alcohol prevention, intervention and treatment services at the local level. In Allegheny County, the SCA is housed within DHS's Office of Behavioral Health (OBH).

Suboxone®: Brand name of buprenorphine

SUD: Substance use disorder

Vivitrol®: Brand name of injectable form of naltrexone

INTRODUCTION

Since 2006, Allegheny County, which contains the City of Pittsburgh, has experienced fatal overdose rates higher than those seen throughout Pennsylvania and many other states in the country. In 2014, there were 342 unintentional overdose deaths[1] in the County, higher than in any prior year. The rash of overdose deaths early that year resulted from heroin containing fentanyl and labeled as "Theraflu," among other names, highlighting a significant and growing local public health crisis and the need for increased use of effective strategies to curb overdose deaths. In response to this crisis, representatives from the Allegheny County Department of Human Services (DHS), the Allegheny County Health Department (ACHD), the Allegheny County Medical Examiner's Office (ACMEO), Pittsburgh Emergency Medical Services (EMS), city and county law enforcement, and behavioral health treatment provider agencies have been actively collaborating to develop the most effective strategies to stem this tide and reduce opiate-related overdose deaths.

[1] Includes all substances. Not limited to opiates.

This report, a joint effort of DHS and ACHD, synthesizes available data sources on opiate overdoses in Allegheny County from 2008 through 2014 with the following goals:

- Use data to better understand risk factors for opiate overdose in Allegheny County
- Identify opportunities for intervention
- Assess the impact of current strategies in place to save the lives of those at risk of fatal overdose
- Provide recommendations for policymakers and other multi-sector overdose initiatives in the region based on available data
- Empower stakeholders by providing them with information relevant to their role in the crisis

EXISTING PLANS

Stakeholders in Pennsylvania and Allegheny County have been actively developing and implementing plans to reduce opiate-related overdose fatalities; these plans include better overdose surveillance, improved healthcare strategies and increased distribution of naloxone hydrochloride (naloxone), the antidote to an opiate overdose commonly known as Narcan. States such as Massachusetts and cities such as Baltimore, Md., have developed approaches to reducing overdose deaths that include expanded access to effective substance use disorder (SUD) treatment including medication-assisted treatment (MAT) approaches, public awareness campaigns and first-responder strategies, in addition to increased distribution of naloxone.

Several major plans to reduce overdose deaths have been developed in Pennsylvania and Allegheny County and are described in this section. The objectives of and the associated activities in these plans are not necessarily the sole responsibility of the County to lead, nor have they been specifically funded by County or other stakeholders. Rather, they may serve as helpful reference points as we develop focused interventions and monitor progress over time.

Allegheny County Health Department Plan for a Healthier Allegheny

The ACHD 2015 Plan for a Healthier Allegheny (PHA)[2] was produced as a guide for health improvement for the next three to five years; it involves multiple partners and a strong commitment of the Advisory Coalition and County residents. It was designed to complement and build upon plans, initiatives and coalitions already in place in the County. The intent of the plan is to identify major health priorities, overarching goals, and specific objectives and strategies that can be implemented in a coordinated way across Allegheny County. One of those goals relates to reducing mortality and morbidity related to mental illness and substance use disorders and the specific strategies listed to reduce the number of opiate-related overdose deaths. For example:

[2] The plan is available at http://www.achd.net/pha/PHA_rev110515.pdf

Objective 5.5: Decrease the number of opiate-related drug overdose deaths.

- Strategy 5.5.1: Increase the distribution of naloxone to first responders, opiate users and their family members, and health care providers.
- 5.5.2: Enhance/design surveillance and monitoring to effectively respond to overdoses in youth and adults.
- 5.5.3: Increase distribution of naloxone to drug and alcohol service providers in Allegheny County.
- 5.5.4: Increase access to naloxone in pharmacies.
- 5.5.5: Increase efforts to educate physicians on appropriate prescription writing for opioids.

U.S. Attorney's Working Group on Drug Overdose and Addiction: Prevention, Intervention, Treatment and Recovery

Following the surge of fatal overdoses in January 2014 related to fentanyl-laced heroin in the Pittsburgh region, U.S. Attorney David Hickton assembled and co-chaired a working group of citizens, parents, individuals in recovery, physicians, providers and regional leaders to seek solutions for Western Pennsylvania that could offer to each community the best science and practice in overdose prevention. The working group was convened to identify ways to halt and reduce overdose deaths in Western Pennsylvania. The recommendations below represent those offered by three working group committees:

Education, Prevention and Family Intervention Committee

- Recommendation 1: Develop a comprehensive public awareness and education plan to reduce overdose deaths.
- Recommendation 3: Assure access to and promote a regional hotline dedicated to overdose prevention and enhance 911 response.
- Recommendation 4: Develop and implement an overdose prevention program for incarcerated populations.
- Recommendation 5: Promote physician education and intervention programs.

Treatment Committee

- Recommendation 1: Increase the number of drug and alcohol assessments and referrals to MAT for people who are incarcerated or on probation.
- Recommendation 2: Promote efforts to increase the availability of naloxone in the community as a safe antidote for opioid overdose.

Quality Improvement, Adverse Events and Interdiction Committee

- Recommendation 2: Utilize overdose data, on an ongoing basis, to identify and target interventions to reduce overdoses and overall drug abuse.

U.S. Attorney Hickton also provides leadership to the National Heroin Task Force. As directed by Congress, the Department of Justice and the White House Office of National Drug Control Policy convened the Task Force in March 2015 to develop strategies to confront the heroin problem and curtail the escalating overdose epidemic and death rates. This report supports one of the recommendations from the final report: "Integrate data management, reporting and analysis."

U.S. Drug Enforcement Administration 360 Strategy

In November 2015, the U.S. Drug Enforcement Administration (DEA) announced that Pittsburgh had been selected as the first of four pilot sites in an initiative called the DEA 360 program, which expands DEA's community involvement in light of the agency's inability to "arrest its way out of the problem." A Nov. 10, 2015, press release described the program as follows:

The DEA 360 Strategy[3] comprises a three-fold approach:

- Provide DEA leadership with coordinated DEA enforcement actions targeting all levels of drug trafficking organizations and violent gangs supplying drugs in our neighborhoods, as we have been doing with ongoing law enforcement operations.
- Have a long-lasting impact by engaging drug manufacturers, wholesalers, practitioners and pharmacists to increase awareness of the heroin and prescription drug problem and push for responsible prescribing and use of these medications throughout the medical community.
- Change attitudes through community outreach and partnership with local organizations, following DEA enforcement actions, to equip and empower communities with the tools to fight the heroin and prescription drug epidemic.

[3] http://www.dea.gov/divisions/hq/2015/hq111015.shtml

Allegheny County Department of Human Services Priorities

DHS's Office of Behavioral Health, Bureau of Drug and Alcohol Programs serves as the coordinating entity for substance use disorder treatment and prevention in Allegheny County as it relates to state and county funding for these services, including Medicaid and HealthChoices. Housed within this bureau is the Single County Authority (SCA) for Allegheny County, assigned by the Pennsylvania Department of Drug and Alcohol Programs (DDAP) to plan, coordinate,

programmatically and fiscally manage and implement the delivery of drug and alcohol prevention, intervention and treatment services at the local level.[4] In response to the growing opiate overdose problem, the SCA has identified the following priority strategies in its five-year plan.

[4] Pennsylvania Association of County Drug and Alcohol Administrators (PACDAA). Online at: http://www.pacdaa.org/

- Expand access to SUD treatment.
  - Increase treatment availability.
  - Increase initiation of treatment for individuals with SUD who present to emergency departments ("warm hand-off" to treatment for overdose survivors).
- Increase training among SUD treatment providers and others in overdose prevention and dissemination of naloxone.
  - Distribute naloxone to SUD and mental health service providers, the Allegheny County Jail (ACJ), family members, youth serving organizations, homeless outreach teams and probation/parole officers.
- Increase use of MAT.
  - Enhance SUD treatment provider capacity to deliver MAT.
  - Increase utilization of MAT among inmates with opiate use disorders in and released from ACJ.

Pennsylvania Department of Drug and Alcohol Programs (DDAP)

In 2014, DDAP was appointed as the lead agency for the Governor's Heroin and Other Opioids Workgroup. Five strategic subcommittees were formed to specifically address the most critical areas of concern. One of the specific recommendations was related to expanding access to naloxone:

- Recommendation E.1: Support and anticipate current legislative efforts to prevent opioid-related overdose deaths by expanding access to naloxone for concerned third parties, in conjunction with appropriate training, and by permitting limited legal protections for witnesses seeking medical help at the scene of an overdose.

METHODOLOGY

The general methodology applied for the analysis presented in this report was to 1) establish a cohort of County residents who died of an opiate-related overdose during 2008—2014, and 2) link all available data related to these individuals to understand the potential risks associated with these fatal overdoses as well as opportunities for intervention. Additional analysis was conducted for population-level data sources (e.g., EMS, hospital emergency department admissions, 911).

Data Sources

Allegheny County Medical Examiner's Office

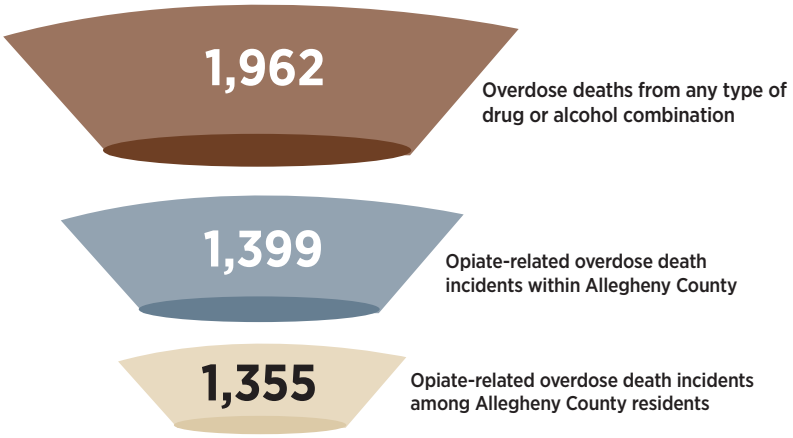
Autopsy reports from the Allegheny County Medical Examiner's Office (ACMEO) were used to identify individuals who died of an overdose death during this period. There were 1,962 total accidental overdose deaths, by all substances, recorded by the ACMEO. These results were then filtered to select only those that were opiate-related (1,399); these results were then filtered to identify those who had a residential address within Allegheny County at time of death. The result was a cohort of 1,355 Allegheny County residents who died of an opiate-related overdose during 2008—2014 (see **Figure 1**).[5] The DHS Data Warehouse was then used to match these individuals to any other available records from encounters with other services or systems known to DHS.

[5] "Opiate-related" is defined as an opioid being indicated at the time of the medical examination as a contributing factor to the fatality.

DHS Data Warehouse

The DHS Data Warehouse is an electronic repository of information pertaining to publicly-funded human services utilization in Allegheny County. The Data Warehouse contains more than 1.4 billion records representing more than 1.2 million distinct clients, and includes data from 29 sources representing program areas (both internal and external to DHS) ranging from Medicaid- and County-funded behavioral health, aging, public benefits, housing, criminal justice and public schools. These data can be used to describe the encounters or service history of individuals over time across both internal and external service providers and systems.

FIGURE 1: **Opiate-Related Overdose Death Cohort, Allegheny County, 2008 through 2014**



LIMITATIONS

There were a number of limitations to the data sources and the analyses in this report. While these limitations did not compromise the integrity of the analyses themselves, they did present a challenge in understanding the complete set of risk factors for those who died of an opiate-related overdose in the County.

Individual-level data limitations

Even though a significant amount of information was gathered about individuals and their encounters with publicly funded services and systems, the information is limited to the data sources included in the DHS Data Warehouse (i.e., those that are publicly funded). There may be additional factors that contributed to fatal overdose risk; however, these data were unavailable for this analysis. While 68 percent (953 of 1,399) of those who died during the seven-year period had a record of an encounter at some point in the past with a service or system represented in the Allegheny County Data Warehouse, 446 did not have a record other than an autopsy report. Additionally, even among those for whom records were available, there were likely more factors that influenced overdose risk than those that were available to the County at the time of this report.

Healthcare data limitations

The behavioral health analysis includes only publicly-funded behavioral health services, i.e., those paid for by DHS or HealthChoices (the Medicaid managed care program). While these data are extensive, they are not necessarily descriptive of healthcare utilization patterns among all Allegheny County residents nor those who are insured by commercial insurance plans.

Additionally, this analysis is limited to those individuals for whom we have a record of prescription fills using the HealthChoices pharmacy file. The Allegheny County Data Warehouse has reliable pharmacy records dating back to 2006. For those who received prescription fentanyl through commercial insurance or other means as part of medical treatment, this analysis would not have the opportunity to learn about their use of healthcare services. To gather a broader perspective about the role of prescribed medications in overdose mortality in Allegheny County, further research in collaboration with commercial insurance providers in the region about prescription fills among people who have died of an opiate-related overdose would be required.

Missing data sources about the local heroin/drug supply

An important source of information missing from this analysis that is related to understanding risks of overdose is that related to federal drug trafficking crimes. One of the known risks of overdose is an unfamiliar supply of heroin or changes in quality of street heroin.[6] As a result of a successful interdiction effort, a substantial drug seizure (i.e., "bust") could change the quality of the heroin supply in a region. Demand remains unchanged with these interventions and a new supply of heroin arriving into the region to meet this demand may contain different cutting agents, perhaps a higher percentage of fentanyl, which may increase overdose risks to a person accustomed to using a similar quantity of a different supply. Including this information in the present analysis could have contributed to understanding the potential effects of interdiction efforts on fatal overdose risks.

[6] Overdose prevention, recognition and response training. Available at: http://naloxoneinfo.org/run-program/training-tools

OVERDOSE MORTALITY

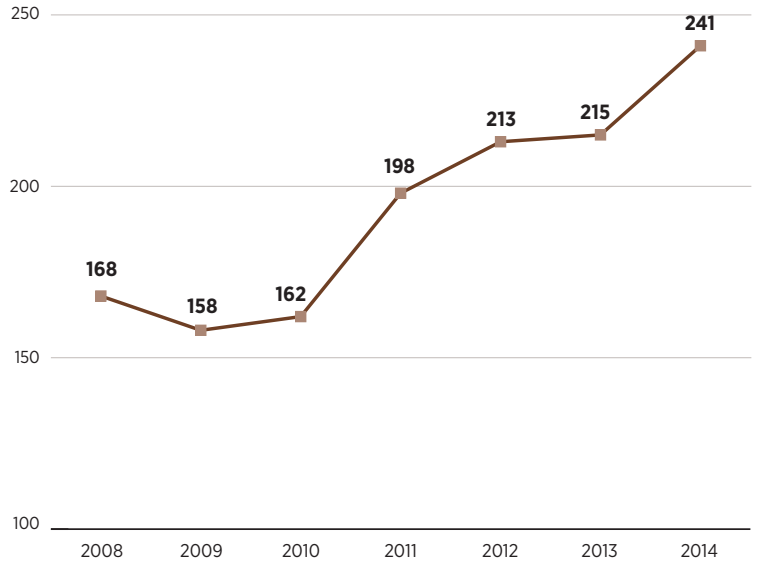
What are the risks by population?

In recent years, more residents have died from drug overdoses than from traffic accidents and homicides combined.[7] From 2008 through 2014, 1,355 Allegheny County residents[8] died from an opiate-related overdose. **Figure 2** displays the annual number of opiate-related overdose deaths during this period. The remainder of data in this section will primarily explore differences in fatal overdose incidence by demographic characteristics.

[7] In 2014 alone there were 59 deaths from traffic accidents (Pennsylvania Department of Transportation http://www.dot.state.pa.us/) and 101 deaths from homicide (Pittsburgh Post-Gazette http://newsinteractive.post-gazette.com/homicide/) in Allegheny County.

[8] There were 1,962 all-cause overdose death incidents during this period, and 1,355 were verified as County residents who died of an opiate-related overdose. Residential addresses were verified through medical examiner records and GIS analysis.

FIGURE 2: **Annual Opiate-Related Overdose Deaths, Allegheny County, 2008 through 2014, N = 1,355**

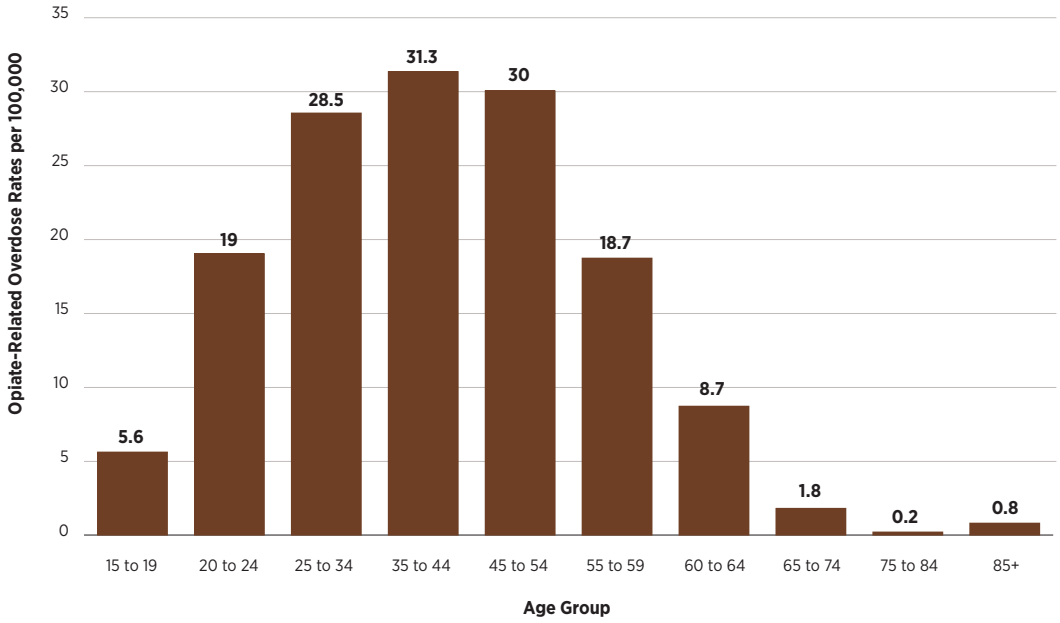


Age

Figure 3 describes overdose rates in the County by age group.[9] Overdose rates were highest among individuals 25 through 54 years old.

[9] One record had no age-related information and was not included. Therefore, n = 1,354.

FIGURE 3: **Opiate-Related Overdose Rates (per 100,000) by Age, Allegheny County, 2008 through 2014, N = 1,354**



Changing demographics in fatal heroin overdoses nationally are also reflected in Allegheny County. Heroin use in the U.S. more than doubled among young adults ages 18 through 25 in the past decade.[10] In 2000, non-Hispanic black individuals ages 45 through 64 had the highest rate of heroin-related overdose deaths while, in 2013, non-Hispanic white individuals ages 18 through 44 had the highest rate.[11] The reasons for this demographic change may be related to how individuals initiate opiate use, which, in recent years, has been through prescription medications.

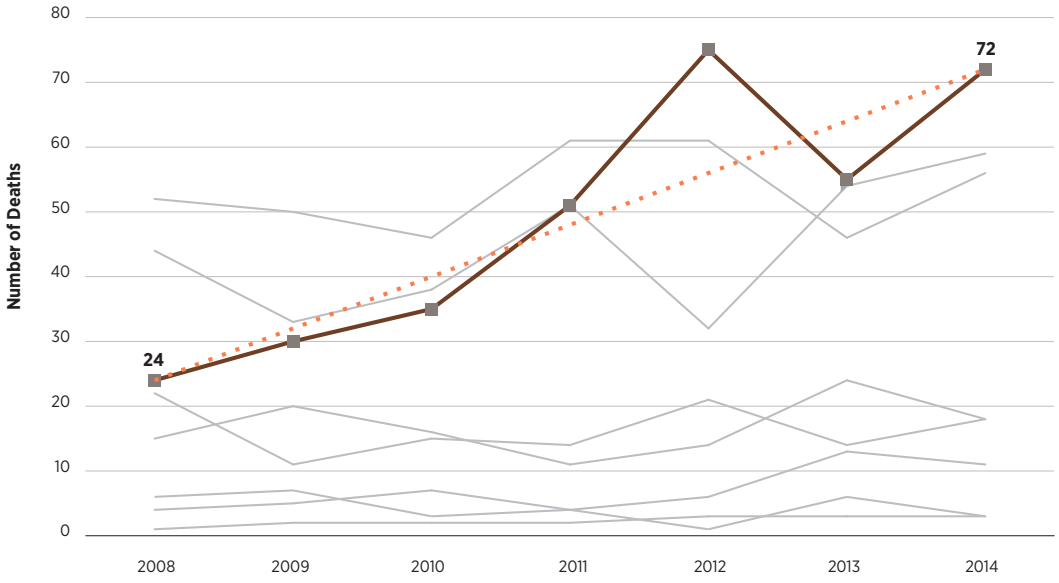
While the incidence of fatal overdose was increasing across all age groups during this period, there was a substantial increase in deaths among Allegheny County adults ages 25 through 34 (**Figure 4**). Whereas 24 overdose fatalities were observed among this age group in 2008, six years later, the number who died of an opiate-related overdose tripled to 72. A similar trend was observed across the U.S. in recent years (2010 through 2013), when the greatest increase in death rates was among 25- through 44-year-olds.[12]

[10] Rudd, RA, Aleshire, N., Zibbell, JE, Gladden, M (2016). Increases in Drug and Opioid Overdose Deaths — United States, 2000–2014. CDC Weekly Morbidity and Mortality Report, 64(50), 1378-1382. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm?s_cid=mm6450a3_w

[11] Hedegaard H, Chen LH, Warner M. Drug poisoning deaths involving heroin: United States, 2000–2013. NCHS data brief, no 190. Hyattsville, MD: National Center for Health Statistics. 2015.

[12] Hedegaard, Chen, Warner. (2015). Drug-Poisoning Deaths Involving Heroin: United States, 2000-2013. National Center for Health Statistics Data Brief. 190:1-8.

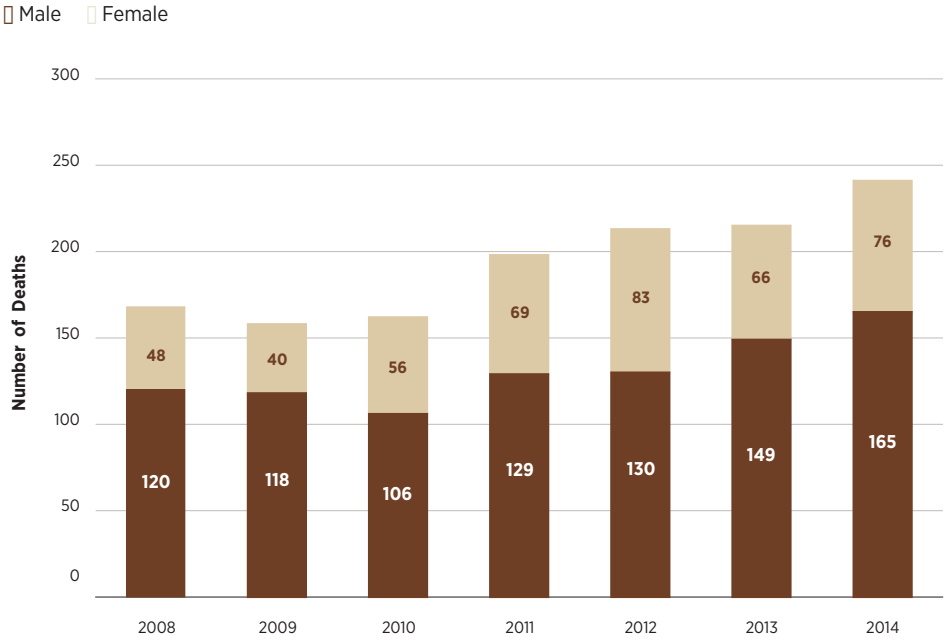
FIGURE 4: **Overdoses among 25- through 34-Year-Olds, Compared to Other Age Groups**



Gender

Each year, more men than women die of a drug overdose; men accounted for over 68 percent of overdose fatalities in 2014 alone (**Figure 5**). Fatal overdose rates, however, increased at approximately the same rate for men and women from 2008 through 2014.

FIGURE 5: **Opiate Overdose by Gender, 2008 through 2014, N = 1,355**

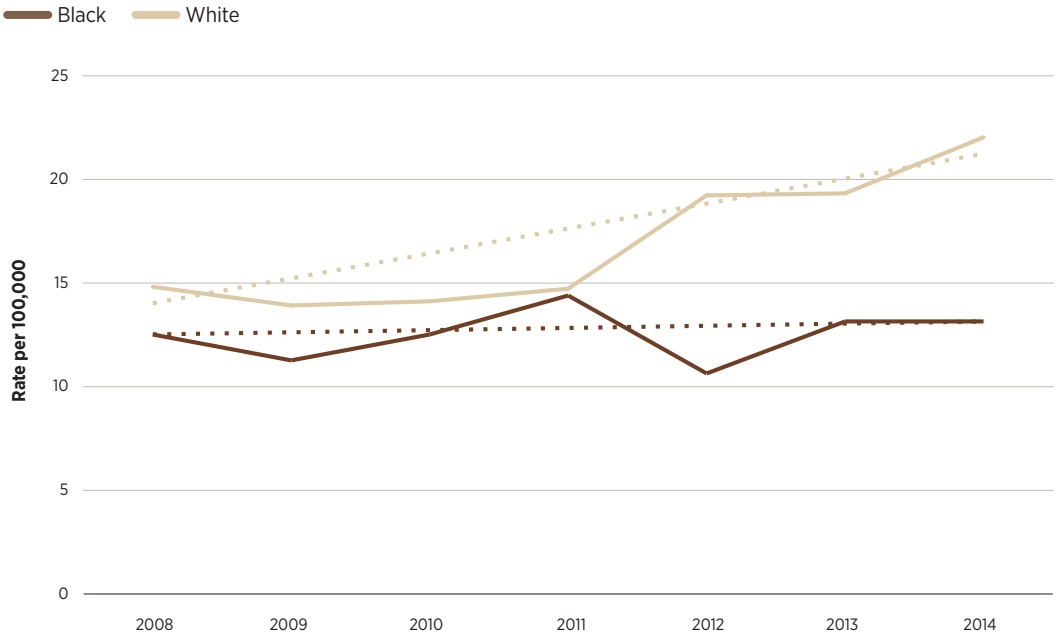


Race

Each year, a greater number of white than black residents died from an opiate-related overdose; white residents accounted for 91 percent of opiate-related overdose fatalities in 2014. While fatal overdose rates are higher for whites each year, the increase in rates of overdose during this period were comparable. No statistical differences were observed in the overdose rates between white and black residents during this period (**Figure 6**).[13]

[13] A Kruskal-Wallis test and Poisson regression method were both performed to assess the potential statistical significance between the increasing death rates between whites and blacks.

FIGURE 6: **Overdose Rates per 100,000 by Race, 2008 through 2014, N = 1,347**



Unique Risks Related to Substance Type

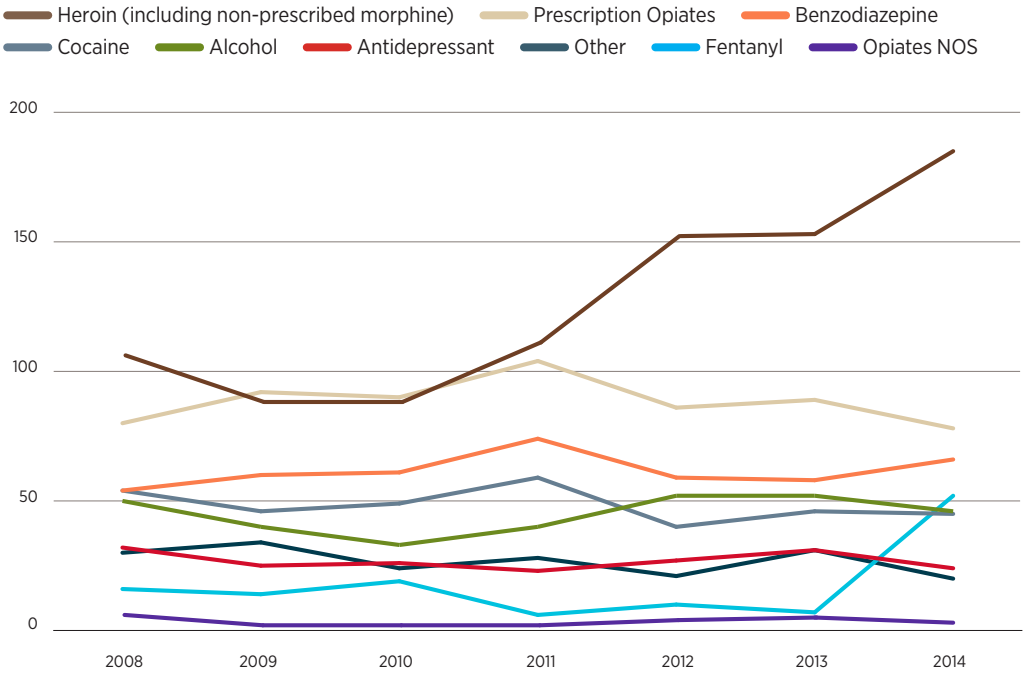
This section will present several dimensions of fatal overdose risks as they relate to the results of autopsies and toxicology examinations.

Drug types and combinations

The medical examiner's reports were used to examine the frequency of different types of substances indicated in opiate-overdose fatalities. Since 2011, heroin is increasingly present in overdose fatalities, followed by prescription opiates and benzodiazepines, a class of sedative drugs commonly used to treat anxiety (**Figure 7**). In 2014, there was also a substantial increase in the presence of fentanyl, a powerful synthetic opiate that has entered the heroin supply. While not specifically included in the analysis for this report, there was another substantial increase in the presence of fentanyl in 2015, and it has become a particularly lethal element in the overdose epidemic in Allegheny County.

While a growing number of overdoses in recent years have involved only heroin, many overdose fatalities during this period resulted from two or more substances in combination. The more common drug combinations among opiate-overdose fatalities during this period were heroin and cocaine, prescription opiate combinations, heroin and alcohol, prescription opiates combined with benzodiazepines, and heroin combined with benzodiazepines. Except for the combinations that involve cocaine, each involved substances that independently have a depressing effect on vital signs such as respiration rate, heart rate and blood pressure. Combining these substances also combines their depressive effect and potentially increases the risk that an overdose will become fatal due to respiratory depression.

FIGURE 7: **Substances Indicated in Opiate-Related Overdose Fatalities, 2008 through 2014, ACMEO[14], N = 1,355**



[14]Note that substances indicated in this chart were individually present or indicated in all fatal overdoses for each year and not necessarily present in combination.

Heroin and prescription medications: What caused the epidemic?

Research has confirmed that the recent epidemic of heroin throughout the U.S. was influenced by several factors. These factors include the increase in opioid prescriptions for pain, marketing and formulation changes for long-acting opioid analgesics, and the cheap price of heroin.

Since 1999, physicians increasingly prescribed opioids in an effort to treat pain; however, there had been a lack of consensus regarding the use of opioids in the treatment of non-acute chronic pain due to their abuse potential. In 2015, the Centers for Disease Control and Prevention observed a parallel between increasing prescription pain killers and overdose deaths from 1999 through 2013 (**Figure 8**). During that time, the amount of prescription opioids sold in the U.S.

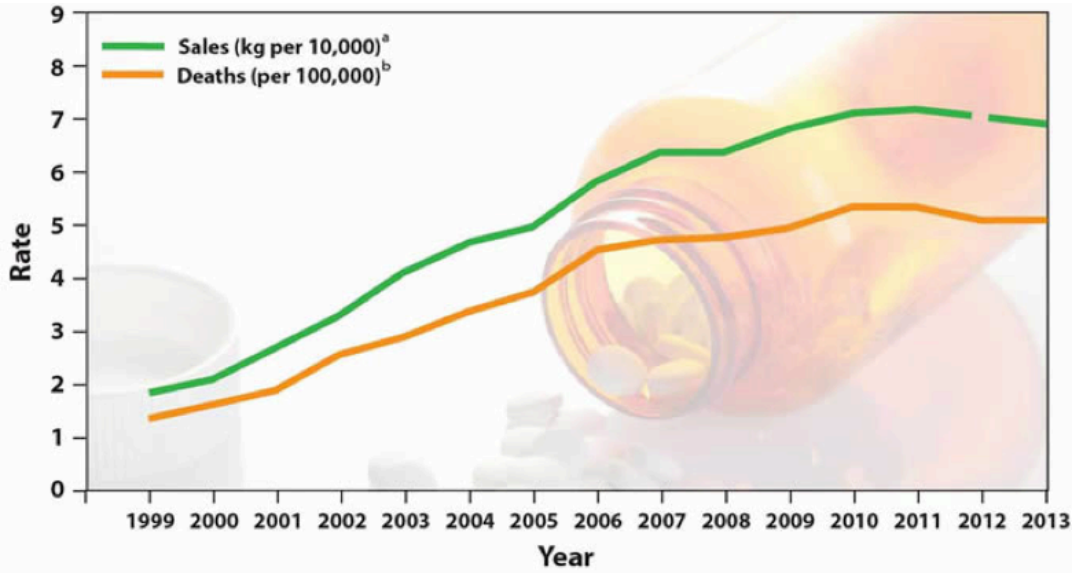
nearly quadrupled, though there had not been an overall concurrent change in the amount of pain reported.[15] The increase in abuse of these opioids early in the epidemic were observed to reflect, in part, changes in medication prescribing practices, changes in drug formulations and relatively easy access via the internet.[16] While the amount of prescription opioids dispensed in Allegheny County is difficult to determine, the implementation of the prescription drug monitoring plan has the potential to improve future monitoring of prescription drug dispensing throughout Pennsylvania.[17]

[15] http://www.cdc.gov/drugoverdose/epidemic/

[16] Compton, W.M. and Volkow, N.D. (2006). Major increases in opioid analgesic abuse in the United States: Concerns and strategies. National Institute on Drug Abuse, 6001 Executive Boulevard, MSC 9589, Bethesda, MD 20892-9589, USA

[17] http://www.health.pa.gov/My%20Health/Diseases%20and%20Conditions/A-D/Pages/ABC-MAP.aspx#.VxU9lPkrK70

FIGURE 8: **Prescription Pain Killer Sales and Deaths, 1999 through 2013**[18]



[18] Centers for Disease Control and Prevention. National Vital Statistics System mortality data (2015).

The formulation change of slow-release prescription opiates such as Oxycontin®[19] since the late 1990s was also a factor in the epidemic. This medication originally had a formulation that made it possible for a user to crush tablets into a powder to snort or inject. As a result of federal legislation designed to address this illicit use, the manufacturer changed the formulation, making it difficult to crush, in 2010. Distribution to pharmacies of the older formulation ceased in the fall of that year. Public health surveillance has suggested that many users switched from prescription opiates to heroin around this time, approximately the same time that fatal overdoses involving heroin began to rise in the U.S. Indeed, four in five new heroin users during this period started out by misusing prescription painkillers.[20] Additionally, 94 percent of respondents in a 2014 survey of people in treatment for opioid use disorders said they chose to use heroin because prescription opioids were "far more expensive and harder to obtain."[21]

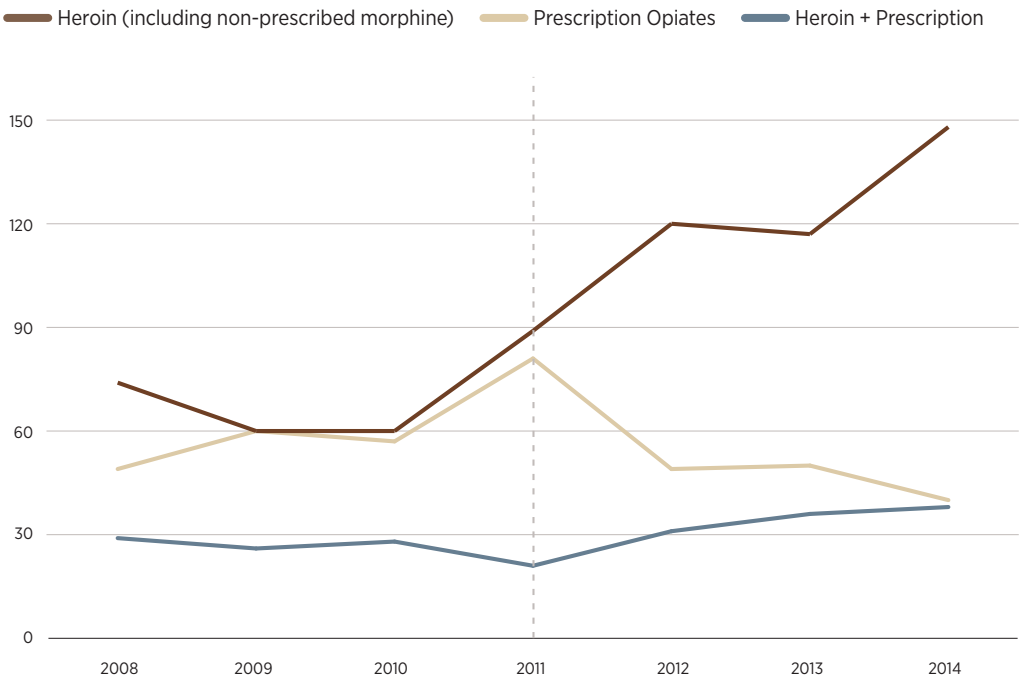
[19] Center for Disease Control (2015). Today's Heroin Epidemic. CDC Vital Signs, July 2015. Available online: http://www.cdc.gov/vitalsigns/pdf/2015-07-vitalsigns.pdf

[20] Muhuri, PK, Gfroerer, JC, Davies, CM. (2013). Associations of nonmedical pain reliever use and initiation of heroin use in the United States.

[21] Cicero TJ, Ellis MS, Surratt HL, Kurtz SP. The changing face of heroin use in the United States: a retrospective analysis of the past 50 years. JAMA Psychiatry. 2014; 71 (7): 821-826.

A similar trend was observed in Allegheny County. There were an increasing number of overdose fatalities that involved prescription opiate medications until 2011. Around this time, heroin became increasingly indicated in fatal overdoses. There was a slight increase in heroin combined with prescription opiates fatalities during this period as well. A summary of the results is presented in **Figure 9**.

FIGURE 9: Heroin vs. Prescription Opiate Medications among Opiate Overdose Fatalities in Allegheny County, 2008 through 2014, N = 1,355



How did prescribed medications contribute to fatal overdose?

To examine the prevalence of prescribed medications present in the individuals who died of an opiate-related overdose from 2008 through 2014, ACMEO toxicology reports and HealthChoices claims records were utilized. Of the 1,399 opioid-related deaths that occurred in Allegheny County, nearly half (624 or 45%) were HealthChoices members 90 days prior to their death; 473 of these individuals filled some type of psychopharmacologic drug and/or pain medication within the 90 days before the date of the fatal overdose. The types of drugs are noted in **Table 1** (note that these counts are not unique, and individuals could have filled more than one medication in multiple categories).

TABLE 1: Filled Prescriptions among HealthChoices Members within 90 Days of Fatal Overdose

	HEALTHCHOICES MEMBERS (N = 624)	
FILLED PRESCRIPTION	#	%
Opiate	265	43%
Antidepressant	251	40%
Benzodiazepine	247	40 %
Other Psychotherapeutic Drugs	352	56%

Forty-three percent of these individuals (265) filled a prescription for an opiate within 90 days of their death. While it is difficult to determine the extent to which these prescribed opiates contributed to the person's death, 66% (175 of 265) filled a prescription for a prescribed opiate within 30 days of death, and 64 (37%) had the same prescribed opiate in their system at the time of death (according to HealthChoices pharmacy records and the ACMEO toxicology report).

Forty percent (247) filled a prescription for a benzodiazepine within 90 days of their death. While it is also difficult to determine the extent to which these prescribed benzodiazepines contributed to the person's death, there were 97 people who filled a prescription for a benzodiazepine within 30 days of death and 79 (81%) of them had the prescribed benzodiazepine in their system at the time of death (according to the ACMEO toxicology report).

Opiate use disorder treatment medications: Suboxone®, Vivitrol® and Methadone

Advances in pharmaceutical science have yielded new treatment medication options for opiate use disorders in addition to methadone, which has been used in specialty opioid treatment programs (i.e., methadone maintenance treatment or MMT) to treat opiate use disorders for over 40 years. Buprenorphine (most commonly known by the brand name Suboxone®[22]) and naltrexone (most commonly known in its injectable form by the brand name Vivitrol®) are newer medications increasingly used to support MAT (medication and concurrent clinical counseling treatment), although many people also receive these medications alone as treatment.

[22] All prescriptions for Suboxone® were for the film formulation except for two independent prescriptions filled for the tablet form. Only the Vivitrol® injectable formulation was included for naltrexone.

During this period, an increasing number of HealthChoices members filled a prescription for these newer medications (**Table 2**). With increased use of these medications, concerns have developed about their misuse or their role in contributing to overdoses. Given these concerns, toxicology information was examined for any evidence of its presence. During this seven-year period, there were two instances (one in 2013 and another in 2014) where Suboxone® was indicated as a factor in the autopsy examinations of County residents who died of any type of drug overdose.[23] There were no instances where Vivitrol® was indicated. There were multiple instances in which methadone was indicated.

[23] Metabolites for buprenorphine include norbuprenorphine, buprenorphine-3-glucuronide, and norbuprenorphine-3-glucuronide. While the medical examiner considers metabolites of other opioid substances upon autopsy, there were no instances when these metabolites were noted as a factor in the cause of death of the individuals examined by the medical examiner.

TABLE 2: **Medications Used to Treat Opioid Use Disorders, HealthChoices Members, Allegheny County, 2008 through 2014**

	SUBOXONE®		VIVITROL®		MMT	
	# FILLED RX	INDICATED IN # OF DEATHS	# FILLED RX	INDICATED IN # OF DEATHS	# RECEIVING TREATMENT	INDICATED IN # OF DEATHS
2008	903	0		0	2,365	36
2009	1,154	0	2	0	2,366	37
2010	1,445	0	22	0	2,788	31
2011	1,883	0	68	0	2,898	26
2012	2,124	0	84	0	2,954	19

	SUBOXONE®		VIVITROL®		MMT	
	# FILLED RX	INDICATED IN # OF DEATHS	# FILLED RX	INDICATED IN # OF DEATHS	# RECEIVING TREATMENT	INDICATED IN # OF DEATHS
2013	2,271	1	163	0	2,966	18
2014	2,522	1	228	0	3,065	20

While methadone was indicated in more cases than either Suboxone® or Vivitrol®, there may be other risks of overdose related to how these newer medications were used in the treatment of opioid use disorder. Full opioid agonist medications, such as methadone, continue to stimulate the opioid receptors until all receptors are activated, reaching desired effects to reduce pain or physiological cravings to use. At certain doses, opioid receptors can be stimulated to such a degree that depressed vital signs such as breathing and heart rate can result in overdose. Partial opioid agonist medications like Suboxone® work similarly but have a ceiling effect and, therefore, a lower potential for overdose risk. Vivitrol® is an antagonist and blocks opioids by attaching to the opioid receptors without activating them.[24] Although there were only two individuals during this period when Suboxone® was indicated in the death and none when Vivitrol® was indicated, there were 42 people who had filled a prescription for Suboxone®, 10 who had filled prescriptions (received injections) for Vivitrol®, and one who filled prescriptions for both within 90 days of their death.

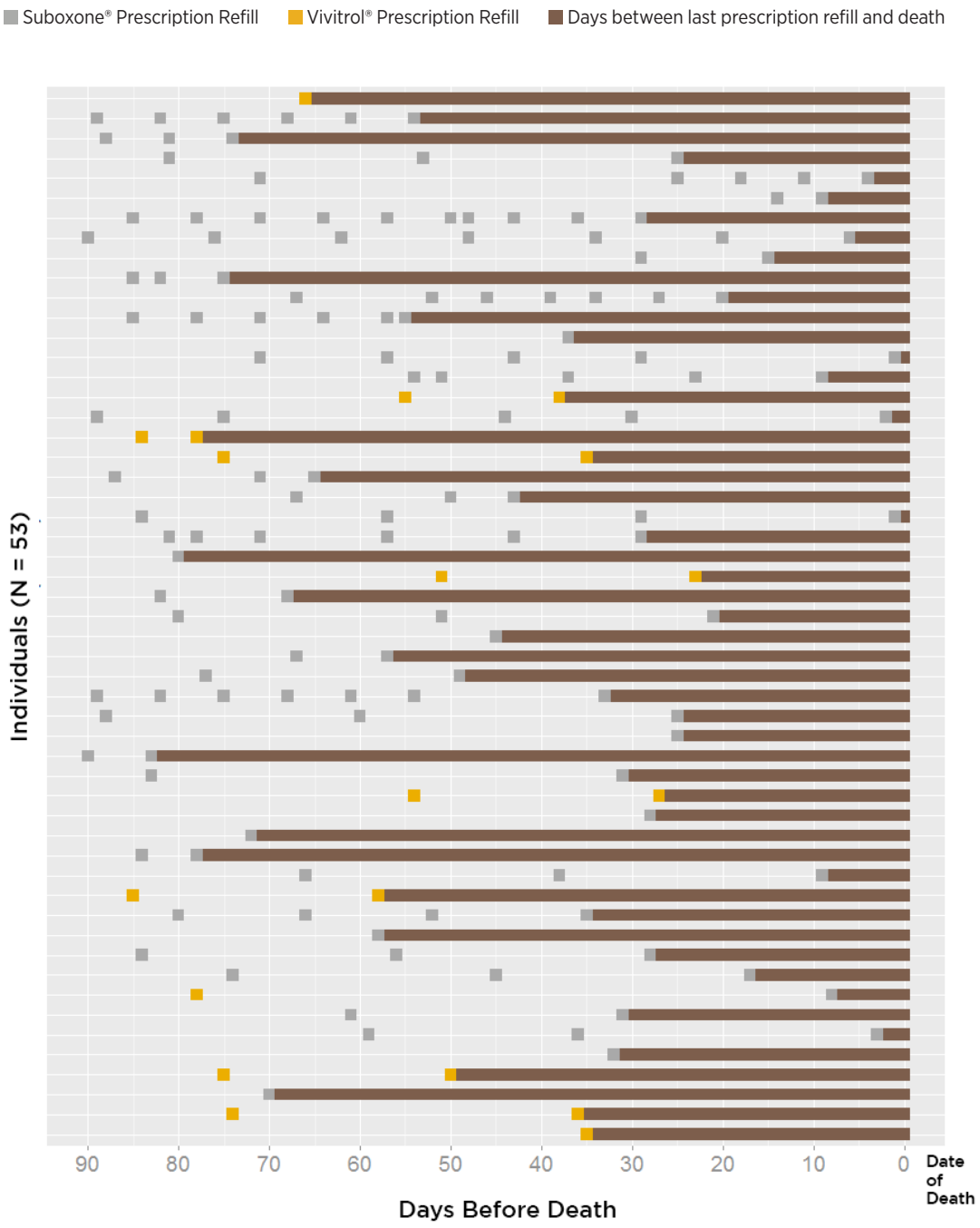
[24] For more information on these medications see: http://www.samhsa.gov/medication-assisted-treatment/treatment/

An analysis was performed to assess prescription fill or treatment involvement patterns that may have contributed to overdose risk, if not directly due to the medication itself. There appeared to be many people who filled a prescription for a seven-day supply of Suboxone® multiple times.[25] This is a quantity commonly used when initiating treatment to encourage the person to return for counseling and/or medical care. The people who filled Vivitrol® prescriptions appeared to have done so on a monthly basis as recommended for this long-acting medication. **Figure 10** describes the prescription fill and fatal overdose pattern among these individuals. In a majority (74%, or 31 of 42) of these circumstances, there was a gap of three weeks or longer between the last Suboxone® prescription fill and death. Seventy-three percent of individuals (eight of 11) who received Vivitrol® injections experienced a similar gap between last injection and death (greater than 30 days between last injection and death). These findings may suggest a period of potential increased overdose risk following a discontinuation of treatment with either medication, which is consistent with observations in the peer-reviewed literature in that a period of increase risk of overdose appears following a period of abstinence such as incarceration or SUD treatment.[26]

[25] A 30-day prescription is also a common quantity to be filled but this may be prescribed to individuals who are not in an induction phase on the medication or who are otherwise clinically appropriate for this prescription.

[26] Warner-smith, M., Darke,S., Lynskey, M., and Hall, W. (2001). Heroin overdose: causes and consequences. Addiction, 96 (8), 1113-1125.

FIGURE 10: **Periods of High Risk Following Prescription Fill Gap for Suboxone® and Vivitrol®**



Behavioral health utilization was also analyzed to assess what types of psychosocial/counseling interventions individuals were receiving concurrent with the Suboxone® prescription. In particular, this analysis focused on whether individuals received concurrent SUD counseling and what is accepted as MAT[27] vs. a medication-only treatment regimen. The concurrent behavioral health service utilization among this cohort varied. Of the 42 individuals who filled a prescription for Suboxone® within 90 days of their death, there were 29 (69%) who had an SUD counseling service during that period. Examining the period closer to the date of death, 13 of these individuals received SUD counseling and supportive services concurrently with Suboxone® in the 30 days prior to overdose death. In 10 of these cases, the person was engaged in mental health counseling and supportive services only. In seven cases, there were records of both mental health and SUD services. Whether substance use was identified or addressed in counseling treatment, when mental illness was considered the primary concern, was unable to be determined. Finally, in eight of the cases, there were no records of concurrent behavioral health counseling services utilized during the 90-day period prior to the fatal overdose.

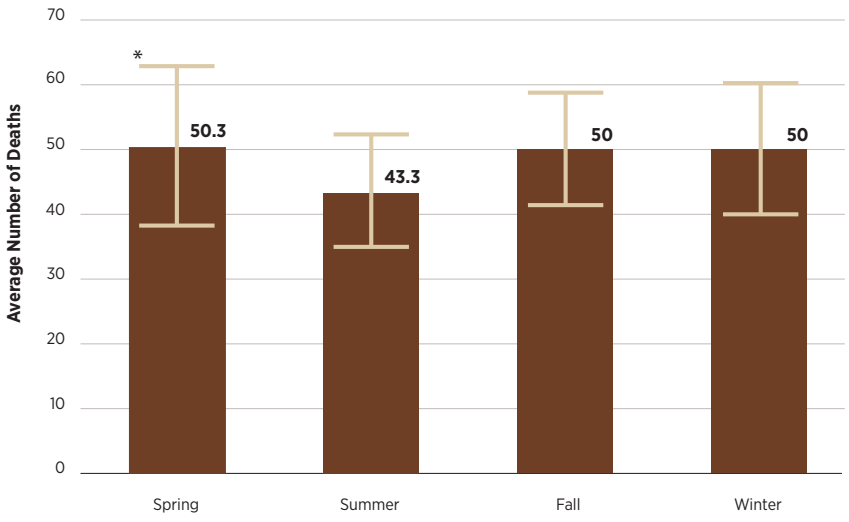
[27] Medication-assisted treatment (MAT), including opioid treatment programs (OTPs), combines behavioral therapy and medications to treat substance use disorders. Yet, the authors recognize that opinions differ and that some individuals successfully maintain recovery using only medications http://www.samhsa.gov/medication-assisted-treatment

Were there times of the year when fatal overdoses were more common?

Seasonality

A seasonality analysis was conducted to test whether evidence existed to demonstrate significant patterns of seasonality in the numbers of overdose deaths. While the average monthly death rate appeared to be lower in the summer months, the results suggest that there is insufficient evidence to conclude that there was a seasonal effect on overdose fatalities during this period.

FIGURE 11: **Average Number of Opiate Overdose Deaths by Season, 2008 through 2014, N = 1,355**

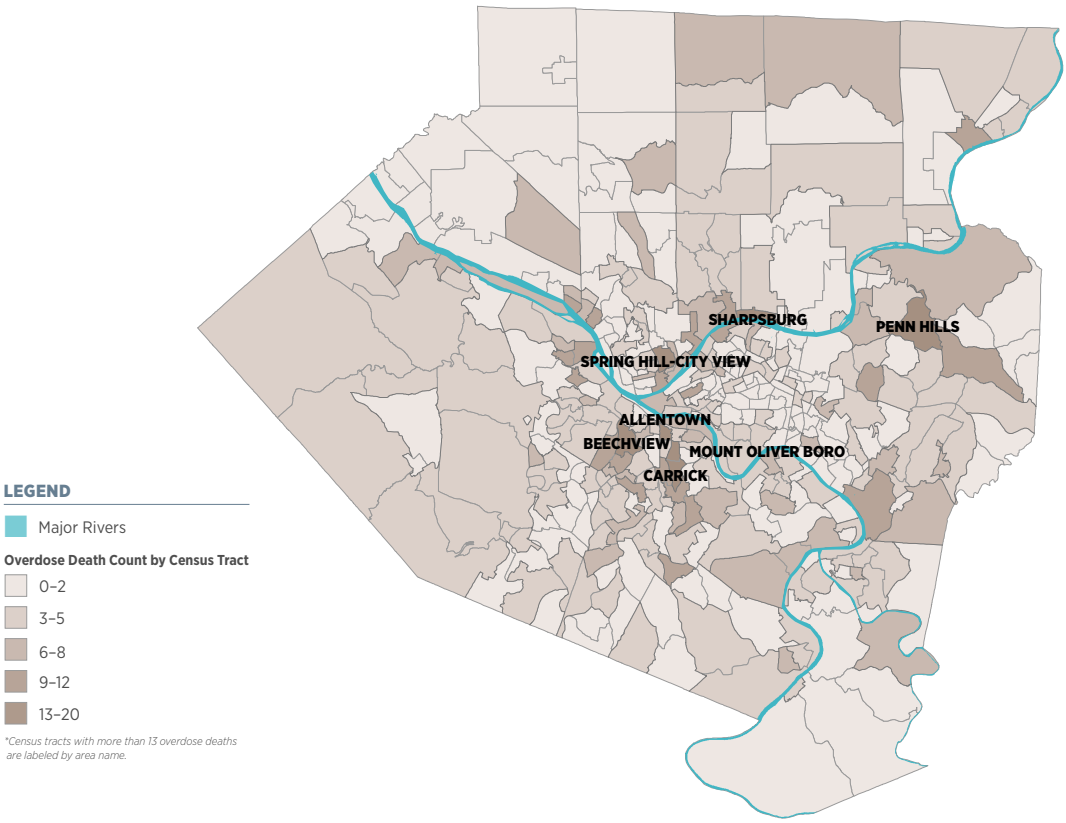


*Standard Deviation is marked as error bar in the chart

Were there geographic areas within Allegheny County where a higher incidence of overdose deaths was observed?

Overdose fatalities in Allegheny County 2008 through 2014: Hot-spotting and cold-spotting
Geospatial analysis was conducted to understand where a higher frequency of fatal overdoses occurred. Two census tract maps were created to display the number or density of overdose fatalities by incident location and by residential location of the person who died during the seven-year study period. Census tracts with more than 13 overdose deaths are labeled with the name of the neighborhood, borough or municipality that falls within that census tract. **Figure 12** displays the density of overdose death incident locations. The highest number of opiate-related overdose deaths occurred within the census tracts that contain Spring Hill-City View, Sharpsburg, Penn Hills, Allentown, Beechview, Mount Oliver Borough and Carrick. However, the highest counts of overdose deaths occurred among people who also lived in some of these census tracts (Allentown, Beechview, Carrick) and also in Bellevue.

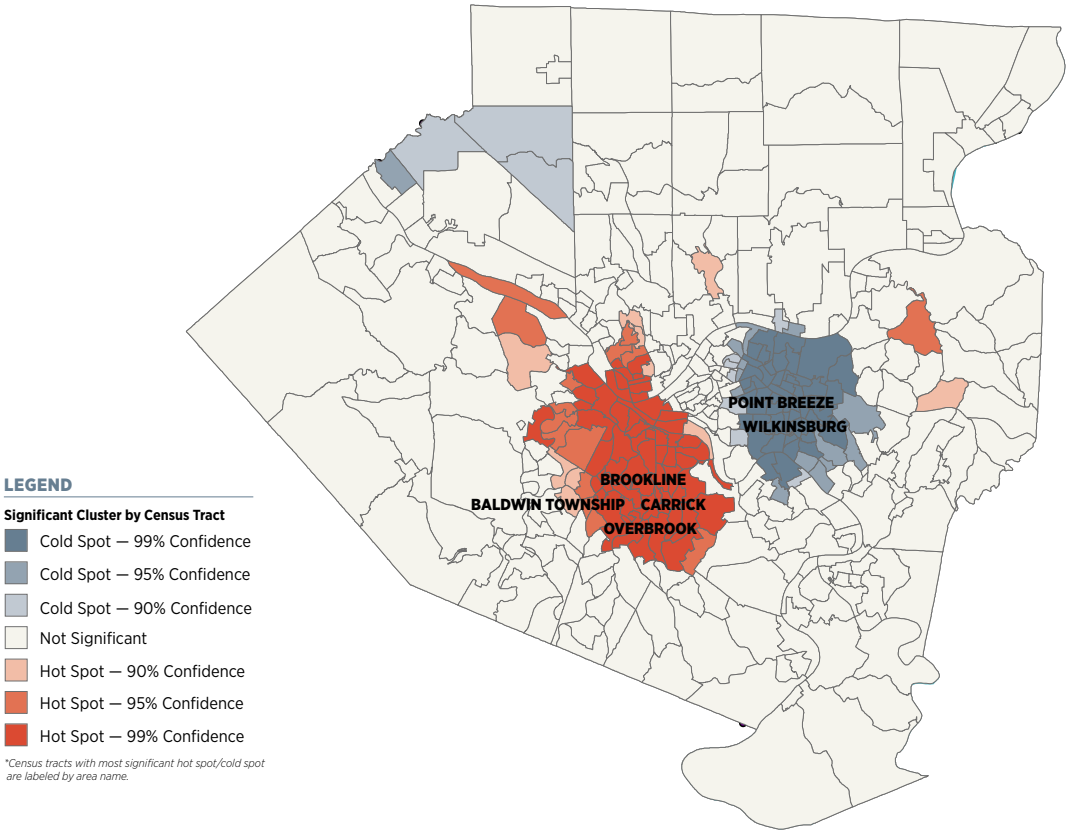
FIGURE 12: **Opiate-Related Overdose Deaths, by Census Tract, 2008 through 2014**



To better understand the highest areas of concern, a "hot spot" analysis was conducted to identify statistically significant spatial clusters of higher fatal overdose counts. The results suggest that the areas in Allegheny County with statistically significant spatial clusters of higher

counts of fatal overdoses were in the North Side and southern neighborhoods of the City, as well as the South Hills and the West End (**Figure 13**), and included Brookline, Carrick, Baldwin Township and Overbrook. Little difference was observed when a hot spot analysis was conducted by residence of overdose victim rather than where incidents occurred. This suggests that people may be using drugs and overdosing near their residence. To confirm this interpretation, a separate analysis was performed to assess traveling distance between where the person lived and died. In over 82 percent of cases, victims died within a one-mile traveling distance of their residence.

FIGURE 13: **Hot and Cold Spots — Opiate-Related Overdose Deaths by Incident Address in Census Tract, 2008 through 2014**



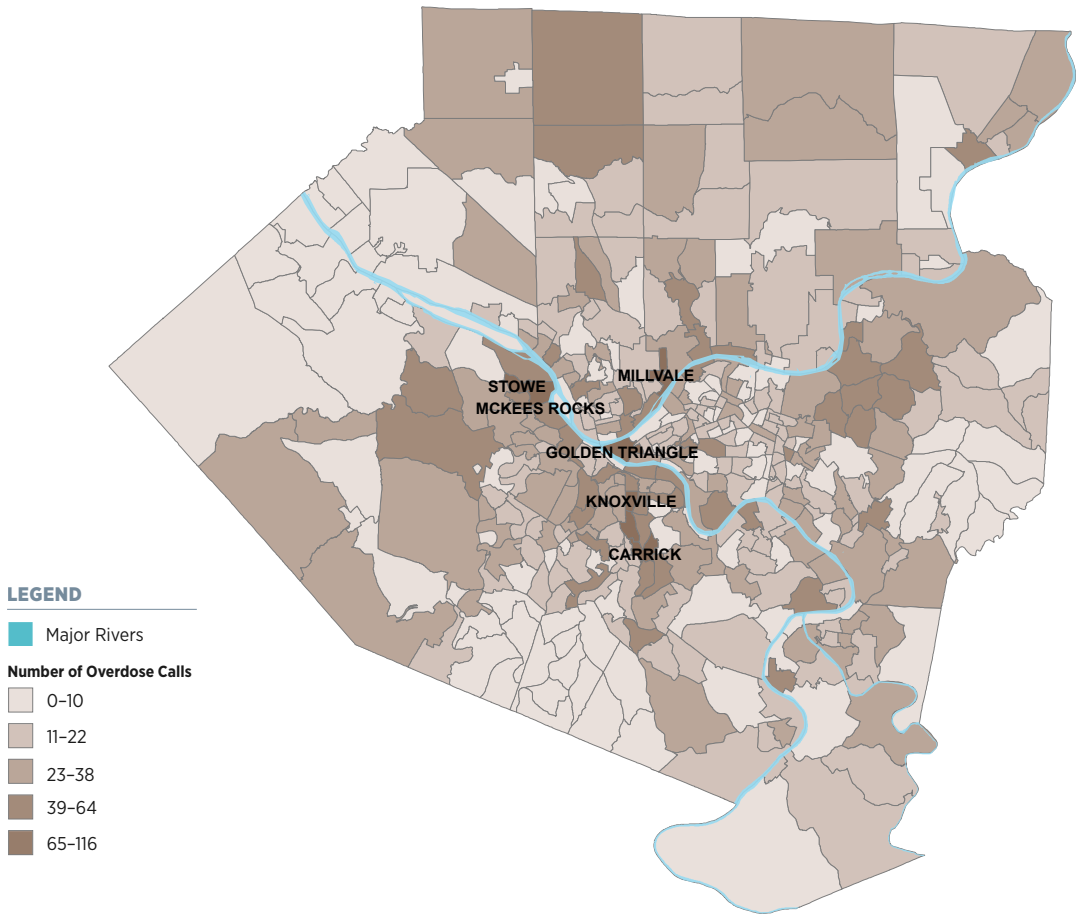
Non-fatal overdose activity

Non-fatal overdoses represent an important data point for understanding the magnitude of overdoses in the County. Since non-fatal overdoses are not reportable incidents, 911 call data was examined where a drug overdose may have been indicated. It is important to note that the reason given for a 911 call may not prove to be the actual reason for the event.

An analysis was performed to identify areas within the County where 911 was called in the event of a drug overdose. All call types related to overdose from Aug. 8, 2010 through May 19, 2015, including those that were not specifically opiate-related, were included in the analysis. There were 10,044 unique calls to 911 regarding overdose during this period. Results are displayed in **Figure 14**.

The most frequent calls came from the downtown area of Pittsburgh (Golden Triangle), the western neighborhoods of Stowe and McKees Rocks, the northern neighborhood of Millvale, and the southern neighborhoods of Knoxville and Carrick.

FIGURE 14: **Drug-Related Event Calls to 911, Aug. 8, 2010 through May 19, 2015**



EMS dispatches and naloxone administration

To increase the specificity of the analysis, a review of all available Emergency Medical Services (EMS) information was reviewed for instances when naloxone was administered, from Jan. 1, 2014 through Sept. 20, 2015. Naloxone is a drug that reverses the effects of opioids. It is administered by EMS when an opioid overdose is suspected. However, it can also be administered to

unconscious patients for other reasons as well. Therefore, it is important to note that not all episodes of naloxone administration are equivalent to opioid overdoses.

During this period, there were 1,466 occasions when EMS was dispatched and naloxone was administered and documented. On most occasions (89%), the person was "treated and transported." Very few (<2%) "refused transportation or treatment."[28] **Figure 15** represents the number of occasions, by ZIP code, when EMS was dispatched and naloxone administered.

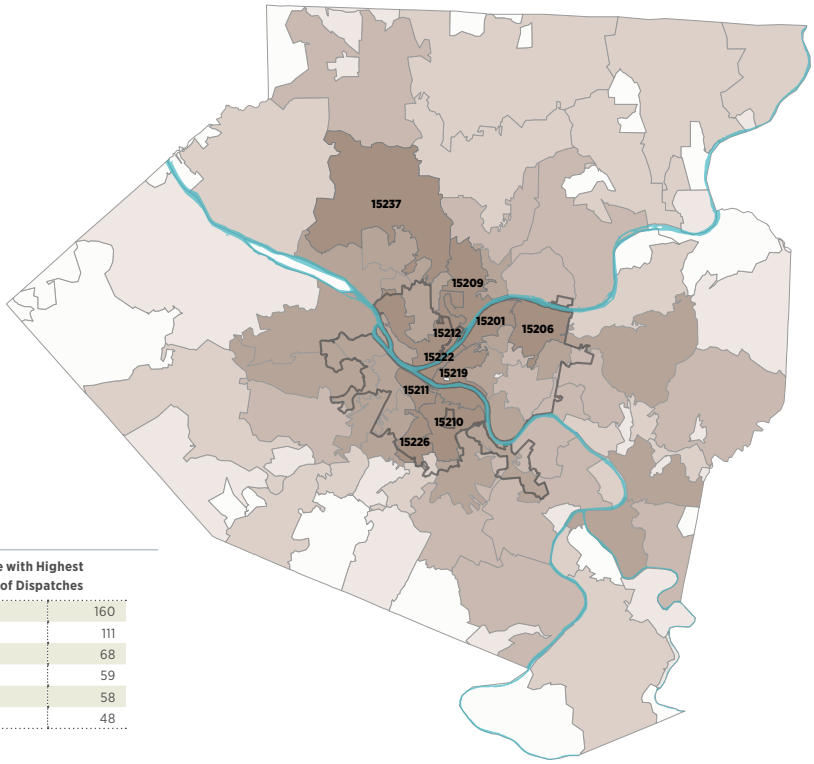
While it is unclear whether all EMS services were captured in EMS records, in 2014 there were 630 records showing that EMS administered naloxone and the person was revived.[29] During the same year, there were 241 opiate-related overdose deaths in the County; this calculates to 2.6 EMS saves for every death.

Time to treatment with naloxone is critical to reducing the risk of fatal overdose. An assessment of EMS response times was conducted. Half of all county EMS teams that responded to a suspected overdose incident did so in 13 minutes or less from the time of dispatch to the time of the first procedure.

[28] "Treated and transported" and "Refused transportation or treatment" are categories listed within the EMS dispatch data. EMS transports to the hospital.

[29] In 2014, there were 2,271 calls to 911 in Allegheny County that were coded as related to overdose, with a variety of subcategories that do not always specify the type of drug involved. Because this information could not be reliably verified, a ratio describing the relationship between call volume, EMS dispatch and administration of naloxone, and status of the overdose (fatal vs. non-fatal) was not calculated.

FIGURE 15: EMS Dispatches when Naloxone was Administered, Jan. 1, 2014 through Sept., 2015



LEGEND

Number of Dispatches
0
1–2
3–6
7–15
16–35
36–160

ZIP Code with Highest Number of Dispatches	
15212	160
15210	111
15219	68
15222	59
15206	58
15209	48

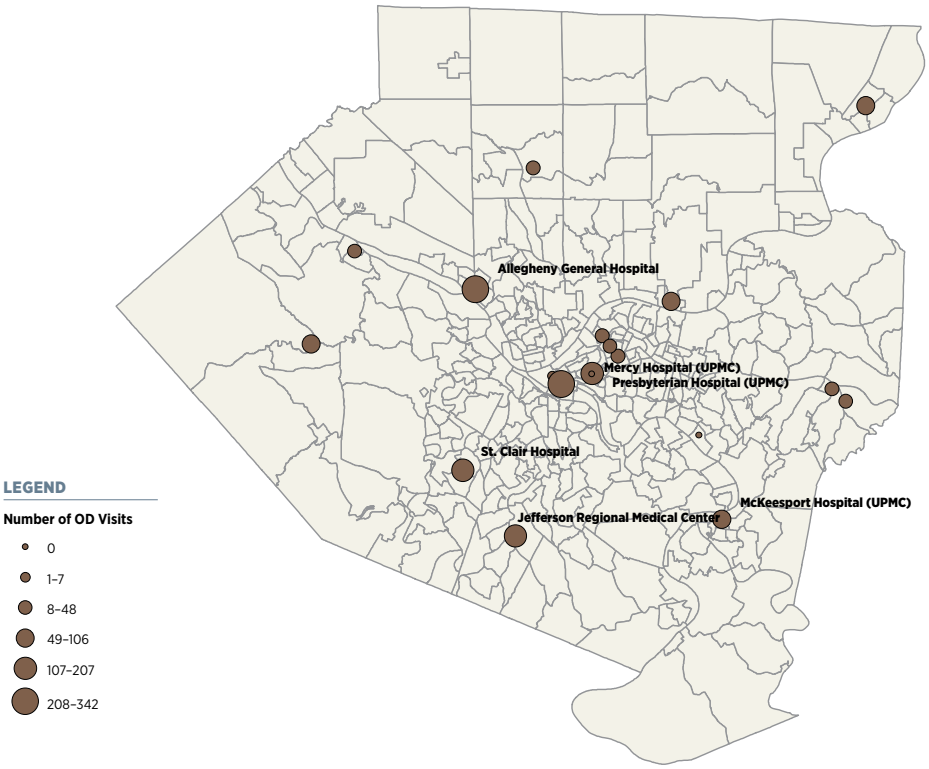
Emergency department admissions related to overdose

[30] https://www.hmsinc.com

Emergency room admission data were collected from EpiCenter[30] for 2014 and 2015. EpiCenter provides an interface for surveillance of all emergency department visits and collects the following information: chief complaint, gender, age and ZIP code of residence of the patient. In 2014, in order of prevalence of emergency department admissions with a chief complaint of "overdose," UPMC Mercy Hospital, Allegheny General Hospital, UPMC Presbyterian and St. Clair Hospital received the highest number of admissions in Allegheny County (see **Figure 16**).[31]

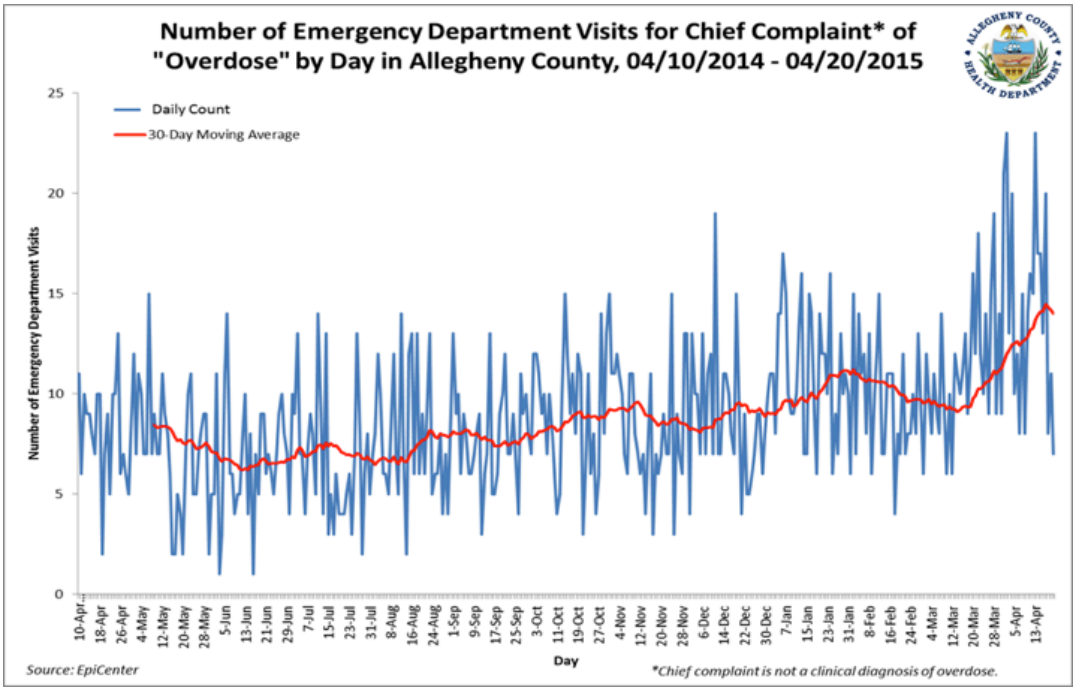
[31] These are admissions with the chief complaint of overdose. While likely an opiate-related overdose, data quality does not support assurance that each incidence is due to an opiate-related overdose.

FIGURE 16: **Emergency Department Admissions Related to Opiate Overdose, Allegheny County, 2014**



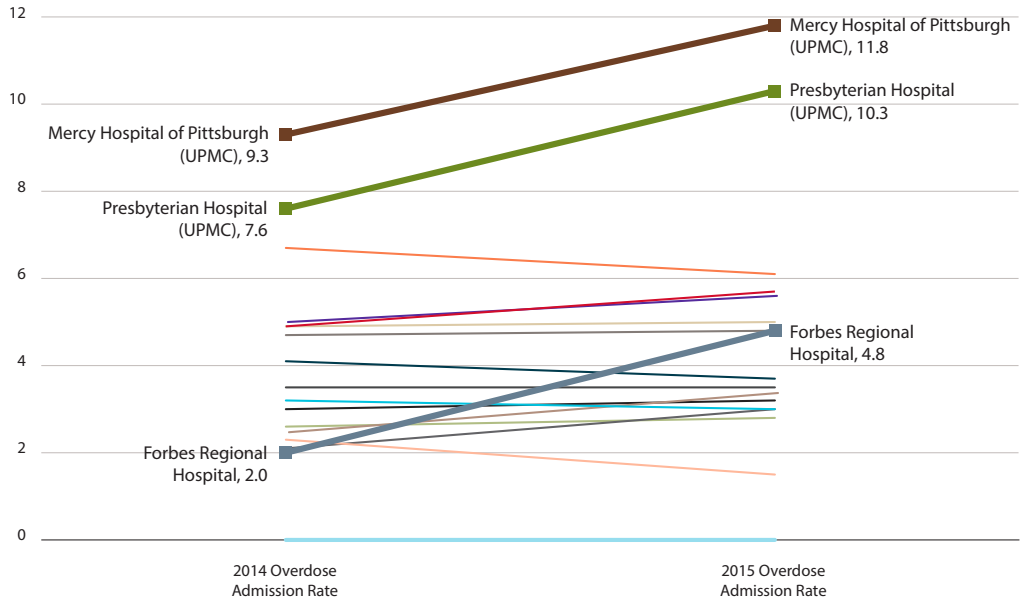
From April 10, 2014 through April 20, 2015, the average daily number of emergency department admissions with a chief complaint of overdose ranged from six to 14 per day (**Figure 17**).

FIGURE 17: **Emergency Department Visits in Allegheny County by Day, April 10, 2014 through April 20, 2015**



During 2014 and 2015, certain hospitals experienced a greater number of overdose admissions (**Figure 18**).

FIGURE 18: **Overdose-Related Emergency Department Admission Rates (per 100,000), 2014 and 2015**



Opportunities for intervention: Examining the relationship between those who died and prior County involvement

It is important to analyze the extent to which individuals who died were involved in publicly-funded services such as jail, behavioral health and other human services in order to better understand the epidemic and identify opportunities for intervention. The DHS Data Warehouse was queried to examine encounters with County services and systems among the 1,399 people who experienced a fatal opiate-related overdose death in Allegheny County from 2008 through 2014. Sixty-eight percent (953) were able to be matched to one or more service encounters within the Data Warehouse at any time in the past.[32]

[32] While time frame of records from each system varies somewhat in the data warehouse, many records, including those for Allegheny County Jail, date back to 2000.

For the analyses in this section, we also examined how much time passed since the person last encountered the services/systems. Note that there may be some overlap in counts of individuals in this section because it was possible for a person to have had encounters in multiple systems prior to the fatal overdose.

Human services involvement

DHS oversees many human services programs in the County, including, but not limited to, mental health and SUD services, child welfare, homelessness and aging. An analysis was performed to examine whether individuals who died of an opiate-related overdose had an encounter with a DHS service. Of the 1,399 individuals, nine percent (119) were involved in child welfare services as adult caregivers/parents, seven percent (100) encountered the homelessness services system, and four percent (53) encountered the Area Agency on Aging in the five years prior to their death (**Table 3**).

TABLE 3: **Human Services Involvement within Past Five Years, Individuals Who Died from 2008 through 2014**

PROGRAM DESCRIPTION	PAST 5 YEARS INVOLVEMENT, ADULTS 18+ (N = 1,399)
Child Welfare (Adult Caregivers/Parents)	119
Homelessness Services	100
Area Agency on Aging	53

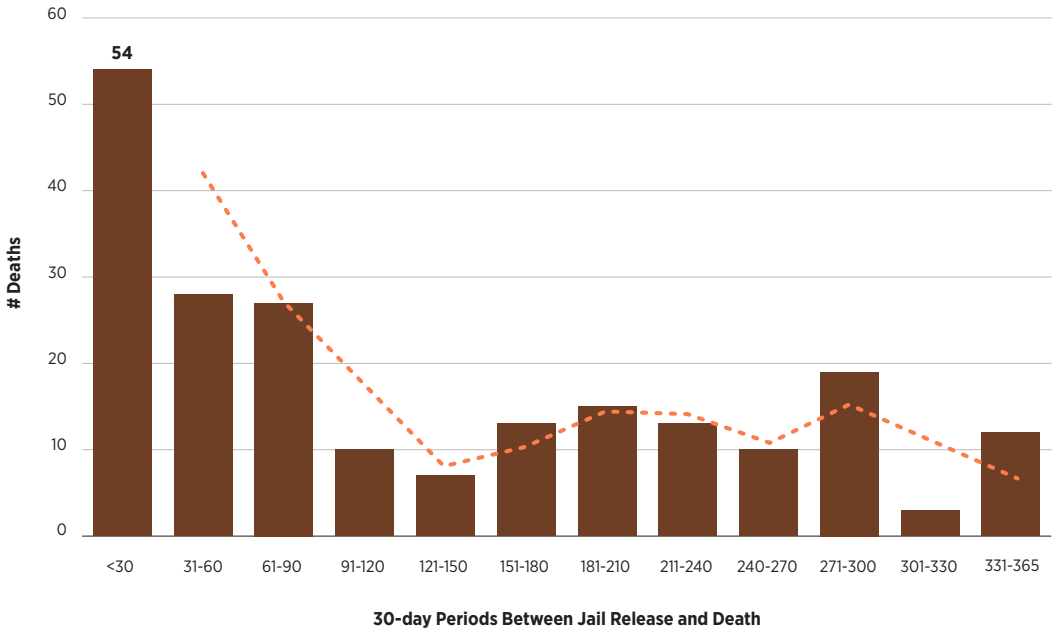
Allegheny County Jail

An analysis was conducted to understand how many individuals had been incarcerated in the ACJ, as well as the length of time from jail release to fatal overdose. Thirty-eight percent (531 of 1,399) of those who died of an opiate-related overdose had been incarcerated in ACJ at some point in the past. Additionally, 14 percent (197 of 1,399) had been incarcerated in ACJ within the mental health unit, and six percent (82) received justice-related support services within the five years prior to their death.

A separate analysis was conducted to assess the number of days between jail release and fatal overdose to understand if there were critical periods post-release when fatal overdoses occurred. There were 211 people who had an incarceration and release from jail in the year prior

to death. **Figure 19** shows the results of this analysis. The largest number of overdose deaths (54 of 211, or 26%) occurred during the first 30-day period following jail release, and more than half (109 of 211, or 52%) occurred during the first 90 days.

FIGURE 19: **Time between ACJ Release and Fatal Overdose, 2008 through 2014, N = 211**



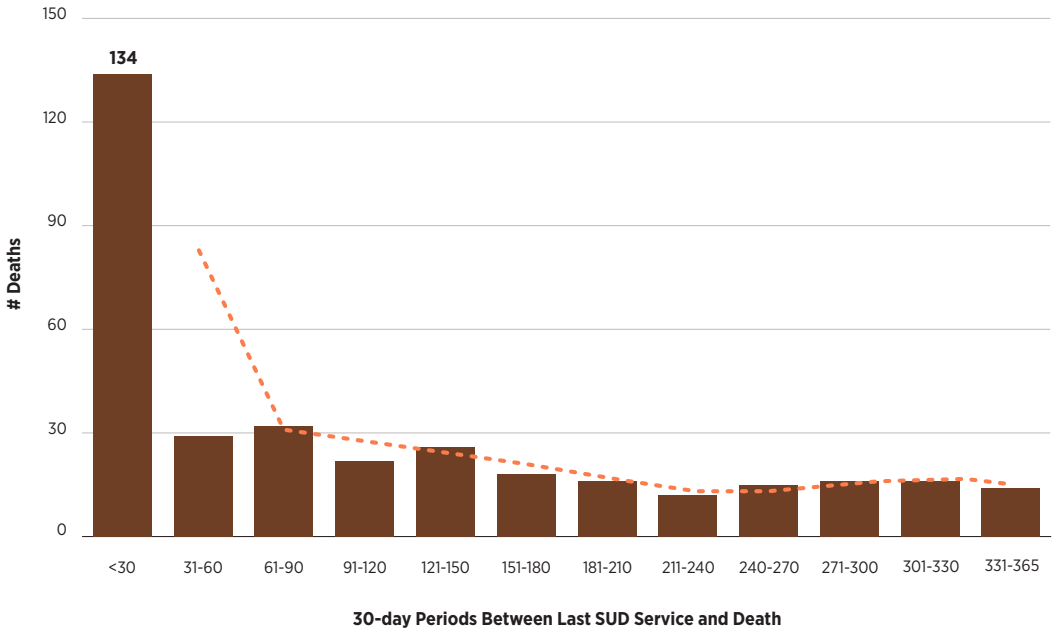
Substance use disorder (SUD) services

An analysis was performed to identify how many individuals who died of an overdose had a record in the DHS Data Warehouse for a publicly-funded SUD treatment service. Fifty-two percent of those who died of an opioid overdose (702) during the seven-year period had received a publicly-funded SUD treatment service at any time in the past.

A separate analysis was conducted to assess the number of days between the most recent SUD service and the fatal overdose to understand if there were critical periods after certain types of treatment or other factors that might be related to fatal overdose risk. **Figure 20** describes the results of this analysis. Twenty-five percent of those who died of an opioid overdose (350) had received the service in the year prior to death. Results suggest that opiate-related fatalities occurred most frequently (38%, or 134 of 350) within 30 days of a recent SUD treatment service. The most common (27%, or 36 of 134) last service a person received in the 30 days prior to a fatal overdose was non-hospital rehabilitation service, commonly known as "rehab."

Alarmingly, most people who died in the first 30 days of their most recent SUD service (85 of 134, or 63%) actually died within one week of the service, suggesting more strongly that they may still have been engaged in treatment. Twenty-seven of the 85 had received an MMT service in the week prior to death and were likely actively engaged in treatment.

FIGURE 20: **Time between Last SUD Service and Death, in 30-Day Periods, N = 350**



The frequency of all past year publicly-funded SUD treatment was tabulated. The most common SUD service (23%, or 82 of 350) that people who died had last received was non-hospital rehabilitation. **Table 4** displays these results.

TABLE 4: **Last Publicly-Funded SUD Service Received in Past Year**

	PEOPLE (N = 350)	
LAST SUD SERVICE	#	%
Non-Hospital Rehabilitation	82	23%
MMT	62	18%
Outpatient	57	16%
Detoxification (includes hospital, non-hospital and ambulatory)	42	12%
Case Management	38	11%
Intensive Outpatient	18	5%
Partial Hospitalization	14	4%
Other	37	11%
Total	**350**	

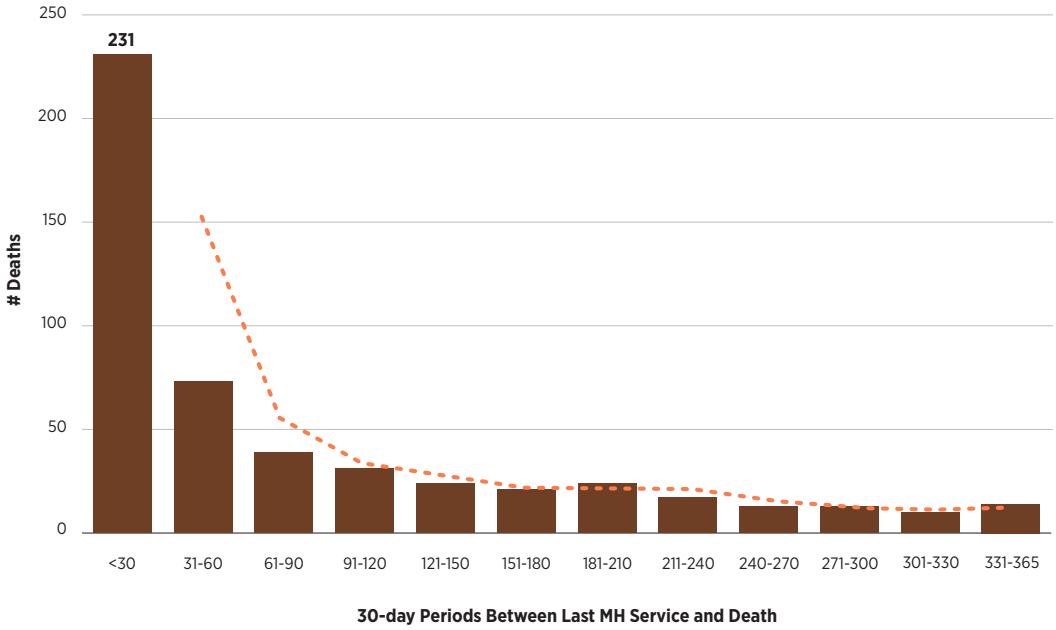
Mental health services

An analysis was performed to identify how many individuals who died of an overdose had received a publicly-funded mental health service. Forty-five percent (616) had received such treatment service at any time in the past, and 36 percent (510) had received the treatment in the year prior to death.[33]

[33] Of the 1,355 people who died during this period (2008 through 2014), 702 or 52% received a SUD treatment service and 616 or 45% received a mental health treatment service at any time in the past. ACJ records in the data warehouse date back to 1999. Administrative management services were omitted from this assessment because it is not a service that is delivered face to face.

A separate analysis was conducted to assess the number of days between the most recent mental health service and the fatal overdose. **Figure 21** describes the results, which suggest that opiate-related fatalities occurred most frequently (45%, or 231 of 510) within 30 days of a recent mental health service. Forty-seven percent of those (109 of 231) actually died within one week of the most recent service, suggesting they may have been actively engaged in treatment.

FIGURE 21: **Time between Last Mental Health Service and Death, in 30-Day Periods, N = 510**



The frequency of all past year publicly-funded mental health services was tabulated. The results suggest that the most common mental health service (26%, or 135 of 510) that people who died had last received was outpatient services, which includes both clinical and non-clinical supportive services. **Table 5** displays these results.

TABLE 5: Last Publicly-Funded Mental Health Service Received in Past Year

LAST MENTAL HEALTH SERVICES	# PEOPLE (N = 510)	%
Outpatient Services	135	26%
Medication Management	98	19%
Allegheny County Jail Mental Health Services	72	14%
Inpatient Services	66	13%
Service Coordination	48	9%
Crisis Services	28	5%
Emergency Services	26	5%
Other	37	7%
Total	**510**	

DHS and Community Care Behavioral Health Organization also conduct root cause analyses (RCA) for adverse incidents involving consumers in Allegheny County's mental health system. Qualitative analysis, facilitated initially by computer-assisted text mining[34] and manual review, identified a total of 48 (or 24% of the 199) RCA incidents that were related to substance use and, consequently, potentially related to the possibility of overdose. Three main themes emerged from these 48 substance-related cases:

1. *The importance of coordinating care among systems* (e.g., addressing conflicting treatment approaches or philosophies) and *across multiple providers* (e.g., information-sharing while in care and discharge planning for continuity of care)
2. *The need to offer integrated treatment services* (e.g., services addressing co-occurring disorders or staff training)
3. *Limitations related to enforcing or mandating SUD treatment* (e.g., there is no involuntary commitment mechanism for entering SUD treatment)

[34]Text mining keywords included: AOD, DUI, DWI, Halfway, Abuse, Addiction, Alcohol, Beer, Benzo, Cannabis, Clean, Cocaine, Comorbid, Co-occur, Crack, Dependence, Drug, Dual, Heroin, Illicit, Marijuana, Methadone, Opiate, Overdose, Pain, Recovery, Relapse, Substance, Weed, Withdraw

Other Known Opportunities for Intervention

Nearly half of the opioid-related deaths (624 or 45%) involved individuals who were actively enrolled HealthChoices members 90 days prior to their death. Seventy-six percent of these individuals (473) filled a prescription for a psychopharmacologic drug and/or pain medication within the 90 days prior to the date of their fatal overdose; 43 percent (265) filled a prescription for an opiate. Thus, there are opportunitieis to intervene with patients at visits to mental and physical health providers. In addition, the point of prescribing pain medication represents an opportunity to obtain substance use and overdose histories and, if indicated, refer to treatment, discuss overdose prevention plans, and consider co-prescription of naloxone for patients with opioid prescriptions.

Between April 2014 and April 2015, the average daily number of emergency department admissions with a chief complaint of overdose ranged from six to 14. This suggests that emergency departments can also serve as an intervention point for overdose survivors and those with frequent emergency department visits for substance use–related reasons.

Allegheny County's Coordinating Care for Individuals with Substance Use Disorders project, a collaboration with four local emergency departments designed to link individuals with SUD to appropriate treatment, is an example of the opportunities at this intervention point. The project seeks to improve health outcomes, increase opportunities for recovery for individuals with SUD, and reduce avoidable emergency department visits, repeat hospitalizations and overall costs.

CURRENT INTERVENTIONS

Interventions at the Policy Level

Act 139 and the Good Samaritan provision

Senate Bill 1164 was signed into law by Pennsylvania Governor Tom Corbett, in September 2014, as Act 139 of 2014. This legislation allows first responders, including law enforcement, fire fighters, EMS and other organizations, to administer naloxone. The law also allows individuals, such as friends or family members who may be in a position to assist a person at risk of experiencing an opioid-related overdose, to obtain a prescription for naloxone. Additionally, Act 139 provides immunity from prosecution for those responding to and reporting overdoses, otherwise known as the Good Samaritan provision.[35, 36]

The weekly average number of calls was calculated before[37] and after October 1, 2014 to assess whether 911- calls increased as a result of this policy. Because it appeared that calls had increased following the signing of Act 139, a formal statistical procedure (intervention analysis[38]) was performed to test whether these raw observations suggested an effect.

According to the test, the intervention effect was not significant. In conclusion, using the information available at the time of this report, there was no evidence of a significant increase in overdose call volume after October 2014. The increase in the average number of monthly overdose calls was mainly due to the increases in call volume over time during this period.

Interventions at the Healthcare Level

SUD treatment providers that distribute naloxone and/or deliver overdose prevention education

As mentioned earlier, people who experience a period of abstinence, including periods of detoxification and/or treatment, and then return to drug use, are at a heightened risk of overdose because of the lower tolerance for the drug that results from a period of abstinence. One strategy to reduce the risks of fatal overdose is to educate individuals receiving treatment for an opiate-use disorder about how to prevent a fatal overdose and give them tools (such as naloxone) to reverse a potential overdose. A growing number of SUD treatment provider agencies that deliver services to Allegheny County residents have adopted overdose prevention strategies that include the distribution of naloxone.

In the spring of 2016, DHS and its partners conducted a survey of contracted SUD service provider agencies about treatment services and assessed their "readiness" to implement

[35] Pennsylvania Department of Health. Available online at: http://www.portal.health.state.pa.us/portal/server.pt/community/emergency_medical_services/14138/act_139_-_naloxone/1938552

[36] Additional overdose-related legislation can be found at the Pennsylvania Association of County Drug and Alcohol Administrators (PACDAA): http://www.pacdaa.org/Pages/15-16OverdoseLegislation.aspx

[37] The period of 270 days was chosen because, at the time of the analysis for this report, Allegheny County DHS and ACHD had access to information about the 911 system through May 2015, 270 days following the implementation of Act 139. Therefore, a period of 270 days prior to the implementation of the policy was considered as a comparison.

[38] Method: Built an ARIMA model based on the monthly count of overdose calls before October 2014. There appeared to be a significant upward trend but no significant seasonality in the data. We then compared the forecasted value and the observation data from October 2014 to April 2015 to examine the pattern of the difference in order to determine the pattern of potential intervention effect. There was no apparent pattern in the difference so a constant permanent change was chosen for the potential intervention effect (in other words, to see whether there was a significant change in mean after intervention). The entire dataset was fit into a model with the intervention effect included, and the significance of the parameter of intervention effect was tested.

[39]More than 50 organizations provide at least one publicly-funded clinical service.

overdose prevention[39] strategies that included the distribution of naloxone. Executive or clinical directors from 24 organizations that provide publicly-funded clinical services responded to a question about overdose prevention. The results are shown in **Table 6**. Sixty-three percent (15) reported offering naloxone, while 37 percent (nine) reported that they do not.

TABLE 6: **SUD Providers and Overdose Prevention (MAT Survey, Spring 2016), N = 24**

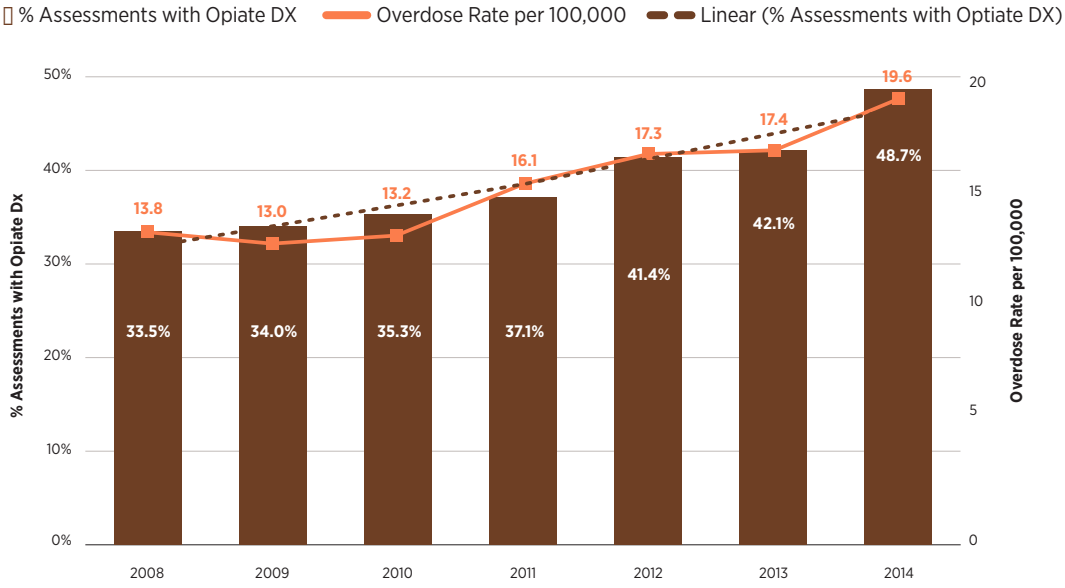
Does your organization offer Narcan (or naloxone hydrochloride) to people with opiate-use disorders to prevent fatal overdose?

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
Yes	63%	15
No	37%	9

SUD treatment assessments

An analysis of all publicly-funded SUD treatment assessments related to opiate use from 2008 through 2014 suggests that the frequency of people seeking treatment assessments paralleled the increasing fatal overdose rate (**Figure 22**). This suggests that a growing proportion of the SUD treatment population was seeking treatment for problems related to opiate use. This may indicate changing needs among the population seeking treatment and, therefore, opportunities for community treatment providers to adopt effective clinical practices to meet these needs.

FIGURE 22: **Percent of Opioid-Related Treatment Assessments Compared to Opiate-Related Overdose Rate, 2008 through 2014**



SUD treatment providers offering medication-assisted treatment

Scientific research has established that MAT increases retention in treatment and decreases drug use, infectious disease transmission and criminal activity.[40] There is growing awareness of the role that MAT may play in reducing overdose deaths. Yet a recent national survey of SUD treatment providers found that about half offered no MAT whatsoever, due either to the agency's treatment philosophy or staffing capacity. This section will review MAT utilization and capacity within the local publicly-funded SUD treatment system.

[40] National Institute of Drug Abuse (2012). http://www.drugabuse.gov/publications/topics-in-brief/medication-assisted-treatment-opioid-addiction

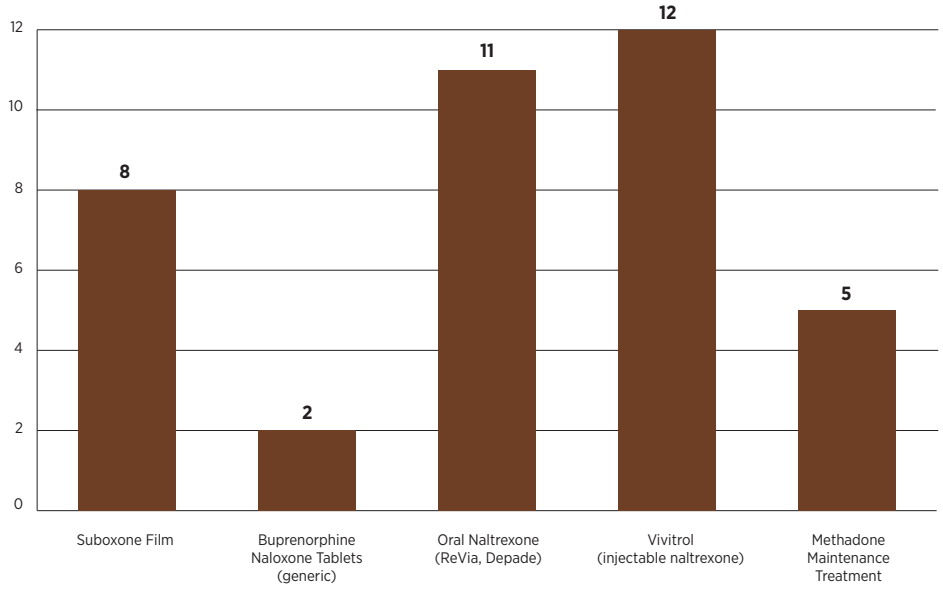
During the previously referenced 2016 SUD provider survey, provider agencies reported their current offerings of MAT. **Table 7** shows the level of care at which MAT was offered, and **Figure 23** describes the types of medication offered. Of the 24 respondent organizations, most (82%) offered MAT within their outpatient settings. More providers than expected (50%) offered Vivitrol®, and about 38 percent offered Suboxone®.

TABLE 7: **MAT Provided, by Level of Care, 2014, N = 24**

At which level(s) of care do you offer MAT?

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
Hospital or Non-Hospital Detoxification (4A or 3A)	17%	4
Short-Term Residential Rehabilitation (3B)	17%	4
Long-Term Residential Rehabilitation (3C)	21%	5
Partial Hospitalization (2A)	21%	5
Halfway House (2B)	13%	3
Intensive Outpatient (1B)	46%	11
Outpatient (1A)	58%	14

FIGURE 23: **Type of MAT Offered, 2016, N = 24**

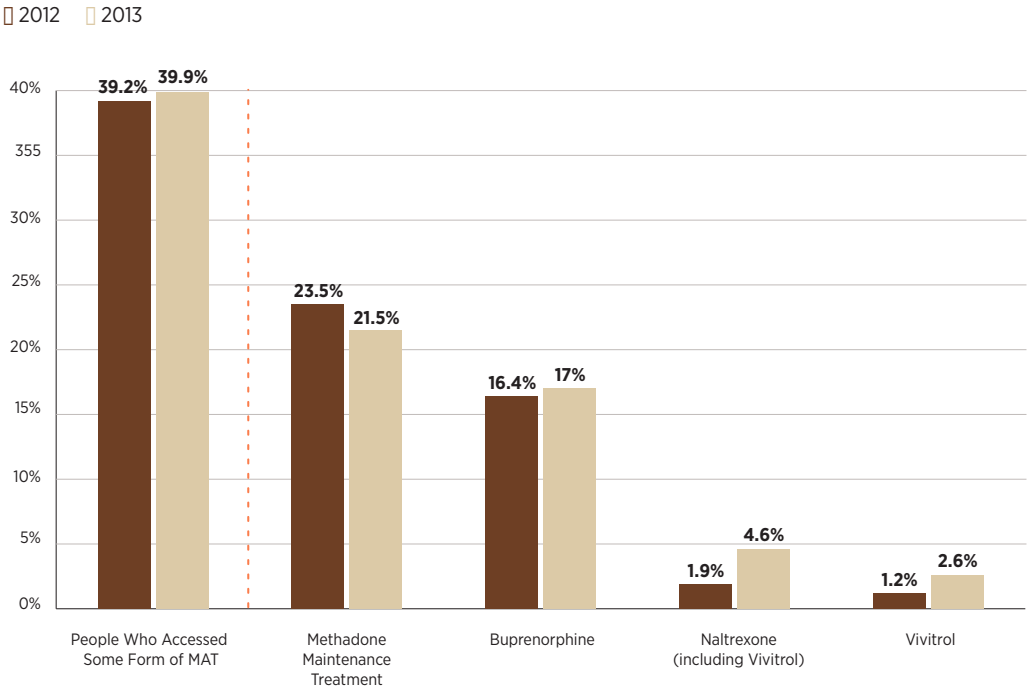


Utilization of MAT

MAT is defined by the U.S. Substance Abuse and Mental Health Service Administration (SAMHSA) as the use of medications, in combination with counseling and behavioral therapies, to provide a whole-patient approach to the treatment of substance use disorders. Increasing the utilization of MAT is considered to be an important overdose prevention strategy. An analysis of 2013 service utilization data in Allegheny County found that 40 percent of the 3,683 people with an opioid related diagnosis who started a new episode of publicly-funded SUD treatment utilized some form of MAT (**Figure 24**). MMT was the most common MAT approach (22%) followed by buprenorphine combined with counseling (17%). A small portion (3%) used Vivitrol® along with counseling.

[41]Access to Medication-Assisted Treatment for Opioid related Disorders in Allegheny County: 2013. Available at: https://www.ahci.org/Documents/MAT%202013.pdf

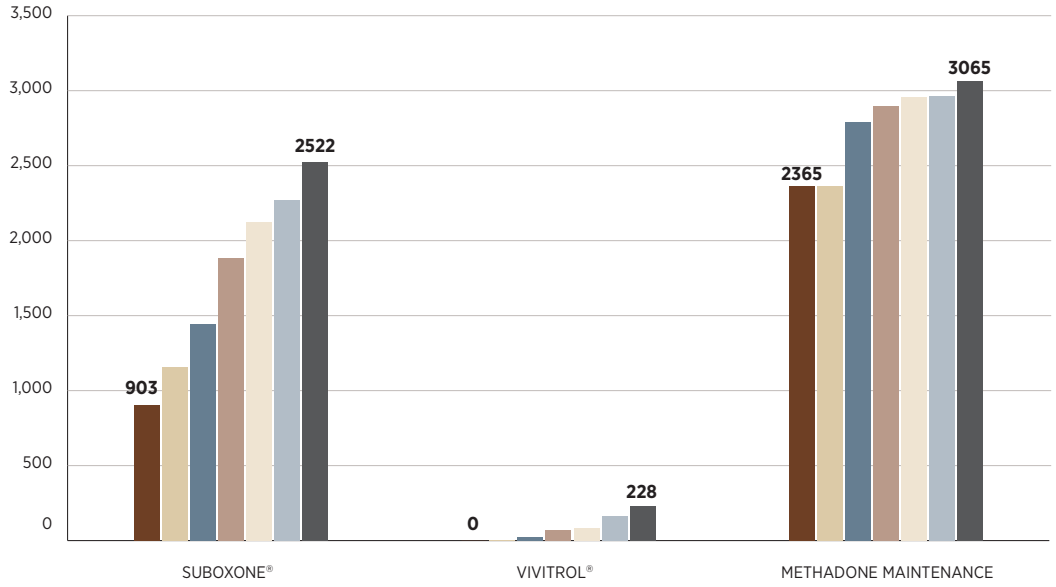
FIGURE 24: **Utilization of MAT: New Treatment Episodes, 2012 through 2013**[41]



A separate analysis was performed to understand how many individuals who received treatment for an opiate-use disorder received MAT versus counseling or medication alone. The number of people in publicly-funded treatment who were using medications to support their treatment and recovery grew during this period (see **Table 2** or **Figure 25**). In 2008, there were 903 people who filled a prescription for Suboxone®; six years later (2014), 2,522 did so. Similarly, there were no people using Vivitrol® in 2008[42] and 228 in 2014. Additionally, there were 2,365 who received MMT in 2008 and 3,065 in 2014. While MMT is MAT, by design, since it involves methadone combined with group and individual counseling, the use of other medications may or may not have involved concurrent counseling.

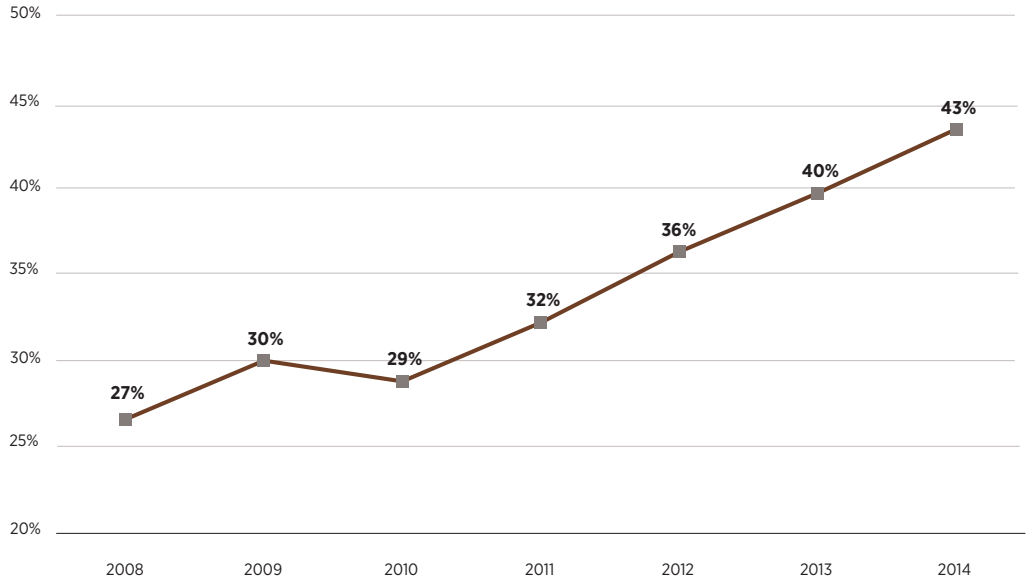
[42]The U.S. Food and Drug Administration (FDA) formally approved extended-release injectable naltrexone (Vivitrol®) in October 2010 to treat people with opioid dependence. https://store.samhsa.gov/shin/content/SMA12-4682/SMA12-4682.pdf

FIGURE 25: **Utilization of Medications and MMT, 2008 through 2014**



Because the number of Suboxone® prescriptions filled each year was substantial, an analysis was conducted to assess the extent to which people who filled Suboxone® prescriptions also utilized concurrent counseling. The results suggest that the proportion of people who also received a concurrent counseling service increased each year (**Figure 26**).

FIGURE 26: **Percentage of Clients Receiving MAT among Those Who Filled Suboxone® Prescriptions, 2008 through 2014**



Practice guidelines

As a result of the current epidemic, the Pennsylvania Physician General and the Department of Health, with support from DDAP, developed prescribing guidelines for emergency departments, pharmacists, dentists and physicians specializing in chronic non-cancer pain, geriatrics and OB/GYN. These guidelines provide guidance for safer, more effective pain relief practices, with greater emphasis on non-opioid therapies and greater caution to prevent addiction and diversion. The Physician General has identified plans to develop prescribing guidelines for sports medicine, pediatrics and benzodiazepines in the near future.

In addition, Community Care Behavioral Health Organization has developed best practice guidelines for MMT, Vivitrol® and Suboxone®, and managing benzodiazepines in MAT.[43]

[43] http://www.ccbh.com/providers/phealthchoices/bestpractice/index.php

Naloxone availability within pharmacies in Allegheny County

Availability of and demand for naloxone in Allegheny County has increased over time in response to the increases in opiate overdoses, federal recommendations and state law such as Act 139. In May of 2015, Dr. Karen Hacker, ACHD Director, issued a countywide standing order for naloxone; this was followed in October 2015 by a statewide standing order by Pennsylvania Physician General Dr. Rachel Levine.

A standing order makes a prescription drug available to more people by delegating responsibilities for administration to another healthcare professional. Dr. Hacker delegated the authority to dispense naloxone to pharmacies in the County, which allows members of the general public to purchase naloxone directly. Dr. Hacker's standing order was the first of its kind for a county health department; ACHD staff have since worked with over a dozen other county health departments to provide technical assistance. This section presents information about naloxone availability in Allegheny County at the time of this report.

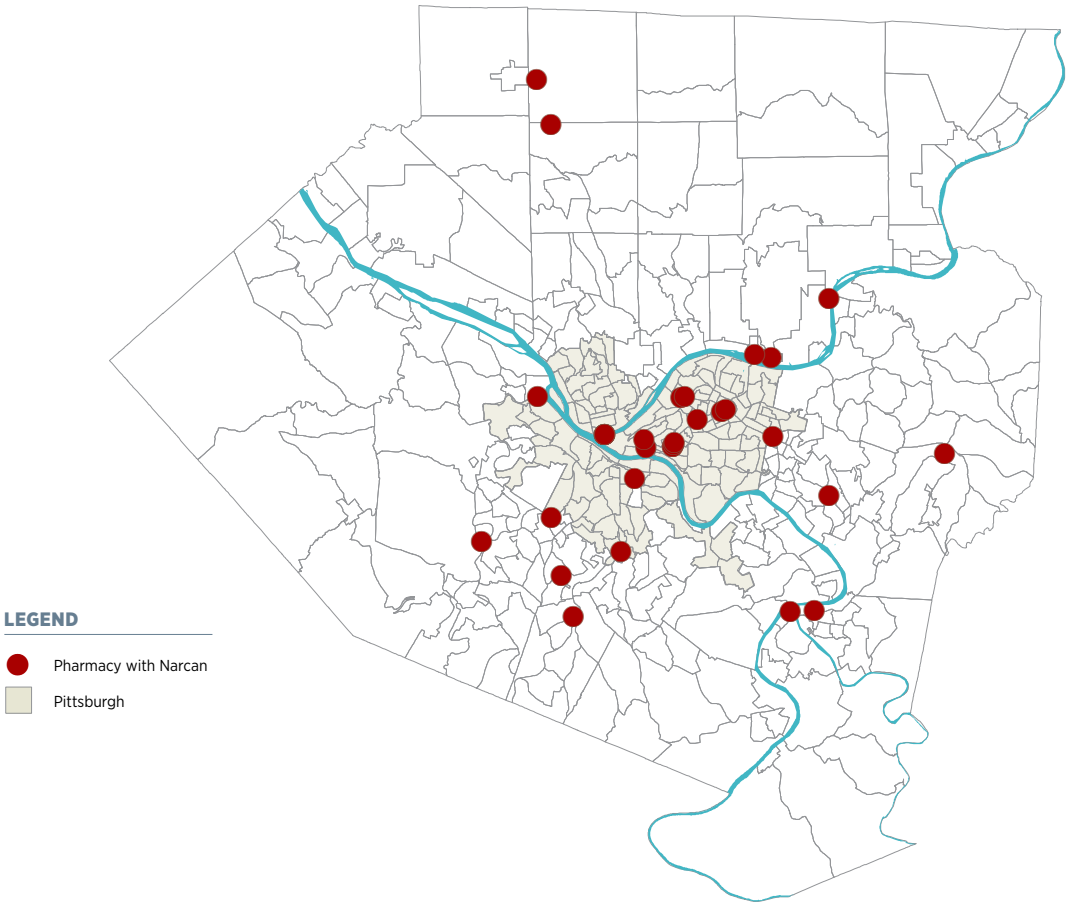
Pharmacies throughout Pennsylvania are increasingly stocking naloxone in its various formulations, although it is still difficult to definitively assess how much naloxone is being sold or distributed by pharmacies. Despite the standing orders, some pharmacies continue to operate under the premise that naloxone can only be dispensed to a customer with a patient-specific doctor's prescription. Additionally, reimbursement issues, such as benefits coverage for certain types of formulations of the drug and rising costs, continue to present distribution challenges. **Figure 27** displays the location of pharmacies in Allegheny County that have confirmed they keep naloxone in stock.[44] There are likely other pharmacies that offer or can stock naloxone, but those listed in **Figure 27** have been verified. Pharmacies that stock naloxone and run out of it can usually have it delivered within 24 hours.

[44] Information was adapted from www.overdosefreepa.pitt.edu. Specific information about pharmacy locations and the type of naloxone formulation (e.g., intra-muscular, intra-nasal, Evzio auto-injector) can be found at this website.

DHS is also distributing a limited number of naloxone kits to SUD treatment, criminal justice and other service providers in order to expand access to naloxone for individuals who may be uninsured and/or have challenges (such as transportation to a pharmacy) that create barriers to accessing this life-saving medication.

[45]Data adapted from OverdoseFreePA.pitt.edu.

FIGURE 27: Location of Pharmacies that Keep Naloxone in Stock[45]



Interventions at the Community Level

Education and training in overdose prevention

Overdose prevention education and training occurs throughout Allegheny County, much of it conducted by Prevention Point Pittsburgh (PPP),[46] a nonprofit organization dedicated to providing health empowerment services to injection drug users. This training includes education about the risks of overdose, strategies that can be used to reduce the risks of overdose, and information about where to access naloxone. There are several other organizations that provide this educational intervention, such as Bridge to Hope,[47] Central Outreach[48] and ONALA Recovery Center,[49] although information about the number of people reached through these efforts was not available for this report.

In 2014 alone, PPP trained 822 individuals in various community settings throughout Allegheny County; another 427 individuals received this training in ACJ. The training continues to be offered bi-weekly on rotating pods within the jail. All inmates on a pod are offered this training.

[46]www.pppgh.org

[47]http://bridge2hope.org/

[48]http://www.centraloutreach.com/

[49]http://www.onala.org/

Police departments and other law enforcement entities in Western Pennsylvania have become increasingly involved with community outreach efforts on the opioids issue over the last year, especially via the DEA's "DEA 360" program, of which the Pittsburgh region was the first pilot site. The program, announced in November 2015, expands DEA's community involvement in light of the agency's inability to "arrest its way out of the problem." DEA staff and other trained educators have provided education to hundreds of individuals in schools, community organizations and institutions of higher education. DEA's role continues to evolve to best respond to the issue.

ACHD has focused its community education efforts on the pharmacy community, partnering with the Pharmacy Schools at the University of Pittsburgh and Duquesne University to contact more than 100 pharmacies in priority neighborhoods by phone, mail or in person to increase naloxone access. ACHD staff have also conducted naloxone training with staff from its Women, Infants and Children (WIC) program, Goodwill of Western PA, North Hills Community Outreach, the Urban League of Pittsburgh and the Allegheny County Immunization Coalition. ACHD staff and volunteers also talked about opioid safety and overdose prevention with more than 200 middle and high school students school students during the Carnegie Science Center's SciTech days in March.

As of this writing, there has not yet been an effort to fund a systematic public information campaign other than Public Service Announcements funded by the DEA 360 initiative.

First-responders carrying naloxone

First-responders, such as fire fighters and police, often arrive at the scene of an emergency prior to emergency medical professionals; they may also encounter overdosing individuals in the community when medical professionals are not available. Therefore, there are statewide and national efforts to increase the number of first-responders who carry naloxone as a potentially life-saving intervention. At the time of this report, employees of the Allegheny County Police and Sheriff's office carry naloxone as do the municipal police departments of Castle Shannon, East McKeesport, Elizabeth, Monroeville, Mount Lebanon, North Versailles, Pitcairn, Scott Township, Whitehall[50] and Wilkinsburg.[51] Pennsylvania State Police also carry naloxone.[52]

As part of a State District Attorney's Association–funded initiative, the Allegheny County District Attorney's office worked with ACHD to procure and assemble free naloxone kits for police departments across the County. At the time of this report, three departments have made use of this free resource since the initiative launched in late September 2015.

Naloxone distribution and overdose reversals

PPP has distributed naloxone for over 10 years. In 2014, 152 people received a naloxone prescription for the first time. When participants return for a refill, PPP conducts a brief interview about the circumstances surrounding the refill and the overdose reversal. PPP shared its program data for purposes of this report.

[50] "Western Pennsylvania police departments slow to carry naloxone." TribLive News, Dec. 6, 2015. Available online: http://triblive.com/news/allegheny/9547384-74/naloxone-police-departments#axzz3tdyGw6zm

[51] http://www.post-gazette.com/news/health/2015/09/18/Wilkinsburg-police-to-be-trained-on-treating-overdoses/stories/201509180016

[52] http://www.post-gazette.com/local/city/2015/04/07/Pennsylvania-State-Police-training-to-carry-naloxone-for-opiod-drug-overdoses/stories/201504070064

In 2014, PPP reported 214 refills for naloxone, following initial prescriptions used on a person on 167 occasions. On each occasion, the person was reported to have been rescued from a fatal overdose; there were no reports of death following naloxone administration. Participants also reported that 911 was not called on the majority of occasions; in more than two-thirds of these occasions, the reason given was fear of police involvement. These findings were similar to those reported by PPP in a published paper about several years of data related to the overdose prevention program.[53]

[53] Alex S. Bennett, A.S., Bell, A., Tomedi, L., Hulsey, E.G., Kral, A.H. (2011). Characteristics of an overdose prevention, response and naloxone distribution program in Pittsburgh and Allegheny County, Pennsylvania. Journal of Urban Health. Available online: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3232410/

Prescription drug take-back services

The Pennsylvania Office of the Attorney General has partnered with DDAP, the Pennsylvania District Attorneys Association and the Pennsylvania National Guard to legally dispose of unwanted prescription medications that create a public health and safety concern. Allegheny County drop-off locations and their hours of operation are listed below.

TABLE 8: **Drug Drop-Off Locations in Allegheny County**[54]

LOCATION	ADDRESS	PHONE	HOURS
Borough of Crafton Police Department	100 Stotz Avenue Crafton, PA 15205	412-921-2016	M–F, 8:30am–5pm
Moon Township Police Department	1000 Beaver Grade Road Moon Twp., PA 15108-2906	412-262-5000	24 hours / 7 days a week
Borough of Green Tree Police Department	10 West Manilla Avenue Pittsburgh, PA 15220	412-921-8624	Unknown
Indiana Township Police Department	3710 Saxonburg Boulevard Pittsburgh, PA 15238	412-767-5333	
Mt. Lebanon Police Department	555 Washington Road Pittsburgh, PA 15228	412-343-4016	24 hours / 7 days a week
Pittsburgh Bureau of Police	1203 Western Avenue Pittsburgh, PA 15233	412-323-7837	24 hours / 7 days a week
South Fayette Township Police Department	515 Miller's Run Road South Fayette, PA 15064	412-221-8700	M–F, 8am–4:30pm
West Mifflin Police Department	1020 Lebanon Road West Mifflin, PA 15122	412-461-0600	24 hours / 7 days a week
Northern Regional Police Department	230 Pearce Mill Road Wexford, PA 15090	724-625-3157	Unknown

[54] DDAP Prescription Drug Take-Back Program: as of April 27, 2016. http://www.ddap.pa.gov/Prevention/Pages/Drug_Take_Back.aspx#.VyED8_krK70

As of spring 2016, ACHD retrieved records from the National Take-Back Initiative,[55] a Department of Justice effort designed to provide a safe, convenient and responsible means of disposing of prescription drugs, while also educating the general public about the potential for abuse of medications. The DEA hosts at least two annual drug take-back events, where additional collection sites are made available. The May 2016 drug takeback event collected 6,473 pounds of unused prescription drugs in Allegheny County alone. ACHD is currently working with DHS and the Allegheny County Police Chiefs Association to secure more permanent drug take-back locations.

[55] http://www.deadiversion.usdoj.gov/drug_disposal/takeback/

TABLE 9: **National Take-Back Initiative Results**

POLICE DEPARTMENT	# OF BOXES	WEIGHT
Allegheny County Police Department — North Park	3	48
Allegheny County Police Department — South Park	1	17
Baldwin Borough Police Department	5	81
Bellevue Police Department	5	95
Dormont Police Department	4	51
Duquesne University Public Safety Department	5	147
East Pittsburgh Police Department	4	92
Findlay Township Police Department	4	85
Greentree Borough Police Department	18	504
Ingram Police Department	4	91
Monroeville Police Department	7	138
Moon Township Police Department	25	506
Mt. Lebanon Police Department	26	602
Munhall Police Department		
Northern Regional Police Department	13	258
Oakmont Police Department	6	146
PA State Police — Moon Township		
Pittsburgh Bureau of Police	29	574
Plum Borough Police Department	7	168
Robinson Township Police Department	10	225
Ross Township Police Department	8	166
Sewickley Borough Police Department	11	211
Shaler Township Police Department	18	634
Sharpsburg Police Department	7	131
University of Pittsburgh Medical Center	37	710
University of Pittsburgh Police	10	240
Upper St. Clair Police Department	2	53
West Mifflin Police Department	1	23
McCandless County Police Department	11	292
Allegheny County Medical Examiner	8	94
Clairton Police Department	3	58
South Park Police Department	2	33
TOTAL	**294**	**6,473**

DISCUSSION AND RECOMMENDATIONS

The analysis in this report is designed to contribute to stakeholder discussions about the risks of opiate-related overdose in Allegheny County. This section provides specific connections between the analysis and topic areas related to risks as well as opportunities for interventions to reduce overdose risks in the community.

Act 139 / Good Samaritan Clause and the use of naloxone

There is ample evidence that the use and availability of naloxone has increased since passage of Act 139 (e.g., EMS, PPP, standing orders in pharmacies); however, much remains to be done. Mental health and SUD providers as well as emergency departments may not be uniformly providing naloxone to their patients. Only 10 municipal police departments are carrying the drug. Not enough pharmacies are stocking the drug and/or using the standing order. In addition, there is no evidence to suggest a significant increase in overdose calls to 911 since passage of Act 139.

Recommendations

1. Improve public education regarding naloxone.
2. Address missed opportunities for intervention by expanding the number of stakeholders carrying naloxone and making active treatment referrals, especially police officers, probation/parole officers, child welfare workers and others who may encounter individuals at risk.
3. Utilize targeted prevention strategies to reach active drug users and their families/friends to communicate the intentions of Act 139, and the importance of using naloxone and calling 911 in the event of an overdose.
4. Target communities within "hot-spot" areas for public education about calling 911 and using naloxone.
5. Expand the number of pharmacies stocking naloxone and using the available standing orders.

Changing Demographics of the Epidemic

Opiate-related overdose deaths are increasing most rapidly among County residents ages 25 through 34. An increase in opiate-use disorders among the younger population suggests the need for healthcare and human services agencies to adapt to the growing future population of those in need of treatment and other support services.

Recommendations

1. Assess the reasons that younger people are now the largest cohort and whether/how this group differs from prior cohorts.
2. Assess the prevention, treatment and recovery needs of the growing population of younger adults with opiate-use disorders.
3. Develop targeted prevention and treatment strategies for younger adult populations.

4. Monitor the potentially future changing needs for SUD treatment in the County.
5. Enhance existing school-based drug and alcohol prevention curricula with overdose prevention education.

Areas in the County with Higher Risks of Overdose Deaths

Geospatial analysis in this report suggests that there are specific areas of the County in which there is a higher incidence of overdose fatalities. Neighborhoods and municipalities with the most significant hot-spots included Brookline, Carrick, Baldwin Township and Overbrook.

Recommendations

1. Use data to continually monitor overdose activity in the County.
2. Utilize prevention strategies that target active drug users and their families (e.g., overdose prevention education, naloxone distribution and needle exchange programs) in higher-risk areas within the County.
3. Expand use of naloxone in high-risk communities by all first responders, and increase availability of naloxone in pharmacies in those same communities.
4. Provide drug take-back opportunities in communities of high risk.

Medication-Assisted Treatment Approaches

Today, MAT for opioid addiction is considered to be evidence-based and a standard of care. Concerns over the abuse of MAT medications are disproportionate to the reality of what is actually occurring in Allegheny County. The evidence suggests that Suboxone® played an extremely small role in the opiate overdose epidemic in Allegheny County; it was indicated in the toxicology reports in only two overdose deaths (0.14% of the 1,399 deaths).

This analysis included the results of an assessment of the publicly-funded treatment system's capacity to deliver MAT and the actual utilization of these treatment modalities. Currently, this capacity is limited, but the system is increasing in its ability to effectively provide the treatment that is needed for opiate-use disorders. It is unknown to what extent stigma or lack of awareness contributes to under-utilization of MAT, but clear communication about the benefits and risks with this or any treatment approach must be science-based. In addition, the high risk of overdose in the 30 days following missed doses of either Suboxone® or Vivitrol® and the high risk of overdose while engaged in MMT emphasizes the need for effective monitoring and engagement of those utilizing MAT.

Recommendations

1. Promote health communication strategies that educate the public about effective treatments for opiate-use disorders, how they work and, depending upon a person's unique situation, who might benefit from each.
2. Increase SUD treatment providers' capacity to deliver MAT.

3. Identify members entering an increased overdose risk period (i.e., those who initiated treatment, received Suboxone® or Vivitrol® and then missed more than one seven- or 30-day prescription fill).
    a. Insurers can improve outreach to members who are prescribed these medications (and potentially their family members) to ensure their re-engagement in treatment following periods of missed doses.
    b. Improve outreach to authorized prescribing physicians to alert them to patients potentially at risk of overdose.

4. Incorporate a safety plan for overdose for all individuals receiving MAT, especially in MMT.

Prior Behavioral Health Treatment

Many of the individuals who died of overdose had a prior history of mental health and SUD treatment as well as the use of psychopharmacology in the year prior to their death.

What is unknown is the extent to which mental health service providers: 1) assess for opioid overdose risk or co-occurring SUD using formal evidence-based screening tools, and 2) ensure that the person in need secures the appropriate treatment.

Recommendations

1. Improve the ability of community-based mental health service providers to identify opioid use and overdose risk among clients.
2. Increase overdose prevention education and naloxone access among people receiving behavioral health treatment, especially those leaving rehabilitation, those involved in MMT and those receiving mental health services.
3. Increase the incorporation of an overdose prevention plan within the safety or crisis plans for all people served by community-based mental health and SUD providers.
4. Increase the utilization of MAT approaches among people receiving treatment for an opiate-use disorder.
5. Improve the coordination between mental health, SUD treatment and other healthcare providers, especially with regard to safe prescribing practices.

Release from Allegheny County Jail (ACJ)

The analysis in this report strongly suggests that the first three months and, in particular, the first month following jail release constitutes a period of heightened overdose risk, particularly for those with prior history of substance abuse. During the study period, 54 people died of an overdose within the first month of release from ACJ, and an average of two to three people per month died of an overdose in the year after their release from ACJ. It is unclear how many individuals entering the jail were actively using opiates, nor is it clear how many were at risk of overdose and received naloxone upon release. The period of release from jail represents an important intervention opportunity.

Recommendations

1. Universally assess ACJ inmates for opioid use and overdose risk.
2. Provide naloxone to all inmates identified as using opiates and therefore at risk of overdose upon discharge from ACJ.
3. Deliver evidence-based treatments (such as MAT) to ACJ inmates with an identified opiate-use disorder.
4. Provide case management for those leaving ACJ and entering SUD treatment to improve rates of treatment, initiation and engagement.

Adult Caregivers Previously Involved in Child Welfare

In the past five years, there were 119 deaths among adults involved in child welfare as a caregiver, meaning they were responsible for a child who was abused/neglected or at risk of abuse/neglect. This suggests the magnitude of the impact of opioid use on children and families in the County.

Recommendations

1. Improve screening for opioid and other drug use among adults involved in child welfare.
2. Enhance direct care staff's ability to identify opioid use and overdose risk, and access to expert consultants.

CONCLUSION

Drug use has been a concern in the U.S. since the early part of the 20th century. However, as we entered the 21st century, the explosion of prescription opioid and, subsequently, heroin use led to a significant increase in overdose deaths. This report synthesized available data sources to identify opportunities to reduce overdose mortality and other damaging effects of opioid use in Allegheny County. The results suggest several unmet opportunities for intervention with individuals using opioids and at risk of overdose: upon encountering a law enforcement official; entry or exit from ACJ; entry or discharge from mental health or SUD treatment facilities; at doctors' offices or emergency departments; and at home with family or friends. Future efforts should include continued monitoring of fatal overdoses in the County and support for stakeholders interested in and willing to develop and implement targeted and effective interventions.

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