THE BURDEN OF POISONING IN OHIO, 1999-2008







VIOLENCE AND INJURY PREVENTION PROGRAM

BUREAU OF HEALTH PROMOTION AND RISK REDUCTION
OFFICE OF HEALTHY OHIO
OHIO DEPARTMENT OF HEALTH

DATA PROVIDED BY THE

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THE OHIO VIOLENCE AND INJURY PREVENTION PROGRAM

The Violence & Injury Prevention Program (IPP) is developing a comprehensive injury prevention program for the State of Ohio.

The IPP strives:

- To coordinate surveillance systems that collect injury data.
- To assess the burden of injuries and violence and communicate information for the purpose of action.
- To promote evidence-based injury prevention interventions for at-risk populations.
- To coordinate and collaborate with partners in building program infrastructure.
- To encourage the adoption of policies and programs that lead to the prevention of injuries.
- To provide technical support and training as needed.
- *Ultimately, to make Ohio a safer place to live, work and play by reducing death and disability associated with intentional and unintentional injury.*

The goal of the program is to continue development of a comprehensive injury prevention program through the establishment and sustainment of a solid infrastructure for injury prevention that includes statewide injury surveillance to inform and evaluate public policy, as well as comprehensive injury prevention and control programs. The Ohio Department of Health's (ODH) IPP initiatives include:

- **Ohio Injury Prevention Partnership (OIPP) –** The OIPP is a group of professionals representing a broad range of agencies and organizations concerned with building Ohio's capacity to address the prevention of injury, particularly related to the group's identified priority areas of falls, drug poisonings, motor vehicle traffic (pedestrian) and violence prevention (suicide and firearm related). The mission is, *To prevent injuries in Ohio using data and collaborative partnerships*. The vision for injury prevention is, *Working together to create a safe and injury-free Ohio*. The OIPP was convened in November 2007 and is a partnership of ODH with funds from the Centers for Disease Control and Prevention (CDC) National Center for Injury Prevention and Control (NCIPC). The OIPP helps to improve statewide collaboration around injury and will assist ODH with establishing priorities and future directions regarding injury and violence prevention in Ohio.

  - **Ohio Poison Action Group –** Because of the rapid and alarming increase in drug overdose deaths, the ODH, IPP has created a subgroup, the Poison Action Group, (PAG) to focus specifically on this epidemic of drug deaths. The IPP has also partnered with the Ohio Department of Alcohol and Drug Addiction Services (ODADAS) and their New and Emerging Drug Trends Workgroup (NEDTW) in this effort. **The purpose of the Ohio PAG is to address deaths and injuries resulting from the use, misuse and abuse of prescription drugs.** ***Specifically, the PAG will:***

    - **Prioritize prescription drug overdose as a public health threat**. The IPP recognizes this threat and has made this issue one of our priorities. The Director of Health and the Governor also recognize the seriousness of this epidemic and have taken action to address it (actions described in more detail below)

    - **Determine drugs of abuse responsible for increasing death rates and related access issues.** ODH Vital Statistics (VS) data has been used to identify the drugs involved in unintentional overdoses. A thorough review of available information is provided in Section 2 and 4. Efforts have also been made to encourage coroners to report drug type in vital statistics data in order to reduce the proportion designated as 'unspecified'.

- **Conduct a state symposium:** ***Epidemic of Prescription Drug Overdoses: A Call to Action.*** The symposium was held on July 29, 2009. The purpose was to raise awareness of the problem and provide data, identify contributing factors, highlight programs and promising practices, present strategies for policy and program initiatives, and discuss action steps.
- **Examine statewide data and produce materials to raise awareness about this issue.** Visit the Ohio Poison Action Group
- **Research existing local, regional and state programs and policies.** These efforts are ongoing by the IPP. In addition, the IPP is undertaking a project to track the impact of local programs on rates of prescriptions and treated overdoses. Monitored programs will include drug take-backs, symposia, training, changes in enactment or enforcement policies, etc.
- **Conduct regional forums in high risk areas to present data and discuss solutions**. Forums have been conducted or are being planned in Scioto, Montgomery, Fairfield, Butler and Ross counties among others. These efforts have been extremely successful in stimulating grassroots advocacy that has provided impetus for encouraging state policy makers to address the problem.
- **Develop state-level recommendations and strategies for increasing capacity to respond to this problem.** The PAG/NEDTW has developed recommendations for consumers, prescribers and decision-makers/policymakers. The recommendations were presented to the Directors of ODH and ODADAS in April 2010 and are available online at: http://www.odh.ohio.gov/features/odhfeatures/drugod/opdatfresources.aspx In addition, the Ohio Prescription Drug Abuse Task Force (OPDATF), formed by Gov. Strickland in April 2010, used these recommendations as a basis for identifying priorities and developing statewide recommendations to address this problem in Ohio. The OPDATF's final report and additional information are available at http://www.odh.ohio.gov/drugoverdose
- **Raise awareness of this issue in the media and among the public.** ODH has contracted with Fleishman Hillard to implement a comprehensive social marketing program in high risk areas of Ohio. The campaign, ***Prescription for Prevention: Stop the Epidemic*** (http://www.p4pohio.org) is funded through June 2011 and will involve:
  - Coalition building and focused outreach efforts in at-risk communities in Ross, Adams, Vinton, Jackson and Cuyahoga Counties
  - PSA and educational material development and distribution. Materials are available.
  - Grassroots campaigns in community venues
  - Employer outreach
  - Drug drop-off events
  - Peer-to-peer high school outreach
- **Conduct pilot prevention programs in high risk areas.** Two such projects are being funded by ODH in Montgomery and Scioto County for 2010-2013 to implement the following:
  - Poison Death Review committees
  - Coalition building
  - Education and training of health care providers about the issue
  - Environmental strategies including:
    - Increasing use of OARRS, the prescription monitoring program, among prescribers
    - Conducting a feasibility study of a naloxone distribution and education program
  - Developing state and local policy recommendations
  - Supporting ODH's P4P social marketing campaign by distributing materials

- **Local Injury Prevention Grant Program** - Through the CDC's Preventive Health and Health Services Block Grant (PHHSBG), the IPP provides $605,000 annually to local programs targeting injury. The goal of this grant program is to reduce injury and injury-related deaths to Ohioans through the development of comprehensive, multi-faceted, population-based programs at the local level that address the risks associated with injuries. The nine currently-funded projects (2010-2013 cycle) are focusing on the following injury areas: unintentional child/youth injury; falls among older adults; and unintentional prescription drug poisoning.

- **Child Passenger Safety (CPS) Program** – With fine monies collected through enforcement of Ohio's child restraint law (Ohio Revised Code 4511.81), ODH's CPS Program provides child safety seats to eligible low-income families in all Ohio counties, and targets the high-risk population of children ages seven years and younger. The overall goal of this program is to increase the availability of child safety seats for needy families in Ohio and to encourage their proper use and correct installation through education. These programs work in coordination with nine regional occupant protection coordinators, funded by the Ohio Department of Public Safety, who serve as liaisons between ODH and the local program contacts. ODH distributes approximately 45-60 seats to each of the 88 counties annually, based on the availability of funds.

- **Surveillance Activities**
  - **Injury Surveillance** - The Injury Surveillance program assesses the burden of overall and specific types of injury in Ohio through the examination of multiple data sets including hospital discharge, death, trauma registry and emergency medical services (EMS) data. It monitors trends and emerging injury issues, produces annual reports and responds to requests for data.

  - **Census of Fatal Occupational Injuries (CFOI)** – With funding from the Bureau of Labor Statistics and the Ohio general revenue fund, the CFOI program provides the public, employers and safety personnel with comprehensive data surrounding fatal occupational-related injuries in Ohio. Data are collected from several sources including death certificates, workers' compensation reports, Occupational Safety and Health Administration (OSHA) reports, traffic crash records, agricultural injury reports and media clippings. The data are collated at the national level and used to establish occupational safety policies and programs.

  - **Ohio Violent Death Reporting System (OH-VDRS)** - In September 2009, the CDC awarded a grant for Ohio to participate in the National VRDS (NVDRS), enabling us to address a critical need in our state: the collection and analysis of high quality data on violent death. ODH will be obtaining and linking data from the following key data sources to better understand the circumstances surrounding and contributing to violent deaths in Ohio: Vital Statistics data; coroner data from the 88 county coroners; state and local law enforcement data and child fatality review data.

Please visit the IPP website for more information, resources and program updates.
Go to: **http://www.odh.ohio.gov/odhPrograms/hprr/injprev/OVIPP.aspx**

EXECUTIVE SUMMARY

This report reviews the overall burden of poisoning in Ohio, with a primary focus on the unintentional drug/medication injuries and fatalities. Data for this report were derived from: Ohio death certificates; the Ohio Hospital Association inpatient discharge data (HID) and emergency room (ER) datasets; data from the Ohio Pharmacy Board; the CDC's WISQARS database; The Automation of Reports and Consolidated Orders System (ARCOS) from the Drug Enforcement Administration; and the Substance Abuse and Mental Health Administration. A review of this data indicates that:

- Unintentional poisoning imposes a significant burden on Ohio's healthcare system.
- In 2007, unintentional drug poisoning became the leading cause of injury death in Ohio, surpassing motor vehicle crashes and suicide for the first time on record.
- Among the leading causes of injury death, unintentional poisonings demonstrated the most dramatic increases: from 1999 (369 deaths) to in 2008 (1568).
- From 1999 to 2008, Ohio's death rate due to unintentional drug poisonings increased by 350 percent, and much of this increase can be attributed to prescription drug overdoses.
- Of unintentional drug/medication poisonings, opioids used as pain relievers (such as methadone, oxycodone) have contributed significantly to the rise in unintentional poisonings and were involved in at least 37 percent of all drug poisonings in Ohio in 2008.
- On average, four people die each day in Ohio due to drug-related poisoning.
- Southern Ohio counties have been more significantly impacted than any other region of Ohio, with seven of its counties among the 10 with the highest rates of unintentional drug/medication-related poisoning deaths: (Montgomery, Brown, Scioto, Jackson, Clinton, Vinton, Ross).
- Males 45-55 years of age are particularly vulnerable to unintentional overdose, but rates for females are climbing more rapidly.
- There were more than 54,000 hospital discharges after treatment for poisoning from 2003-07. The number of annual poisoning discharges of Ohioans increased 30 percent from 2003 to 2007.
- More than 97 percent of poisoning hospitalizations involved drugs or medicants.
- After adjusting for inflation, mean costs for treating poisoned inpatients increased only 6 percent from 2003 to 2007.
- The average length of stay (LOS) for drug/medication poisoning cases decreased 6.1 percent from 2003 (2.79 days) to 2007 (2.63 days).

- Drug/medication-related discharge rates were highest for metropolitan county residents: 117.2 per hundred thousand for females, 94.4 for males. Appalachian rates were nearly as high, 108.5 for females, 78.0 for males, while suburban and rural rates were each about 70 per hundred thousand for females and about 52 for males.

- Among the high risk age groups 15-24, 25-34, 35-44, 45-54, rates for residents of Appalachian and metropolitan counties are at least 50 percent higher than among rural and suburban county residents.

- The five counties with the highest average annual rate of drug/medication related hospital discharges were: Guernsey (178.8 per 100,000), Montgomery (152.1), Jefferson (150.9), Ross (143.8) and Columbiana (136.0), all considerably higher than the state as a whole (90.5 per 100,000).

- Methadone-related poisonings, though relatively scarce compared to other substances, increased dramatically (394 percent) from 2003 (126) to 2007 (622).

- Average prescription fill rates for opioid medications such as hydrocodone and carisoprodol were five to 25 times higher among 2008 Ohio unintentional poisoning decedents, than among all Ohioans.

- Hydrocodone and oxycodone were the most frequently filled opioid prescriptions among unintentional poisoning decedents.

- Sixteen percent of the unintentional poisoning decedents in Ohio, who had at least one controlled substance prescribed within two-plus years of monitoring before death, had a history of doctor shopping. Similar to findings in other states, a greater proportion of females than males supplemented their prescription medications through doctor shopping.

- There was evidence of prescription opioid diversion among 2008 unintentional poisoning decedents. One-quarter of unintentional poisoning decedents who had a prescription opioid on their death certificate did not have evidence of a prescription for an opioid within the two-plus years of monitoring before death. As in other states, males between the ages of 15 and 24 were the group most likely to have obtained their opioid through diversion.

- Diversion rates for methadone appear higher than for other opioids. Less than 30 percent of unintentional poisoning decedents who had methadone on their death certificate filled a prescription for methadone within the two-plus years of monitoring before death. The high rate of diversion of methadone is particularly concerning, given that risk of poisoning is higher for methadone than other prescription opioids.

- In general, the prescription fill patterns among unintentional poisoning decedents with “other and unspecified” documented on their death certificate more closely match the prescription fill patterns of those with a prescription opioid documented on their death certificate than those with no prescription opioid recorded. This pattern provides some evidence that drug poisoning deaths due to prescription opioids may be underestimated, as some of these deaths may be misclassified as other/unspecified only.

The report is broken down into six sections:

- **Section 1:** Introduction and Overview of Poisoning in Ohio
- **Section 2:** Fatal Unintentional Drug/Medication-Related Poisoning
- **Section 3:** Poisoning-Related Hospital Discharges
- **Section 4:** Prescription History of Unintentional Poisoning Decedents
- **Section 5:** Prevention Resources for Poisonings
- **Section 6:** Appendices

SECTION 1:
INTRODUCTION AND OVERVIEW OF POISONING IN OHIO

INTRODUCTION

From 1999 to 2008, Ohio's unintentional poisoning death rate increased by more than 300 percent. Unintentional **drug/medication-related** poisoning deaths have been the largest driving force in the overall increase in unintentional injury death rates. After a brief overview of fatal poisonings associated with all intents, this report focuses largely on unintentional drug/medication poisoning in Ohio.

DEFINITIONS

INJURY

The National Safety Council defines injury as:

> *physical harm or damage to the body resulting from an exchange, usually acute, of mechanical, chemical, thermal, or other environmental energy that exceeds the body's tolerance.*[1]

Injuries can be further classified by the intent or purposefulness of occurrence into two categories, intentional and unintentional. Intentional injuries are purposely inflicted and often associated with violence. These include child and elder maltreatment, domestic violence, sexual assault, aggravated assault, legal intervention, homicide and suicide. Unintentional injuries include only those injuries that occur without intent of harm and are not purposely inflicted.

In this series of reports, we will examine the burden of unintentional injury as well as injury resulting from intentional acts such as suicide attempts/completions and assault/homicide. The term "unintentional injury" will be used to describe what may commonly be referred to as an "accident." The term "accident" implies a random act; however, we know most injuries are predictable and preventable. Like diseases, they follow recognizable patterns that can be studied and used to inform prevention strategies such as policy and behavior change.

POISONS AND POISONING

A **poison** is anything that can harm someone if it is:[2]

(1) used in the wrong way,

(2) used by the wrong person, or

(3) used in the wrong amount.

Poisons may be ingested (eaten), inhaled (breathed), injected or absorbed through the skin. Any substance can be poisonous in the right dose.

In this report, poisons do not include adverse reactions to medications taken correctly.

POISONING INTENT

Poisonings are the result of exposure to poisons. They may be either intentional or unintentional. Poisonings occur when the exchange of chemical energy to the tissues of the body exceeds the body's tolerance, e.g. from drugs.

Unintentional poisoning occurs if the person ingesting/absorbing or giving the substance did not mean to cause harm. This includes exposure to gases/chemicals as well as the use of drugs or chemicals for recreational purposes in excessive amounts, such as an "overdose." It also includes the excessive use of drugs or chemicals for non-recreational purposes, such as by a toddler.

Intentional poisoning is the result of a person taking or giving a substance with the intention of causing harm. Suicide and assault by poisoning fall into this category.

When the distinction between intentional and unintentional is unclear, poisonings are usually labeled "undetermined" in intent.

POISON CONTROL CENTERS

There are 61 **poison control centers** in the United States. These centers provide free, 24-hour poison expertise and treatment advice by phone. Poison centers are staffed by pharmacists, physicians, nurses and poison information providers who are toxicology specialists. Three poison control centers are located in Ohio (Cleveland, Columbus, Cincinnati).

The **National Poison Data System (NPDS)** is a uniform data set of U.S. poison center cases. It is the only comprehensive poisoning surveillance database in the U.S. NPDS contains detailed toxicological information on more than 50 million poison exposures reported to poison centers in the U.S.

METHODS

DATA SOURCES

National

- Centers for Disease Control (CDC)
  - Web-based Injury Statistics Query and Reporting (WISQARS)
  - Wide-ranging Online Data for Epidemiologic Research (WONDER)
- Substance Abuse and Mental Health Services Administration (SAMHSA)
- Drug Enforcement Administration (DEA) Automation of Reports and Consolidated Orders System (ARCOS)
- Children's Safety Network: National resource center for injury and violence prevention.

State

- Ohio Department of Vital Statistics
- Ohio Poison Control Centers (Cleveland, Columbus, Cincinnati)
- Ohio Automated Rx Reporting System (OAR_XRS) database, Ohio State Board of Pharmacy

Private

- Ohio Hospital Association (OHA): Inpatient discharge data (HID) and Emergency Room Dataset (ER)

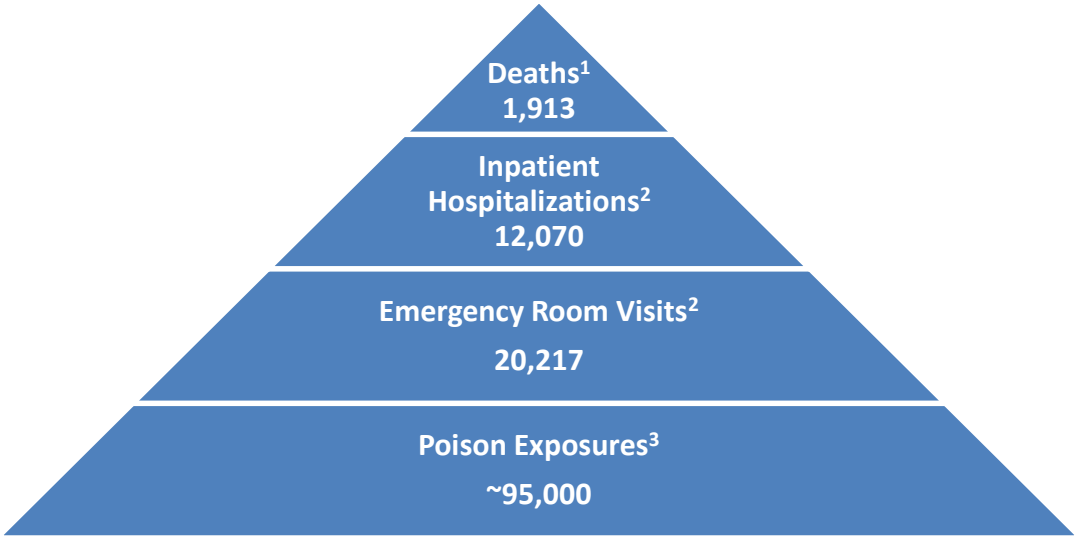
LIMITATIONS

- The injury mortality data for 1999 and later is coded based on the ICD-10 classification system, as opposed to ICD-9 coding used prior to 1999. Because of the different coding systems, we must use caution when doing trend analysis across these years.
- The availability of data after 2006 varies across data sources. While most state-level data is available through 2008, at the time of publication some national databases did not have data available after 2006.
- It is likely that the burden of specific types of drugs (e.g., opioids, benzodiazepines) is underestimated due to the high proportion (32 percent) of drug/medication-related poisoning deaths attributed only to "other/unspecified drugs". A review of a random sample of the "other/unspecified drugs" death certificates revealed that most of these documents cited 'multiple drug use' or the equivalent, without identifying the specific substances that contributed to death.
- Considerable disparity exists in county coroner resources for performing autopsy/toxicology testing on decedents. Resources may be especially scarce in rural areas of the State. For this reason, the fatal drug/medication-related poisoning data (Section 2.) presented likely underestimate the true burden of drug overdose in Ohio as some overdoses may be undetected or undocumented.

Overview of Poisoning in Ohio

The Ohio Poison Control Centers estimate that in 2008 there were approximately 95,000 reports of poison exposure in Ohio. That same year there were 1,913 poisoning deaths among Ohioans, when all intents are included. There were more than 12,000 inpatient hospitalizations and more than 20,000 emergency room visits in Ohio for poisonings in 2007. (*Figure 1.1*)

Figure 1.1 Poisoning (all intents) in Ohio 2008 (2007 for hospitalizations and ER Visits)[1,2,3]

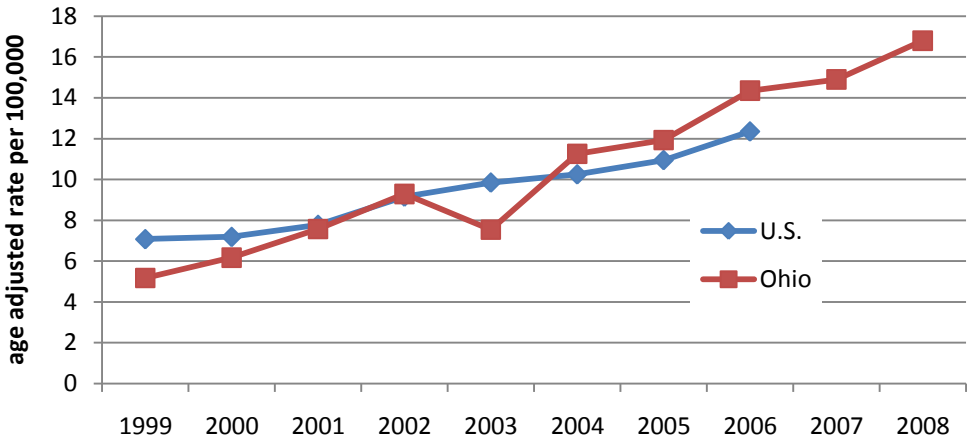


Sources: [1]Ohio Department of Vital Statistics 2008 data [2] Ohio Hospital Association (2007)
[3] Ohio Poison Control Centers (Cleveland, Columbus, Cincinnati) 2008 data

Overview of Fatal Poisonings in Ohio

Though the poisoning death rates in Ohio and the nation at large were both steadily increasing from 1999 to 2006, Ohio's rate increased faster than the national rate. Ohio experienced a slight decrease from 2002 to 2003, followed by a dramatic increase from 2003 to 2006 during which the poisoning death rate nearly doubled. The national poisoning death rate increased 74 percent from 1996 to 2006, while Ohio's rate increased 178 percent and continued to rise through 2008. *(Figure 1.2)*

Figure 1.2. Age adjusted poisoning (all intents) death rates per 100,000 by year, United States and Ohio, 1999-2008[1,2]

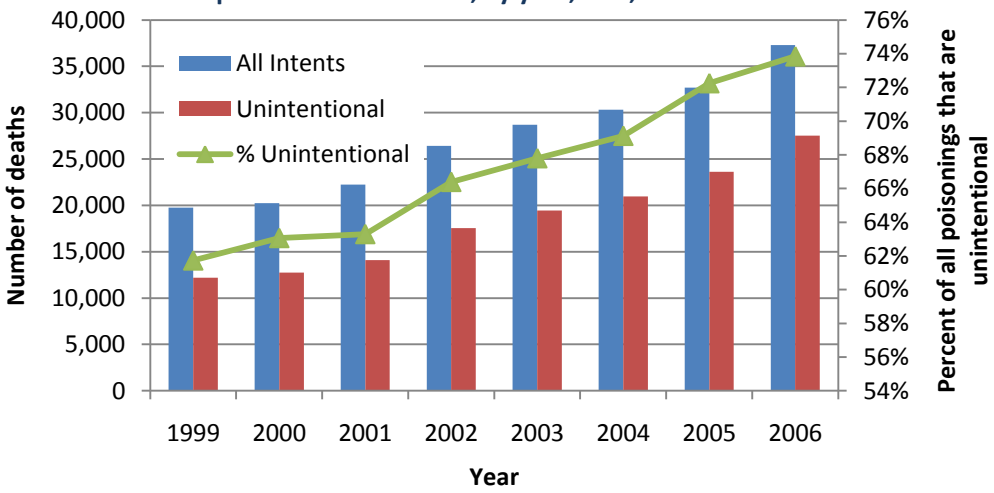


Source: [1]CDC WISQARS Fatal Injury Reports http://webappa.cdc.gov/sasweb/ncipc/mortrate.html accessed 07/17/09. [2]Ohio Department of Vital Statistics- 2007-2008 Ohio data

OVERVIEW OF UNINTENTIONAL FATAL POISONINGS IN OHIO

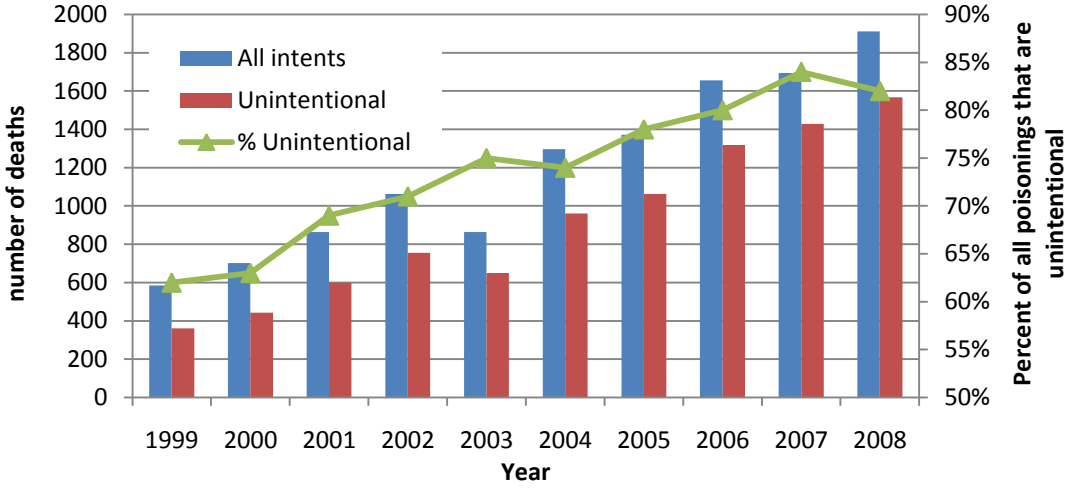
The percentage of all poisoning deaths in the U.S. that were attributed to unintentional or "accidental" intent increased from 62 percent in 1999 to 74 percent in 2006 (*Figure 1.3*). In Ohio, the percentage of the poisoning deaths that were of unintentional manner increased from 62 percent in 1999 to a high of 84 percent in 2007 (*Figure 1.4*). These increases in the number of unintentional poisoning deaths were largely driven by increases in drug overdoses. A large portion of this report will focus on these fatal drug overdose cases.

Figure 1.3. Number of poisoning deaths, all and unintentional, and percent unintentional, by year, U.S., 1999-2006[1]



[1]Source: CDC WISQARS Fatal Injury Reports http://webappa.cdc.gov/sasweb/ncipc/mortrate.html accessed 07/17/09.

Figure 1.4. Number of poisoning deaths, all and unintentional, and percent unintentional, by year, Ohio, 1999-2008[1,2]

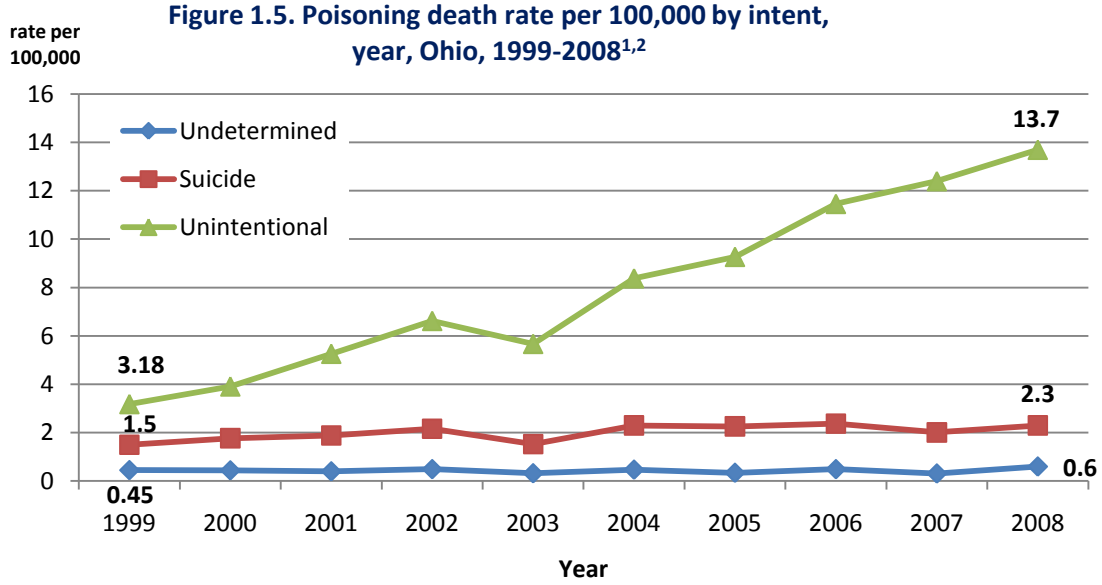


Source: [1]CDC WISQARS Fatal Injury Reports http://webappa.cdc.gov/sasweb/ncipc/mortrate.html accessed 07/17/09. [2]Ohio Department of Vital Stats 2006-2008 data.

RAPIDLY INCREASING TREND

While poisoning death rates associated with suicide or of unknown intent have remained relatively stable in Ohio, unintentional poisoning rates have increased from 3 per 100,000 in 1999 to almost 14 per 100,000 in 2008 (*Figure 1.5*).

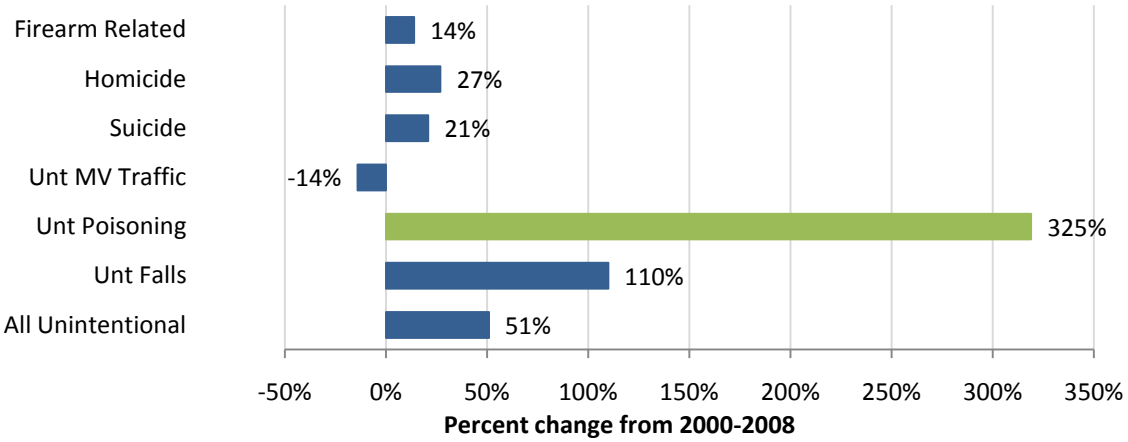
Figure 1.5. Poisoning death rate per 100,000 by intent, year, Ohio, 1999-2008[1,2]



Source: [1]CDC WISQARS [2]Ohio Department of Vital Statistics Ohio 2007-2008

Among the leading causes of injury death, unintentional poisonings increased from the cause of the fewest number of annual deaths in 1999 (369 deaths) to the greatest in 2008 (1,568) (*data not shown*). Unintentional drug/medication-related poisonings increased from 327 annual deaths in 1999 to 1,473 in 2008. These poisoning deaths represent an increase of 350 percent and far surpass any increase in other leading causes of injury from 1999 to 2008 (Figure 1.6).

Figure 1.6 . Percent change in death rate per 100,000 for leading causes of injury, Ohio 1999-2008[1,2]



[1]Source: Ohio Department of Health, Office of Vital Statistics;
[2]Unintentional Poisoning includes non-drug (5.3 percent) and drug-related (94.7 percent)

COST TO OHIOANS

In addition to the tragic loss of human life, poisonings are associated with high direct and indirect costs. From 2004-07, unintentional fatal poisonings were estimated to cost Ohioans an average of $3.6 billion per year. Non-fatal, hospital-admitted poisonings cost an additional $35.5 million. These costs include medical, work loss and diminished quality-of-life (*Table 1.1*).

Table 1.1 Average annual costs of unintentional poisonings in Ohio[1]

Type of Costs	Fatal Costs[2]	Non-fatal, hospital admitted costs[3]
Medical	$5,160,120	$21,189,500
Work loss	$1,260,480,808	$5,856,300
Quality of Life loss	$2,333,600,989	$8,459,500
Total	**$3,599,241,917**	**$35,505,300**

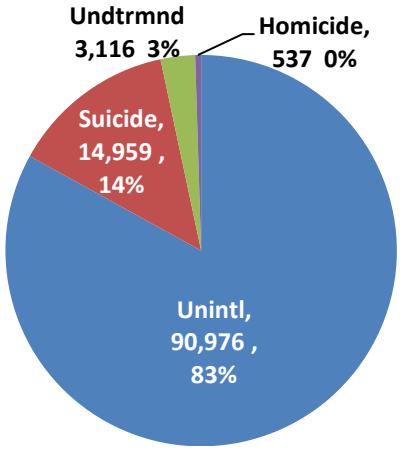
[1]Source: Children's Safety Network Economics & Data Analysis Resource Center, at Pacific Institute for Research and Evaluation, 2005; [2]Year 2004 Dollars, Based on 2004-2007 average Ohio incidence
[3]Year 2005 Dollars, Based on Year 2003 Ohio incidence

YEARS OF POTENTIAL LIFE LOST (YPLL) DUE TO POISONINGS

Years of potential life lost (YPLL) is an estimate of the average number of years a person would have lived if he or she had not died prematurely from a given cause. Overall in Ohio, there were 109,588 total YPLL due to poisoning of all intents from 2005-07: *(Figure 1.7)*

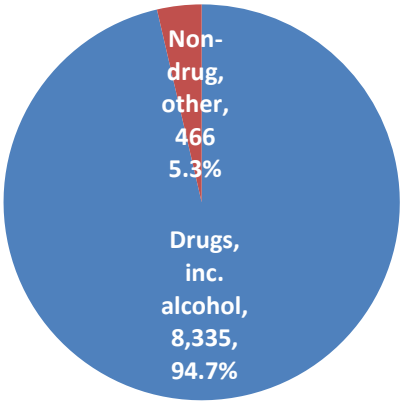
- 90,976 YPLL due to **unintentional poisoning** *(22.2 percent of all injury death YPLL)*
- 14,959 YPLL due to **suicide** by poisoning *(3.6 percent of all injury death YPLL)*
- 3,116 YPLL due to poisonings of **undetermined intent** *(0.8 percent of all injury deathYPLL)*
- 537 YPLL due to **homicide** by poisoning *(0.1 percent of all injury death YPLL)*

Figure 1.7. YPPL in Ohio due to poisoning, by intent, 2005-07[1]



[1]Source: CDC WISQARS http://webappa.cdc.gov/sasweb/ncipc/ypll10.html, accessed 10/12/10

Figure 1.8. Proportion of unintentional poisoning deaths due to drugs/medications, Ohio, 2000-08[1]



[1]Source: ODH Office of Vital Statistics

OVERVIEW OF UNINTENTIONAL POISONINGS FROM DRUGS AND MEDICATION

The bulk of injuries and deaths from unintentional poisoning in the U.S. are attributable to prescription medication or illicit drugs.

- Between 2000 and 2008, 95 percent of poisoning deaths in Ohio were due to drugs/medications. *(Figure 1.8 above).*
- Since the early 1990s in the U.S., unintentional prescription medication-related (opioids and other) deaths have exceeded deaths associated with cocaine or heroin, which increased 12.4 percent and 22.8 percent respectively from 1999 to 2002.[3]
- In 2002, the number of deaths from prescription opioids alone surpassed those from either heroin or cocaine.
- Prescription opioids were involved in more unintentional overdoses (37 percent) in Ohio in 2008 than heroin, cocaine, hallucinogens and barbiturates combined (34 percent) in Ohio. *(Figure 2.11)*

Due to the alarming rise in unintentional prescription drug poisoning deaths, the majority of Section 2. is devoted to this issue.

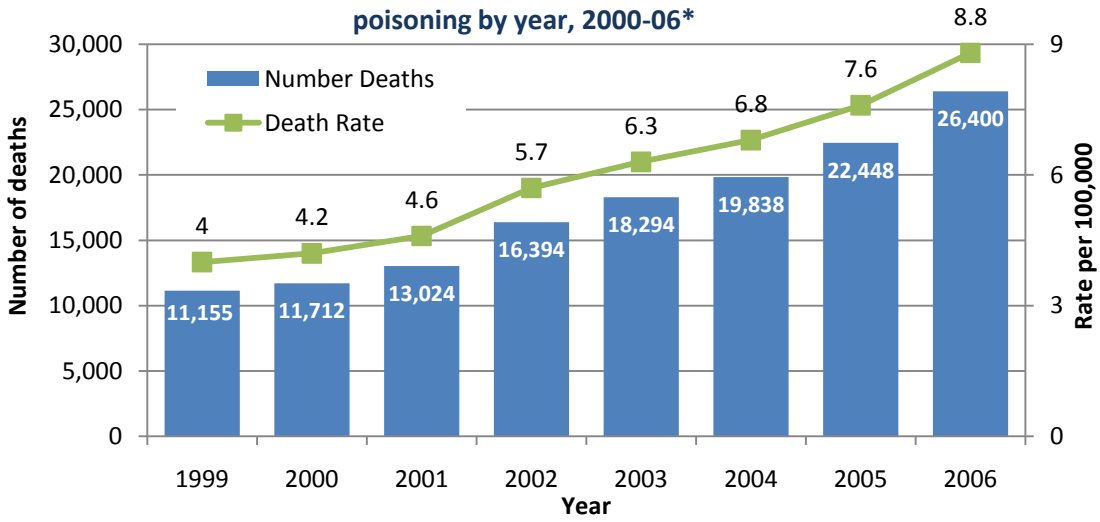
SECTION 2:
FATAL UNINTENTIONAL DRUG/MEDICATION-RELATED POISONING

INTRODUCTION AND RECENT TRENDS IN OHIO AND THE UNITED STATES

From 2000 to 2006, the number of deaths due to unintentional drug/medication poisoning in the U.S. more than doubled from 11,712, or an average of 32 deaths per day in 2000, to 26,400, or an average of 72 deaths per day in 2006 (*Figure 2.1).*

The number of U.S. deaths due to unintentional drug overdoses in 2006 exceeds that of one large jet crash *every day for 2 months*, each killing 350 people.

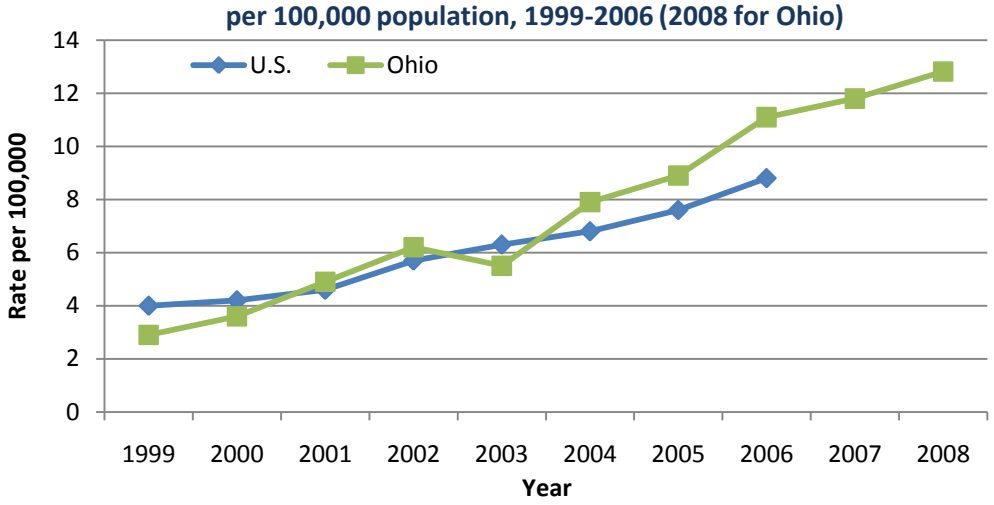
Figure 2.1. US deaths and death rates due to unintentional drug poisoning by year, 2000-06*



Sources: **1**. "WONDER (NCHS Compressed Mortality File, 1979-1998 & 1999-2005. **2**. 2006-2008 ODH Office of Vital Statistics, **3**. Change from ICD-9 to ICD-10 coding in 1999 (caution in comparing before and after 1998 and 1999.)

Ohio's death rate is growing faster than the national rate. In 1999, Ohio's unintentional drug poisoning death rate was 2.9 per 100,000 compared to the national rate of 4.0 per 100,000 *(Figure 2.2).* By 2006, Ohio's unintentional drug poisoning death rate had risen to higher than 11.1 per 100,000 compared to the national rate of 8.8 per 100,000. In 2008, Ohio's death rate rose to almost 13 per 100,000. On average, from 2006 to 2008, nearly four people (3.7) died each day in Ohio due to unintentional, drug-related poisoning.

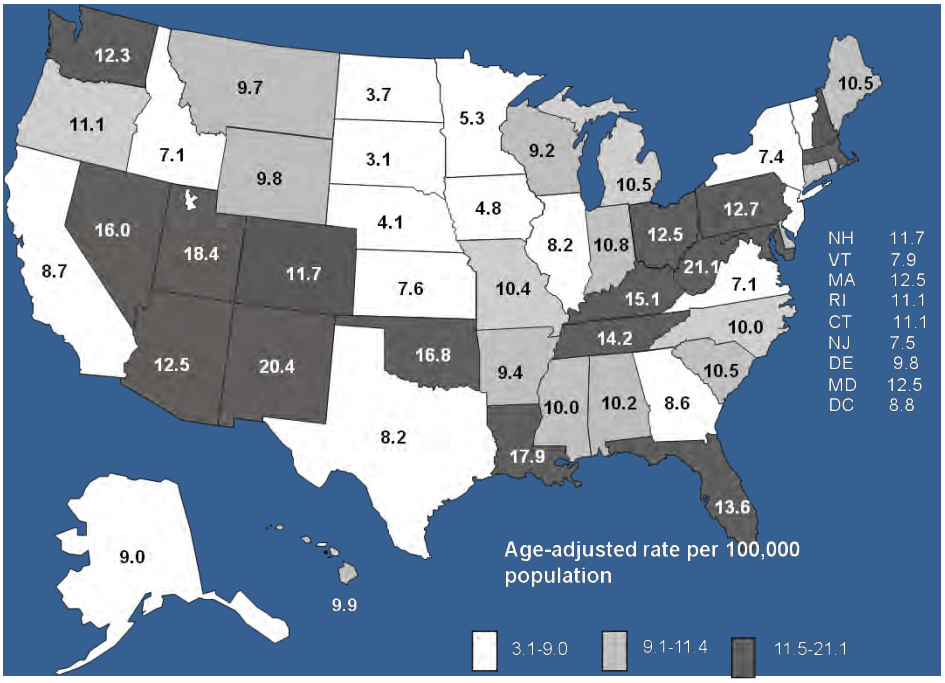
Figure 2.2 Ohio[1] and U.S.[2] unintentional drug poisoning death rates per 100,000 population, 1999-2006 (2008 for Ohio)



[1]*Source: ODH Office of Vital Statistics;* [2]*Source: CDC WONDER*

In 2007, Ohio's unintentional/undetermined poison death rate ranked 12th highest in the nation. The ratio of Ohio's death rate to the national average was 1.29. As demonstrated by Figure 2.3, there are clusters of high drug poisoning death rates in Appalachia and the southwestern states.

Figure 2.3 Unintentional and Undetermined Intent Drug Poisoning Death Rates by State, 2007[1]

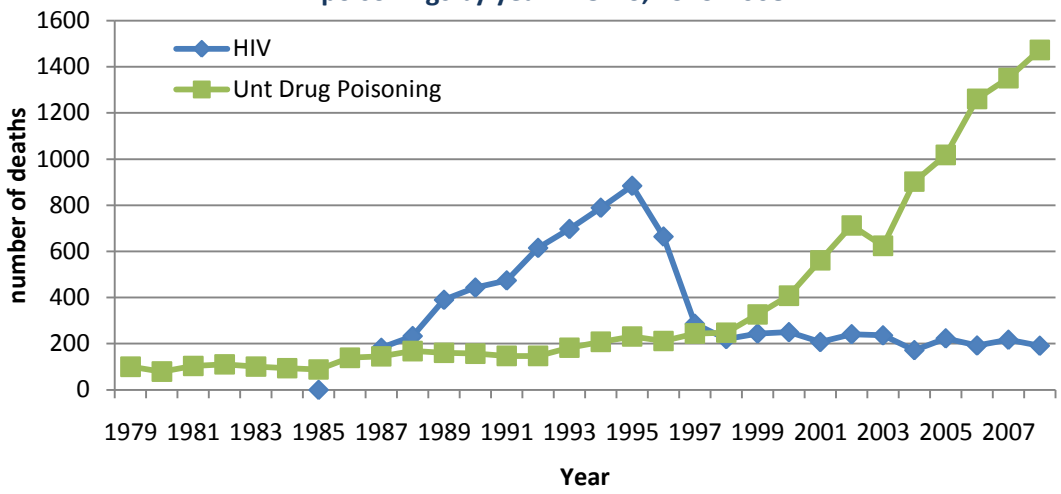


[1]Source: CDC WONDER underlying cause mortality files, age-adjusted rates. Deaths whose underlying cause was coded to unintentional (X40-44) or undetermined intent (Y10-14) drug poisoning. Latest national data available as of 5/09 *(used with permission from Len Paulozzi, MD, MPH, NCIPC, CDC).*

AN EPIDEMIC IN OHIO

By 2005, the number of unintentional drug poisoning deaths exceeded the number of deaths from the HIV/AIDS epidemic at its peak in the mid-90's in Ohio (*Please note, this is not true of national numbers).* The relative tolls in mortality from these two public health crises clearly demonstrates the justification for labeling unintentional drug poisoning deaths as an epidemic as well (*Figure 2.3*).

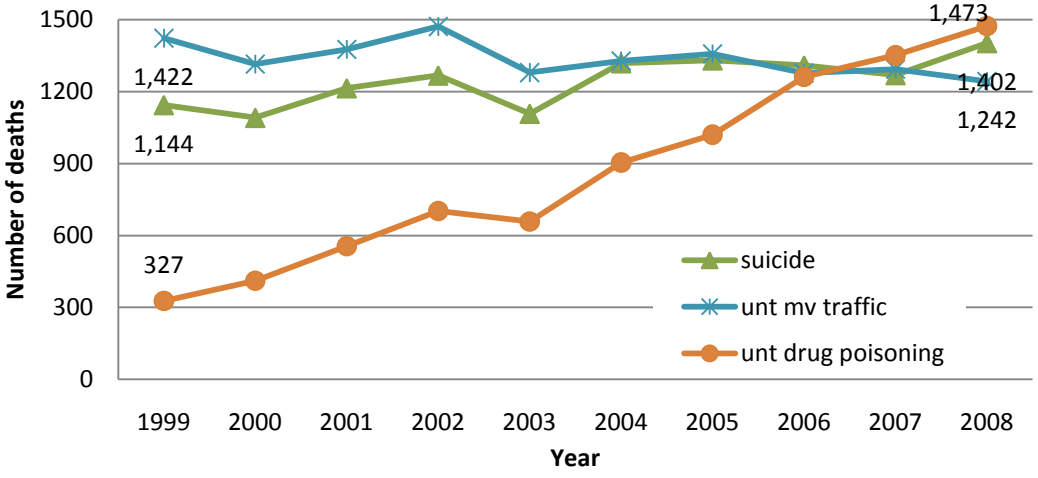
Figure 2.3. Number of deaths due to HIV/AIDS and unintentional drug poisonings by year in Ohio, 1979-2008 [1,2,3]



Source: [1]WONDER (NCHS Compressed Mortality File, 1979-1998 & 1999-2005) [2]2006-8 ODH Office of Vital Statistics, [3]Change from ICD-9 to ICD-10 coding in 1999 (caution in comparing before and after 1998 and 1999)

In 2007, unintentional drug poisoning became the leading cause of injury death in Ohio, surpassing motor vehicle crashes and suicide for the first time on record. This trend continued in 2008. *(Figure 2.4)*

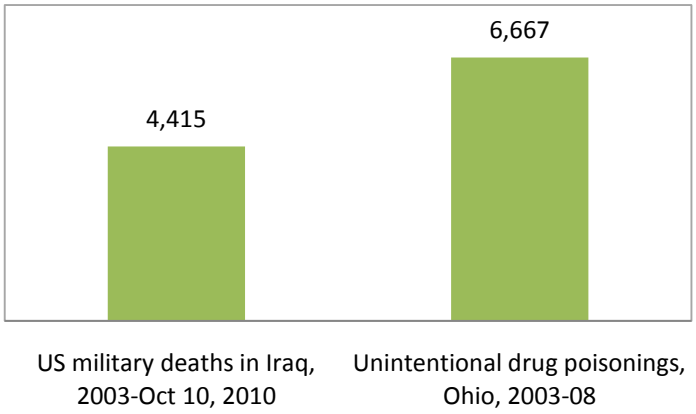
Figure 2.4. Number of deaths from MV traffic, suicide and unintentional *drug poisonings* by year, Ohio 1999-2008*



[1]*Source: Ohio Department of Health, Office of Vital Statistics*

The number of unintentional drug poisoning deaths in Ohio between 2003 and 2008 is more than 50 percent higher than the number of US military deaths in Iraq since 2003. (*Figure 2.5*)

Figure 2.5. US military deaths in Iraq (2003-October 2010)[1] vs. unintentional drug poisoning deaths in Ohio (2003-2008)[2]

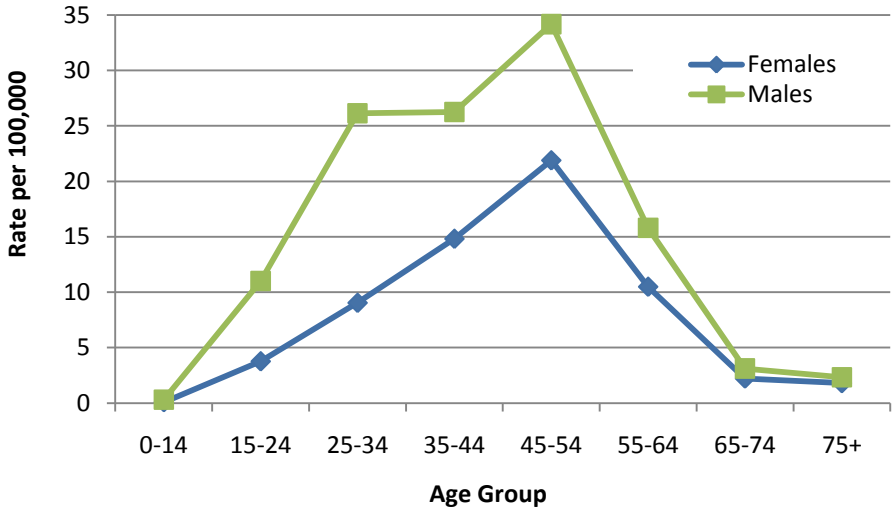


Sources: [1]http://www.cnn.com/SPECIALS/2003/iraq/forces/casualties, accessed 10/10/10; [2] ODH Office of Vital Statistics

POPULATIONS AT RISK

Death rates from unintentional drug/medication-related poisoning are highest for Ohioans ages 45-54, with rates for males 1.5 times greater than the rates for females *(Figure 2.6).* White males have the highest death rates from unintentional opioid poisoning; however, females represent the fastest growing group at risk *(data not shown).*

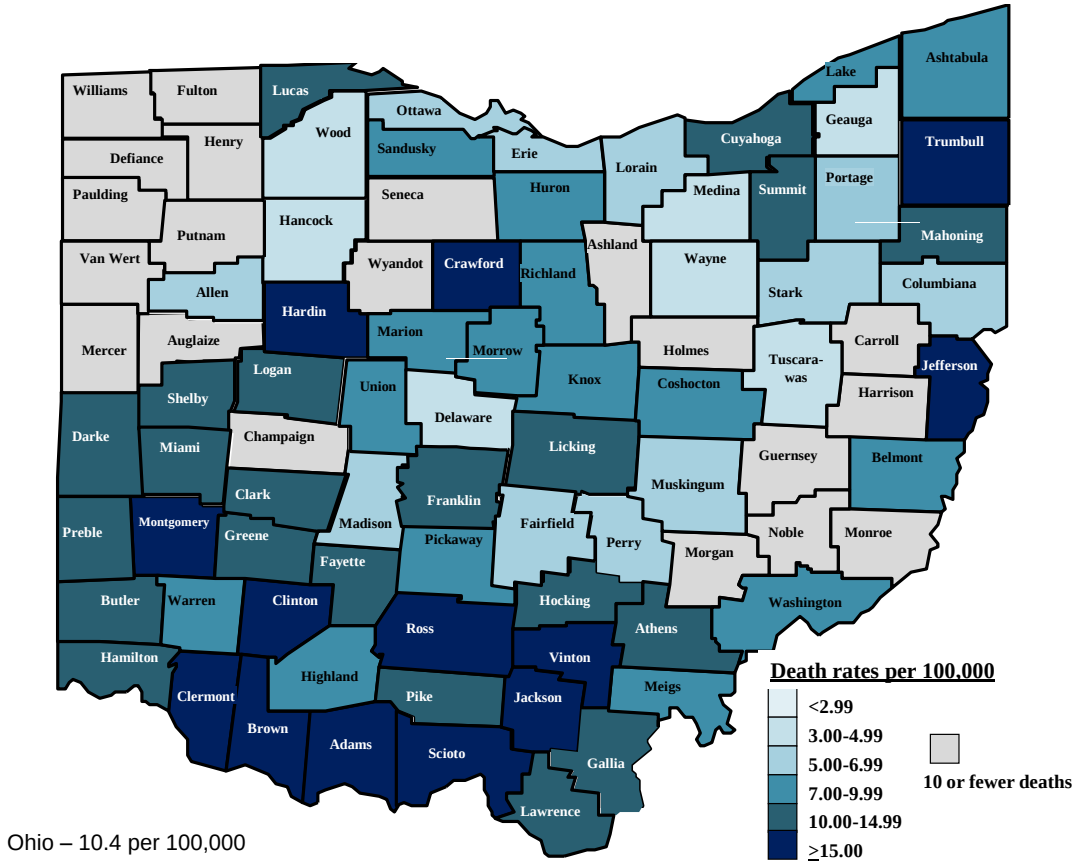
Figure 2.6. Average annual unintentional drug/medication poisoning rate[1] by sex, age group, Ohio 2006-2008



Source: ODH Office of Vital Statistics

Between 2006 and 2008, the highest average annual death rates due to unintentional drug/medication poisoning occurred primarily in the southern region of Ohio (*Figure 2.7*). Of the counties with the top ten death rates between 2006 and 2008, seven are located in this area.

Figure 2.7. Unintentional Drug/Medication Poisoning Death Rates per 100,000 by County, 2004-08[1]



[1]*Source: ODH, Office of Vital Statistics*[2] *Does not include out-of-state deaths of Ohio residents*

Number of unintentional drug/medication deaths[1] & average annual rate (2004-08), by year, county, Ohio, 2004-08[1,2]								
County	2004	2005	2006	2007	2008	Total	Avg annl rate from 2004-08	Ratio of County to State Rate
MONTGOMERY	127	116	125	130	145	**643**	**23.8**	2.3
VINTON	2	4	3	4	2	**15**	**22.6**	2.2
JACKSON	4	4	14	7	8	**37**	**22.3**	2.1
SCIOTO	14	17	15	19	17	**82**	**21.5**	2.1
CRAWFORD	4	10	9	12	9	**44**	**19.8**	1.9
ROSS	7	14	11	19	20	**71**	**18.8**	1.8
BROWN	8	5	5	10	12	**40**	**18.3**	1.8
TRUMBULL	38	29	30	58	40	**195**	**18.2**	1.7
CLINTON	12	4	6	8	8	**38**	**17.9**	1.7
HARDIN	4	2	10	6	6	**28**	**17.6**	1.7
ADAMS	1	6	6	5	6	**24**	**17.0**	1.6
JEFFERSON	9	12	12	9	14	**56**	**16.1**	1.6
CLERMONT	25	22	31	36	38	**152**	**15.8**	1.5
HOCKING	2	1	1	9	8	**21**	**14.5**	1.4
CLARK	25	15	18	20	19	**97**	**13.8**	1.3
FAYETTE	4	3	5	5	2	**19**	**13.5**	1.3
GREENE	16	19	21	16	31	**103**	**13.1**	1.3
ATHENS	3	7	9	13	8	**40**	**12.7**	1.2
PREBLE	1	4	3	7	11	**26**	**12.5**	1.2
FRANKLIN	72	102	154	187	178	**693**	**12.5**	1.2
GALLIA	3	4	6	2	4	**19**	**12.3**	1.2
LUCAS	21	49	44	75	70	**259**	**11.7**	1.1
MIAMI	8	11	8	10	21	**58**	**11.5**	1.1
SHELBY	4	2	3	7	12	**28**	**11.5**	1.1
PIKE	0	3	2	6	5	**16**	**11.5**	1.1
MAHONING	16	29	25	25	41	**136**	**11.2**	1.1
LAWRENCE	7	5	7	8	8	**35**	**11.2**	1.1
BUTLER	21	31	47	45	51	**195**	**11.0**	1.1
HAMILTON	72	86	98	96	111	**463**	**10.9**	1.0
LOGAN	5	3	6	6	5	**25**	**10.8**	1.0
Ohio	**904**	**1,020**	**1,261**	**1,351**	**1,438**	**5,974**	**10.4**	**1.0**
DARKE	6	4	1	7	9	**27**	**10.3**	**1.0**
CUYAHOGA	114	115	168	134	143	**674**	**10.3**	**1.0**
SUMMIT	60	50	53	66	46	**275**	**10.1**	**1.0**
LICKING	13	10	13	15	27	**78**	**10.0**	**1.0**
SANDUSKY	5	1	7	8	9	**30**	**9.8**	**0.9**
WARREN	11	21	17	17	32	**98**	**9.8**	**0.9**
MARION	5	7	3	8	9	**32**	**9.7**	**0.9**

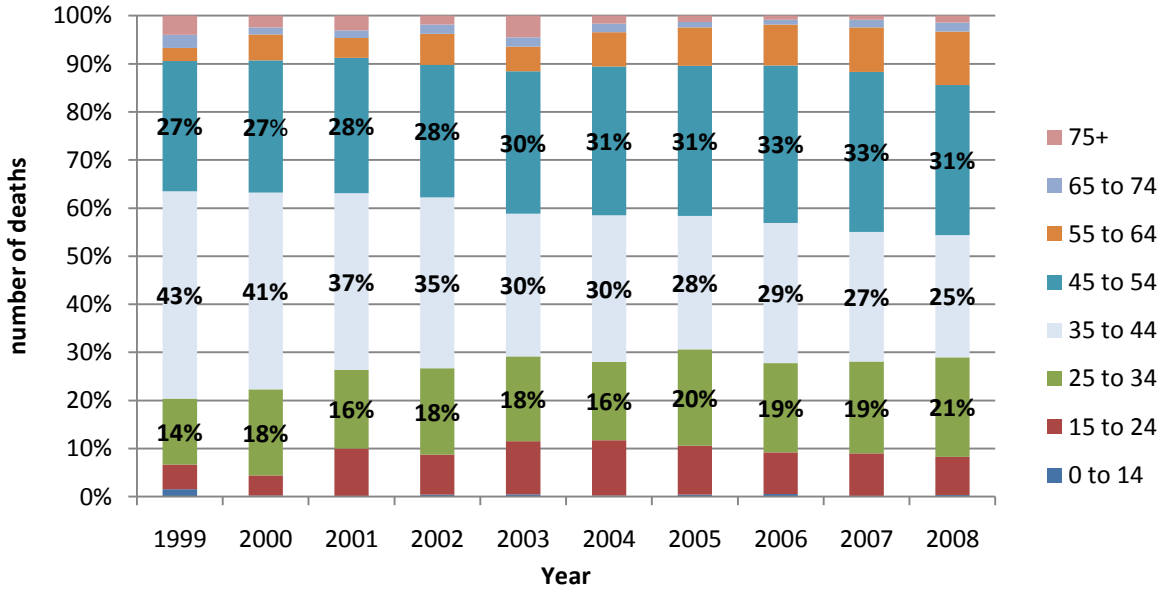
County	2004	2005	2006	2007	2008	Total	Avg annl rate from 2004-08	Ratio of County:State Rate
RICHLAND	8	13	16	10	13	60	9.5	0.9
HIGHLAND	2	6	4	4	4	20	9.4	0.9
MEIGS	0	2	5	3	0	10	8.7	0.8
LAKE	13	18	29	26	14	100	8.6	0.8
COSHOCTON	2	5	2	2	4	15	8.2	0.8
UNION	3	4	5	1	6	19	8.2	0.8
BELMONT	7	6	5	3	6	27	7.9	0.8
KNOX	4	3	4	5	7	23	7.9	0.8
WASHINGTON	1	5	9	4	5	24	7.8	0.7
MORROW	1	3	5	2	2	13	7.6	0.7
PICKAWAY	3	3	5	5	4	20	7.5	0.7
HURON	1	5	5	6	5	22	7.4	0.7
ASHTABULA	8	6	5	7	10	36	7.1	0.7
VAN WERT	0	1	4	1	4	10	6.9	0.7
PERRY	2	2	2	4	2	12	6.9	0.7
FAIRFIELD	12	8	7	13	7	47	6.8	0.7
STARK	15	16	25	25	30	111	5.9	0.6
MADISON	0	1	2	5	4	12	5.8	0.6
ALLEN	5	4	6	6	9	30	5.7	0.5
OTTAWA	0	2	2	5	2	11	5.4	0.5
PORTAGE	9	7	12	8	5	41	5.3	0.5
DEFIANCE	1	2	1	5	1	10	5.2	0.5
ERIE	2	3	4	5	6	20	5.2	0.5
MUSKINGUM	6	1	6	4	5	22	5.2	0.5
CHAMPAIGN	2	0	4	1	3	10	5.1	0.5
LORAIN	12	13	18	16	17	76	5.1	0.5
COLUMBIANA	4	1	7	7	8	27	5.0	0.5
DELAWARE	3	5	7	13	10	38	4.8	0.5
WOOD	3	4	10	5	8	30	4.8	0.5
WAYNE	3	6	7	0	11	27	4.8	0.5
MEDINA	3	8	7	8	9	35	4.2	0.4
ASHLAND	2	3	4	1	1	11	4.1	0.4
GEAUGA	3	3	5	2	5	18	3.8	0.4
HANCOCK	4	3	1	2	3	13	3.5	0.3
SENECA	1	3	3	2	1	10	3.5	0.3
TUSCARAWAS	0	3	8	1	3	15	3.3	0.3
CARROLL	1	2	2	1	3	9	*	N/A
GUERNSEY	2	2	0	3	2	9	*	N/A
MERCER	1	1	2	3	1	8	*	N/A
AUGLAIZE	0	2	1	2	3	8	*	N/A
PAULDING	0	2	1	0	3	6	*	N/A
HENRY	2	3	1	0	0	6	*	N/A

County	2004	2005	2006	2007	2008	Total	Avg annl rate from 2004-08	Ratio of County:State Rate
NOBLE	0	0	1	2	2	**5**	*	**N/A**
WILLIAMS	0	1	1	1	2	**5**	*	**N/A**
FULTON	1	1	1	2	0	**5**	*	**N/A**
PUTNAM	0	0	1	1	2	**4**	*	**N/A**
MORGAN	0	1	1	1	0	**3**	*	**N/A**
HARRISON	2	0	0	1	0	**3**	*	**N/A**
WYANDOT	0	0	1	1	1	**3**	*	**N/A**
HOLMES	1	0	0	1	0	**2**	*	**N/A**
MONROE	0	0	1	0	0	**1**	*	**N/A**
[1]does not include out-of-state deaths of Ohio residents								
[2]Sources: Ohio Dept. of Health, Office of Vital Statistics; US Census Bureau (population estimates)								
*rate suppressed due to small number of deaths; rates would be unreliable								

CHANGES OVER TIME

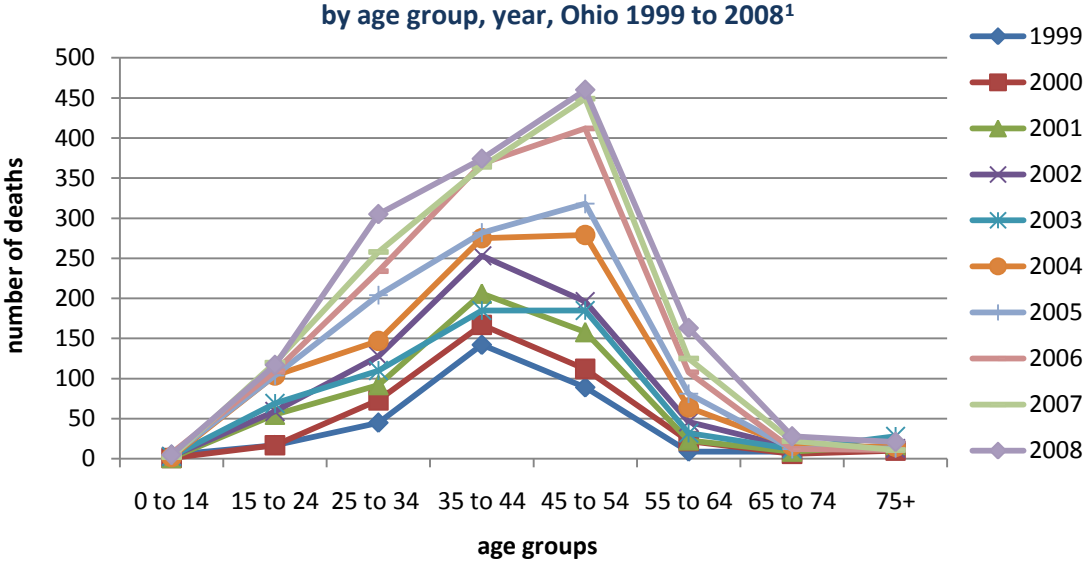
From 1999 to 2002, the greatest proportion of unintentional drug overdose decedents were between ages 35-44. After 2002, those ages 45-54 contributed the greatest proportion, likely due to a cohort effect *(Figures 2.8-2.9).* Also noteworthy is the increase in the proportion of unintentional drug overdoses among those aged 25-34 from 14 percent in 1999 to 21 percent in 2008.

Figure 2.8. Proportional distribution of unintentional drug poisoning deaths by age group, year, Ohio 1999 to 2008[1]



[1]Source: ODH Office of Vital Statistics

Figure 2.9. Number of unintentional drug poisoning deaths by age group, year, Ohio 1999 to 2008[1]



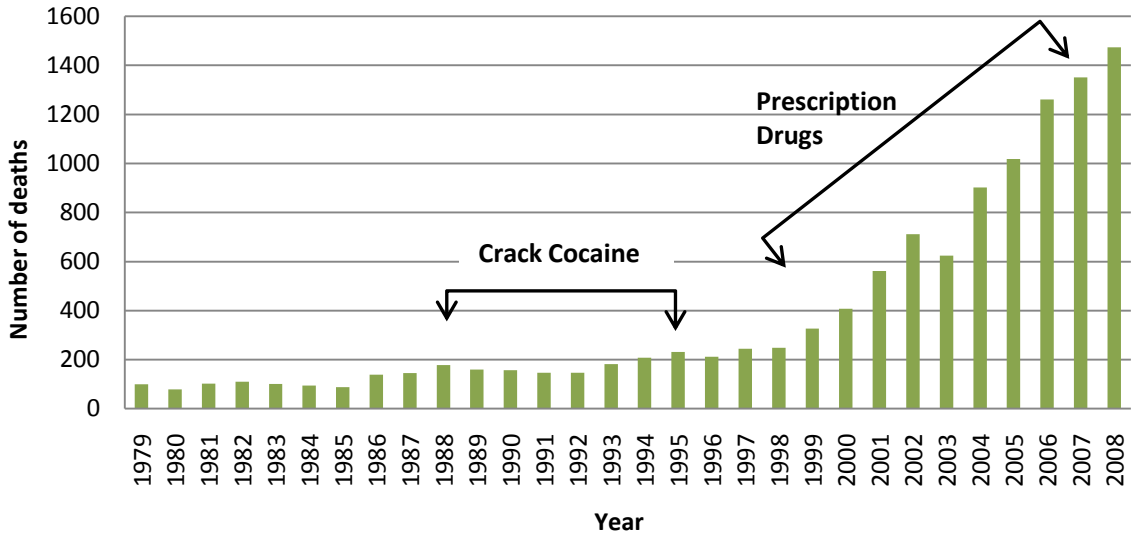
[1]Source: ODH Office of Vital Statistics

ROLE OF PRESCRIPTION PAIN MEDICATIONS

Compared to previous drug overdose epidemics, prescription drugs are responsible for considerably more deaths than illicit drugs.

Mortality rates are currently four to five times higher than the rates during the 'black tar' heroin epidemic in the mid-1970s and more than three times what they were during the peak years of crack cocaine in the early 1990s *(Figure 2.10).*

Figure 2.10. Epidemics of unintentional drug overdoses in Ohio, 1979-2008



Sources:
1 WONDER (NCHS Compressed Mortality File, 1979-1998 & 1999-2005)
2 2006-2008 ODH Office of Vital Statistics,
3 Change from ICD-9 to ICD-10 coding in 1999 (use caution in comparing before and after 1998 and 1999)

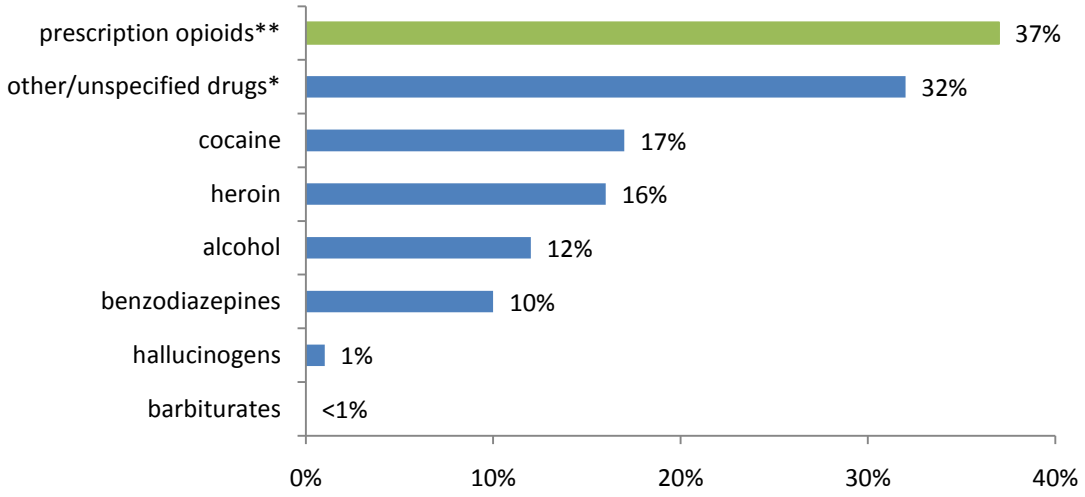
Prescription opioids are largely responsible for this alarming increase in drug poisoning death rates.[3,4,5] They were involved in more than one in three (37 percent)* of all unintentional drug poisoning deaths in Ohio in 2008 (*Figure 2.11*). In 2008, prescription opioids were involved in more unintentional overdoses than heroin, cocaine, barbiturates and hallucinogens combined (34 percent).

Nationally, the opioids most associated with overdose are methadone, oxycodone (e.g., OxyContin®), hydrocodone (e.g., Vicodin®) and fentanyl. Other opioids such as, morphine, meperidine (Demerol®) and hydromorphone (Dilaudid®) also play a role.[4]

Opioids with a long half life (e.g., methadone stays in the body 8 to 60 hours but only relieves pain for 4 to 8 hours) and/or a controlled-release mechanism (e.g., OxyContin®, Opana ER®, Duragesic®, i.e., fentanyl transdermal) have been especially associated with fatal overdoses.[6,7,8]

**See Limitations, page 12 related to toxicology testing and availability of drug category-level data from county coroners.*

Figure 2.11. Proportion of all unintentional drug poisoning deaths with selected drug mentions, 2008[1]



***Prescription opioids include other opioids, methadone, other synthetic narcotics, and other/unspecified narcotics*
**includes only cases where no other drug/medication than other/unspecified is listed as contributing cause of death*
[1]*Source: ODH Office of Vital Statistics*

Role of Other Drugs and Risk Factors

Ten percent of the unintentional drug poisoning deaths in 2008 in Ohio involved benzodiazepines (sedative/anti-anxiety) and 12 percent involved alcohol. Only 1 percent involved hallucinogens and less than 1 percent involved barbiturates. *(See Figure 2.11*) About the same proportion of drug poisoning deaths involved cocaine (17 percent), (including crack cocaine), and heroin (16 percent) in 2008. Anti-depressants, cardiovascular drugs, antihistamines, muscle relaxants and anticonvulsants have also been involved in fatal overdoses.

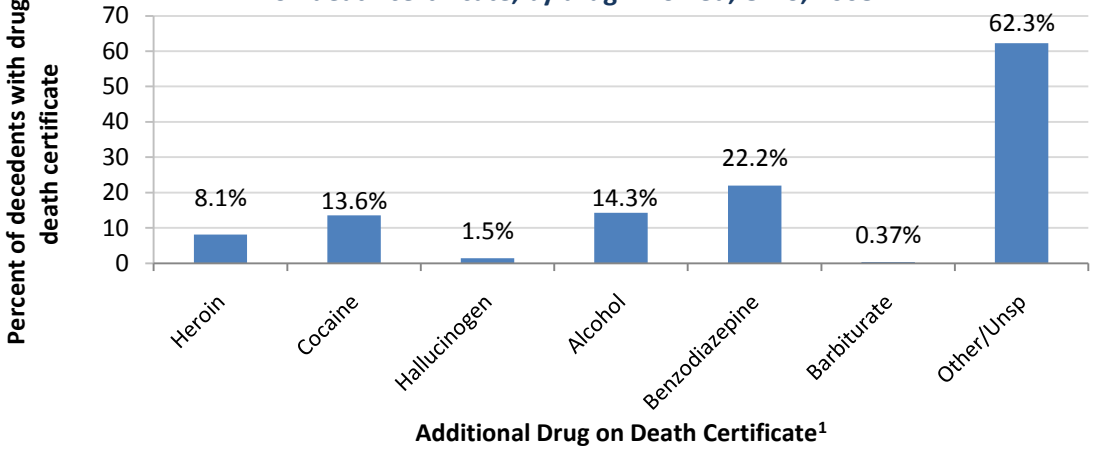
Role of Multiple Drug Combinations

Prescription opioids frequently result in unintentional overdose in combination with other drugs. Most overdoses (75 percent) in Ohio in 2008 involved the use of multiple drugs.

In 2008, the majority of unintentional poisoning deaths in Ohio that involved a prescription opioid, also had at least one other of the following medications listed on the death certificate: heroin, cocaine, hallucinogen, barbiturate, benzodiazepine, alcohol, other/unspecified.

- More than 60 percent of these decedents also had *other/unspecified drug* (ICD10 code T50.9) listed as a cause of death *(Figure 2.12).*
- More than 20 percent of these decedents also had a benzodiazepine listed as cause of death *(Figure 2.12).*
- Fourteen percent of the deaths due to a prescription opioid involved cocaine and eight percent involved heroin *(Figure 2.12).*

Figure 2.12. Percent of unintentional poisoning decedents with a prescription opioid on death certificate who had at least one other drug on death certificate, by drug involved, Ohio, 2008



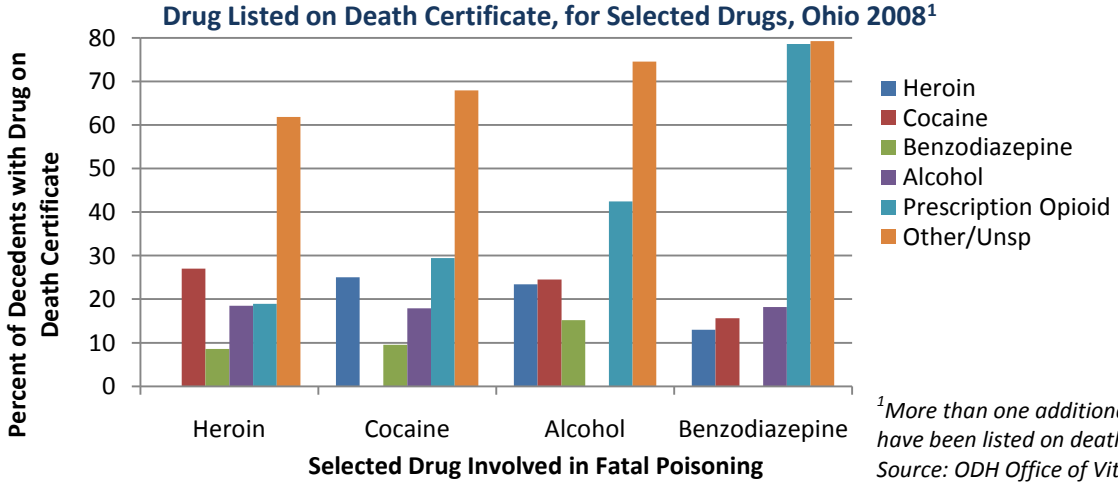
[1]More than 1 additional drug may have been listed on death certificate.
Source: ODH Office of Vital Stats

As with prescription opioids, the majority of drug poisoning deaths due to other prescription drugs (e.g. benzodiazepines) or illicit drugs also involved multiple drugs (*Figure 2.13***).**

This finding is consistent with other states. For example, a report from West Virginia found that multiple substances contributed to 79 percent of drug poisoning deaths.[9]

- In more than 60 percent of decedents who had a poisoning death involving illicit drugs (cocaine, heroin), alcohol, or a benzodiazepine, an *other/unspecified drug* was also listed on the death certificate *(Figure 2.13).*
- More than 75 percent of deaths involving a benzodiazepine also involved a prescription opioid.
- More than 70 percent of deaths involving alcohol also involved a prescription opioid.
- At least 8 percent of 2008 unintentional poisoning deaths were due to a combination of illicit and prescription drugs *(This estimate does not include other/unspecified drugs as the specific drug type is not indicated).*

Figure 2.13. Percent of Unintentional Poisoning Decedents w/Additional Drug Listed on Death Certificate, for Selected Drugs, Ohio 2008[1]



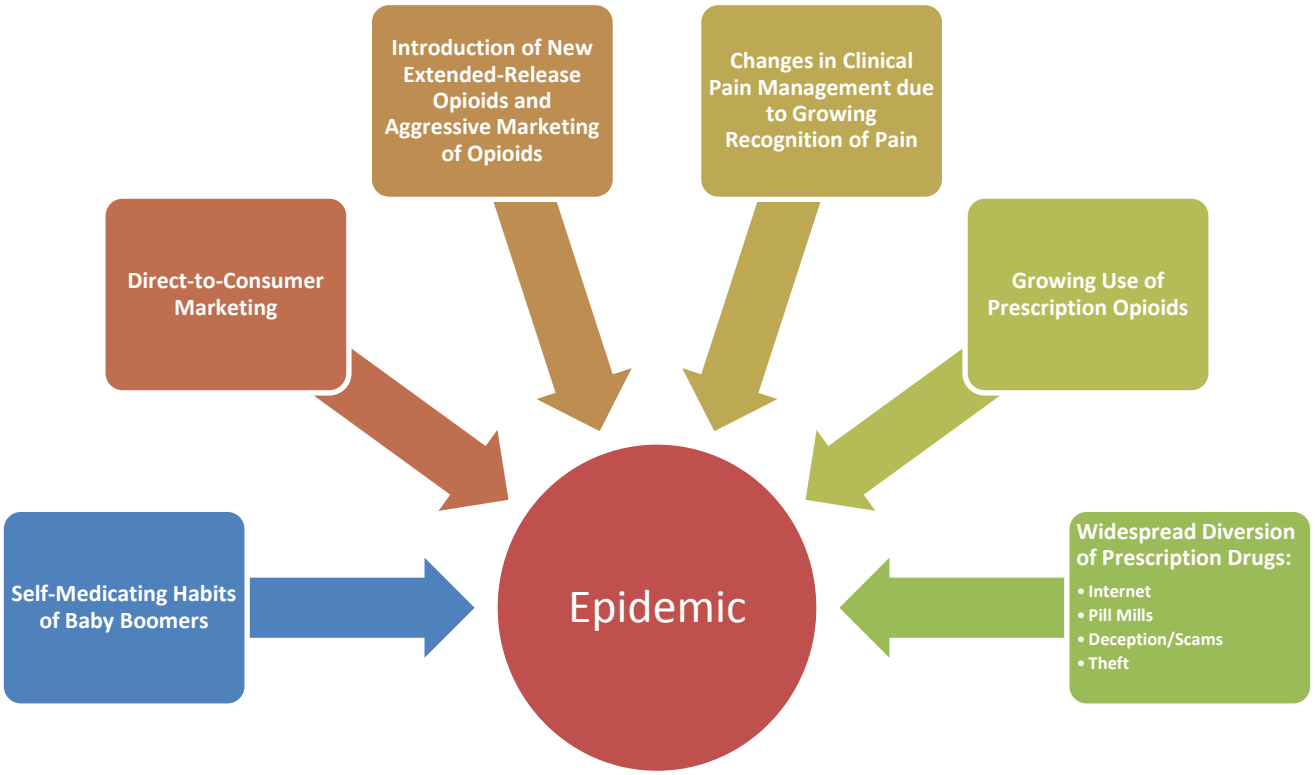
[1]More than one additional drug may have been listed on death certificate.
Source: ODH Office of Vital Statistics

CONTRIBUTING FACTORS TO THE EPIDEMIC AND CURRENT TRENDS

HOW DID THIS BECOME AN EPIDEMIC IN OHIO?

Changing medical and advertising practices have contributed to widespread use of prescription drugs across all levels of the population, thereby increasing the scope of abuse. Societal and medical trends that lead to this problem include: changes in prescribing practices for pain medication, changes in the marketing of medications, overmedication, increased use of prescription opioids, self-medication, improper disposal of excess medications and widespread diversion (Figure 2.14).

Figure 2.14. Contributing Factors to Rising Fatal Drug Death Rates



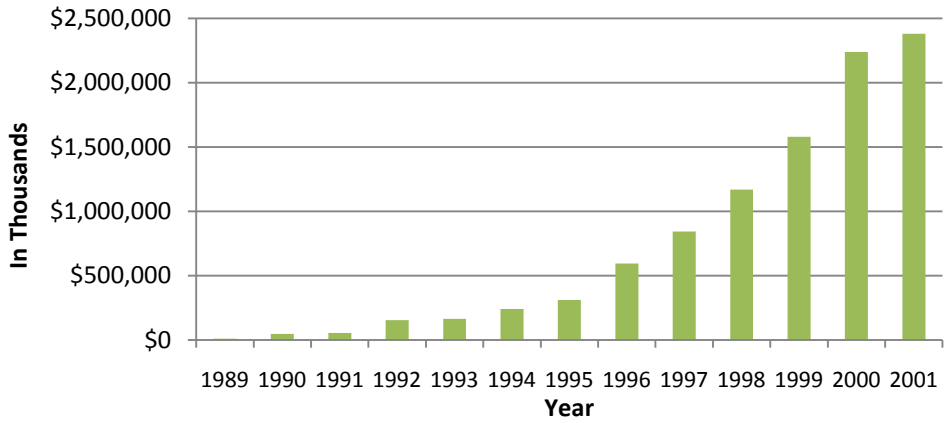
During the 1990s, changes in the marketing of pharmaceuticals using the direct-to-consumer (e.g., television advertising) approach took place in an effort to promote consumer-driven demand for specific drugs.[1]

DIRECT-TO-CONSUMER MARKETING OF PHARMACEUTICALS

Beginning in the early 1990's, there was a significant philosophical shift in the way prescription drugs were being marketed.[10] Twenty years ago, direct appeals to consumers by prescription drug manufacturers via print and broadcast media was a new phenomenon in the health sector. This approach, known as direct-to-consumer (DTC) marketing, has taken an increasingly important position in terms of public awareness of prescription drug products. Surveys have shown that over 90 percent of the public report seeing prescription drug advertisements.[11]

In 1989, the drug industry collectively spent only $12 million on DTC marketing, compared to $2.38 billion in 2001, representing an increase of almost 200-fold in only 12 years (*Figure 2.15)*. A total of 105 prescription drugs were advertised directly to consumers in 2001.[12] By 2005, pharmaceutical companies spent an estimated $4.24 billion on DTC marketing in the U.S. For each dollar Canada spent on DTC marketing in 2005, the U.S. spent $350.[13] Excluding professional samples, DTC marketing grew from 19 percent of expenditures on drug promotion in 1996 to ***more than one third (37 percent)*** in 2005.[13]

Figure 2.15. Total Amount Spent (in thousands) in Direct-to-Consumer Advertising of Prescription Drugs, US, 1989-2001[1]



[1]**Source:** Palumbo, F.B., Mullins C.D., The Development of Direct-to-Consumer Prescription Drug Advertising Regulation. Food and Drug Law Journal: Analyzing the Laws, Regulations, & Policies Affecting FDA-Regulated Products, Vol. 54 (3) 2002.

On the basis of an analysis of 49 brands that were the subject of DTC marketing between 1998 and 2003, IMS Management Consulting concluded that the return on investment from DTC advertising is *"nearly unprecedented in terms of the positive sales response generated*."[14]

The Institute for Safe Medication Practices reports 78 percent of primary care physicians have been asked for drugs that their patients saw advertised on television and 67 percent concede that they sometimes grant patients' requests for medications that are not clinically indicated.[15] Therefore, many patients may be using medications unnecessarily and/or are overmedicated.

Changes in Clinical Pain Management

Growing recognition by professionals of the under-treatment of pain in the late 1990's prompted needed changes in clinical pain management guidelines at the national level, as well as changes in Ohio's law regarding the treatment of intractable pain. To address the perception that prescribing adequate amounts of controlled substances would result in unnecessary scrutiny by regulatory authorities, Ohio's Intractable Pain Act provided that physicians treating intractable pain are not subject to disciplinary action when practicing in accordance with accepted and prevailing standards of care and rules adopted by the Medical Board delineating those standards.[16]

Such fundamental changes in the recognition and treatment of pain contributed to increased prescribing of opioids by physicians and consequent availability of opioids in the community setting.

Aggressive Marketing of Opioids by Pharmaceutical Companies

At the same time that these clinical and regulatory changes in the treatment of pain were made, the introduction of new, extended-release prescription opioids (e.g., OxyContin®) and overly aggressive marketing strategies by pharmaceutical companies to prescribers[17] contributed to the growing use of prescription opioids throughout Ohio.

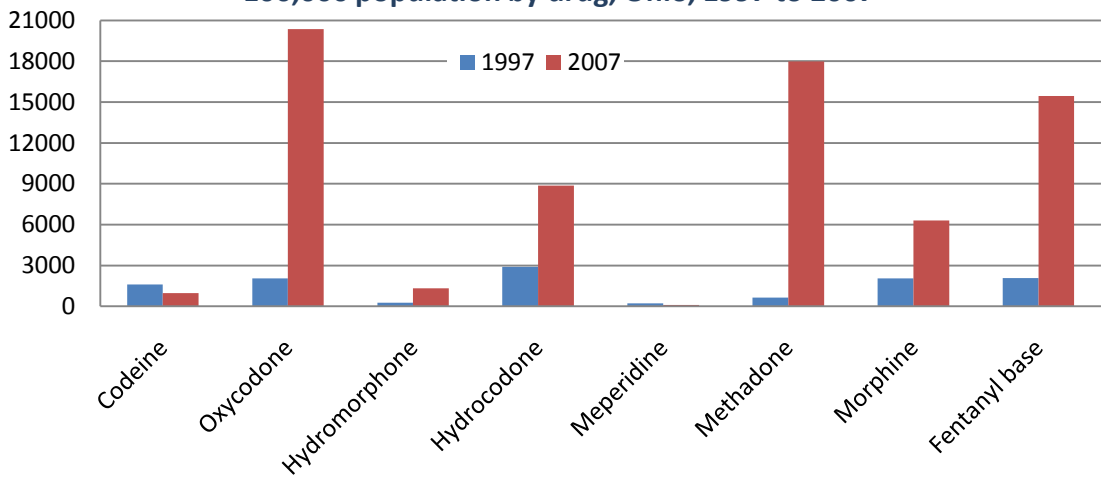
In 2003, the DEA cited Purdue Pharma's focus on promoting OxyContin for treating a wide range of conditions as one of the reasons the agency considered Purdue's marketing of OxyContin to be overly aggressive.[18] The DEA expressed concern that Purdue marketed OxyContin for a wide variety of conditions to physicians who may not have been adequately trained in pain management. Purdue was also cited twice by the FDA for OxyContin advertisements in medical journals that violated the Federal Food, Drug, and Cosmetic Act.[19] It is now known that OxyContin produced a heroin-like high when crushed and snorted, and it was associated with rapidly increasing overdose death rates in the early 2000's.[20]

Growing Use of Prescription Opioids

The greater recognition of the under-treatment of pain, changes in clinical pain management guidelines at the national level, enactment of intractable pain law in Ohio and overly aggressive marketing of new extended-release opioids created an environment ripe for increased opioid prescribing. These acts subsequently resulted in the availability of potent pain medications in the community setting that had been previously restricted to institutional use for severe, chronic pain (e.g., end-stage cancer) patients, thereby increasing the general population's exposure to opioids.

According to the DEA, with the exception of small decreases in codeine and meperidine (Demerol®), which were essentially replaced by other opioids with fewer side-effects, the distribution of other commonly-prescribed opioids increased significantly in Ohio from 1997 to 2007 *(Figure 2.16).* The four most commonly distributed opioids in morphine-equivalent grams per 100,000 population (hydrocodone, oxycodone, methadone and fentanyl) are also the drugs most associated with fatal overdoses throughout Ohio and the country.

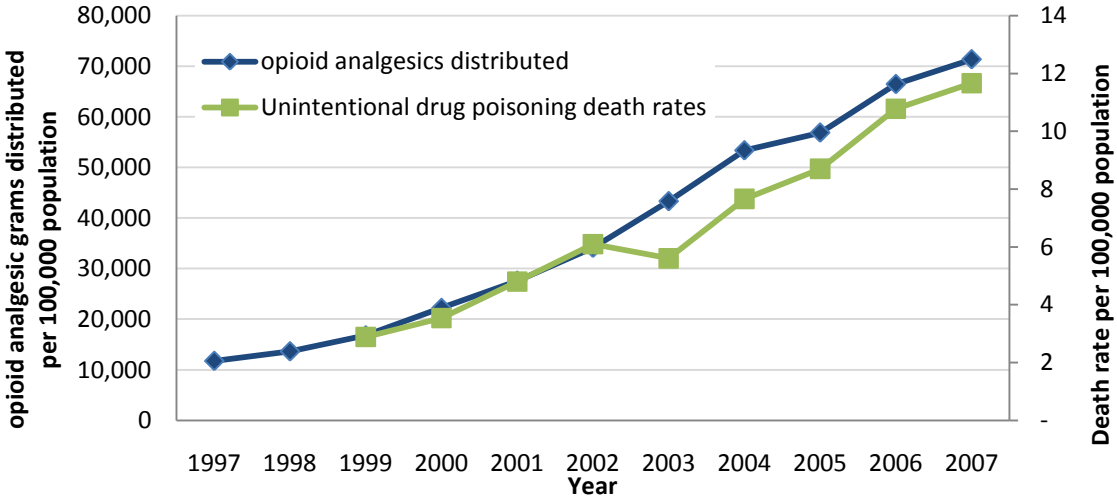
Figure 2.16. Distribution of scheduled opioids[1] in grams per 100,000 population by drug, Ohio, 1997 to 2007[2]



1 Source: DEA ARCOS Reports. In oral morphine equivalents using the assumptions: (1) All drugs except fentanyl are taken orally; fentanyl is applied transdermally. 2) These doses are approximately equianalgesic: morphine: 30 mg; codeine 200 mg; oxycodone & hydrocodone:30 mg; hydromorphone;7.5 mg; methadone: 4 mg; fentanyl 0.4 mg; meperideine: 300 mg.

From 1999 to 2007, Ohio retail pharmacy' rate of overall opioid distribution, in grams per 100,000 population, increased 325 percent while the unintentional drug overdose death rate increased 305 percent (Figure 2.17). These increases represent a nearly one-to-one correlation, demonstrating that increased exposure to opioids has contributed to Ohio's overdose epidemic.

Figure 2.17. Unintentional fatal drug poisoning rates and distribution rates of prescription opioids in grams per 100,000 population by year, Ohio, 1997 -2007[1,2,3,4,5]



Sources: *1 ODH Office of Vital Statistics; 2 DEA, ARCOS Reports, Retail Drug Summary Reports by State, Cumulative Distribution Reports (# 4) Ohio, 1997-2007 http://www.deadiversion.usdoj.gov/arcos/retail_drug_summary/index.html; 3 Calculation of oral morphine equivalents used the assumptions: (1) All drugs other than fentanyl are taken orally; fentanyl is applied transdermally. 2) These doses are equianalgesic: morphine: 30 mg; codeine 200 mg; oxycodone and hydrocodone: 30 mg; hydromorphone; 7.5 mg; methadone: 4 mg; fentanyl: 0.4 mg; meperideine: 300 mg. 4 US Census Bureau, Ohio population estimates 1997-2007. 5) Preliminary data for 2007.*

In 2008, higher prescription rates for hydrocodone and oxycodone were associated with higher death rates in the Southern region of Ohio *(Figure 2.18).* As demonstrated previously, the southern region of Ohio is disparately impacted by drug overdose (*Figure 2.7*). A comparison of dispensed prescriptions in 12 southern Ohio counties and 12 Northwestern Ohio counties with similar populations reveals the following: The ratio of the Southern to Northwestern overdose rates is 3:1, while the ratios of the hydrocodone fill rate and dose rate are essentially two to one. For dispensed oxycodone prescription rates and doses, the southern to northwestern ratios are 2.4:1 and 3:1 respectively.

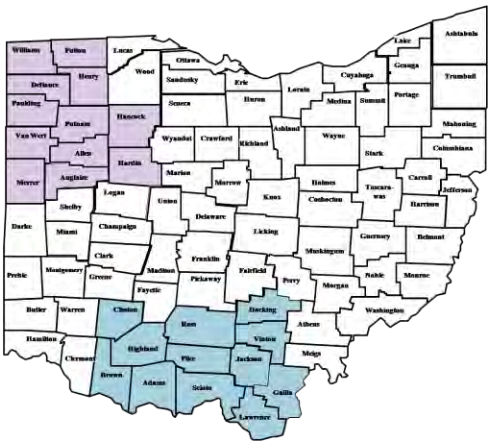
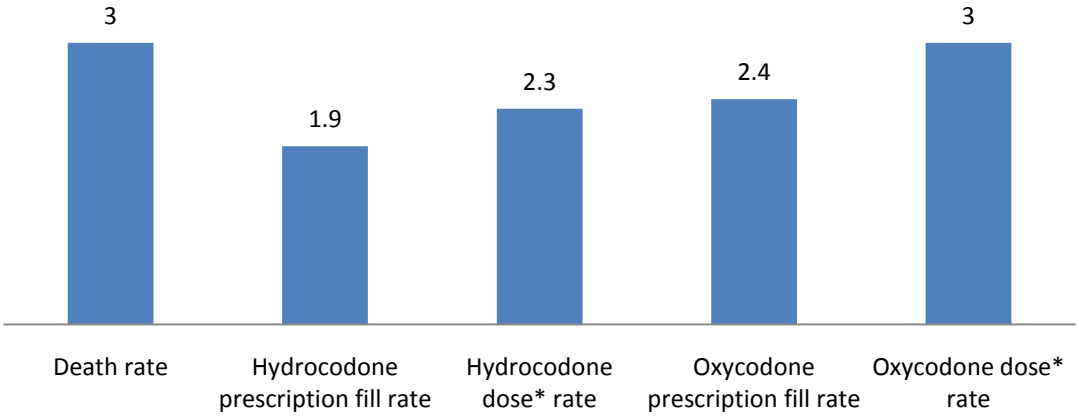


Figure 2.18. Regional Comparisons: Ratio of death rates and opioid prescription rates, Southern to Northwest Region, 2008[1,2,3,4,5]



Sources: [1]ODH Office of Vital Statistics; [2]US Census Bureau; [3]Ohio State Board of Pharmacy, Ohio Automated Rx Reporting System
[4]includes Clinton, Brown, Highland, Adams, Ross, Pike, Scioto, Hocking, Vinton, Jackson, Gallia, Lawrence
[5]includes Williams, Defiance, Paulding, Van Wert, Mercer, Fulton, Henry, Putnam, Allen, Auglaize, Hancock, Hardin
*among filled prescriptions

In the hospital setting, pressure to treat pain compassionately and to obtain positive patient satisfaction ratings may also be contributing to over-prescribing of opioids. Additional research is needed in this area. As a bottom line, increasing pressure on prescribers to adequately treat pain leaves them caught in the middle of legitimate pain patients who need these medications and those using deceptive techniques (e.g. doctor shopping) to obtain these drugs for personal or other use.

PRESCRIPTION DRUG DIVERSION

The result of these and other social trends toward increased prescription drug use is the exposure of a much greater proportion of the public to highly addictive "legal" substances than would be exposed to or likely to experiment with illegal drugs. Through this exposure, and many times for legitimate pain issues, individuals have become addicted thus driving the demand for the drugs and often resulting in illegal markets. Drug diversion, the unlawful channeling of regulated drugs from medical sources to the illicit marketplace, is supplying large quantities of controlled substances to fuel addictions.[21] According to the DEA and SAMHSA, this drug diversion is occurring through multiple channels, including:

- Medication sharing among friends and family members.
- Using multiple physicians and pharmacies to acquire controlled substances for nonmedical use (also known as "doctor shopping");
- Theft from pharmacies, health care facilities, and private homes;
- "Pill Mills" (intentional overprescribing and/or dispensing by unscrupulous physicians in exchange for cash);
- Internet pharmacies;
- Forged and fraudulent prescriptions;

Studies indicate that a common method of diversion is through a family member or a friend. Data from the 2009 National Survey on Drug Use & Health (NSDUH) reveal that 55.3 percent of individuals aged 12 or older who engaged in non-medical use of prescription pain relievers obtained the drug they most recently used from "a friend or relative for free."[22]

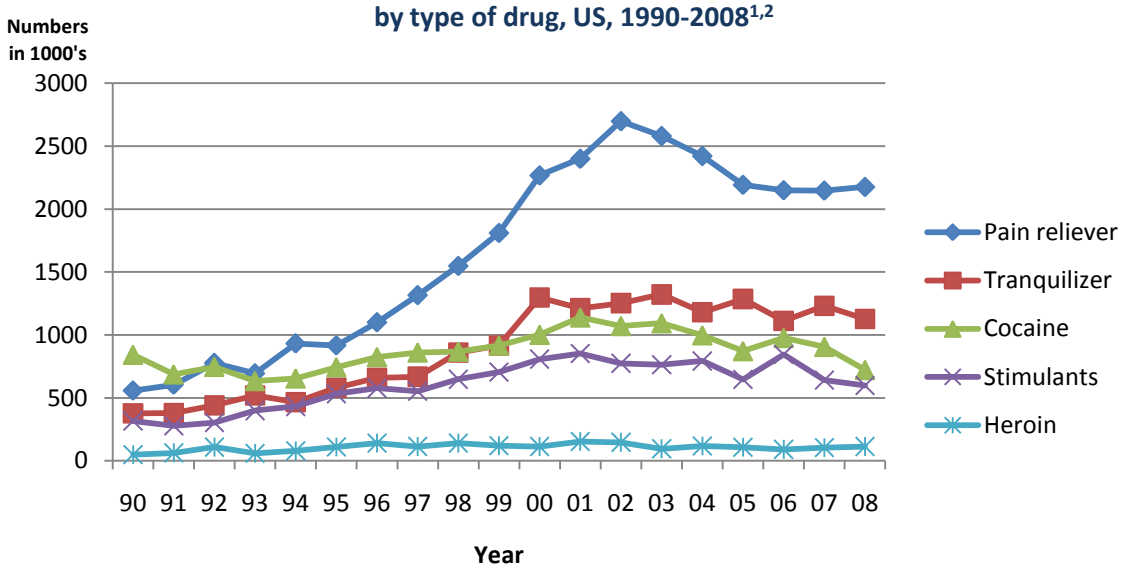
There are strong financial incentives for prescription drug diversion as well. A highly sought-after prescription drug such as OxyContin, has a street value 10 times the pharmacy price.

PRESCRIPTION DRUG MISUSE AND ABUSE

According to the Institute for Safe Medication Practices, half of the prescriptions taken each year in the United States are used improperly.[23]

Changing medical and advertising practices have contributed to widespread use of prescription drugs across all levels of the population, thereby greatly increasing the chances of misuse/abuse. The number of new nonmedical pain reliever users started to sharply increase in the mid-nineties *(Figure 2.19).* From 2000 on in the U.S., there have been more than two million new nonmedical users of prescription pain relievers each year.

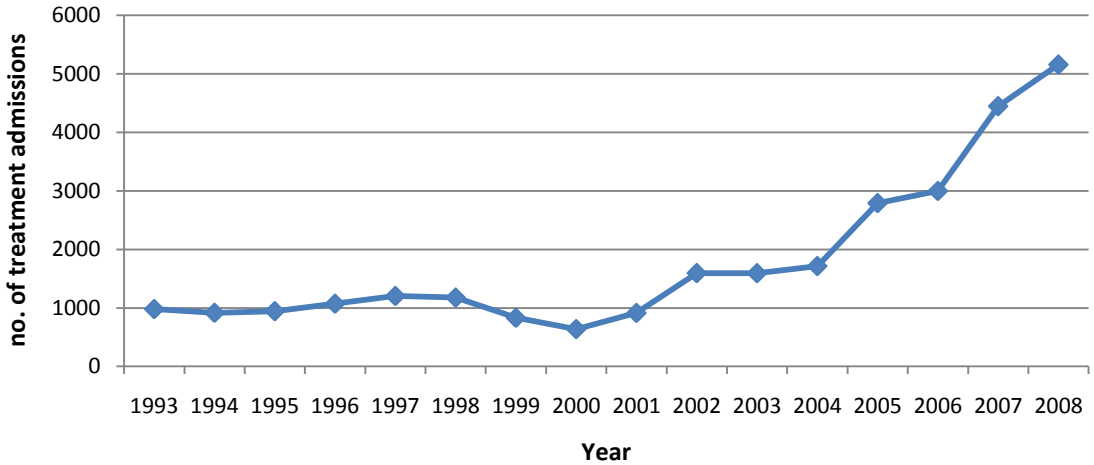
Figure 2.19. Estimated numbers of new nonmedical users in the past year by type of drug, US, 1990-2008[1,2]



1 Source: National Survey on Drug Use and Health (NSDUH) 2002-2008
2 Because of changes in the questionnaire, estimates for stimulant should not be compared with estimates for data years prior to 2007.

Another significant consequence of these trends is that admissions for non-heroin opioid abuse treatment are on the rise. In the past decade, such admissions have increased more than 300 percent in Ohio *(Figure 2.20).*

Figure 2.20. Number of substance abuse treatment admissions for non-heroin opioids by year, Ohio, 1993-2008[1]



1 Source: Office of Applied Studies, Substance Abuse and Mental Health Services Administration, Treatment Episode Data Set (TEDS), Ohio. Data received through 4/27/10.

WHAT CAN BE DONE TO ADDRESS THIS ISSUE?

AT THE LOCAL LEVEL…

- Form a poisoning/overdose coalition to address the problem at the county or regional level.
    - Members should include health care professionals, private citizens and representatives from local health departments, alcohol and drug addiction treatment centers, law enforcement agencies, healthcare and allied health professional associations, mental health agencies, hospitals, businesses, media, and other interested and relevant organizations or agencies.
- Work with local partners to implement social marketing campaigns to educate the public about prescription drug abuse and misuse.
- Conduct education campaigns for local populations at particular risk.
- Develop training programs for use in reaching adults in a variety of settings (e.g. places of employment, professional conferences/meetings, doctors' or dentists' offices, etc.).
- Conduct proper prescription drug storage and disposal programs such as drug take back events.
- Establish county poison death review (PDR) committees to identify the circumstances surrounding drug poisoning/overdose deaths and provide insight into prevention.

AT THE STATE LEVEL…

- Fund social marketing campaigns to educate the public about prescription drug abuse and misuse.
- Develop model education campaigns for populations particularly at risk.
- Develop training programs for use at the local level in reaching adults in a variety of settings (e.g. places of employment, professional conferences/meetings, doctor's offices, dentists' offices, etc.)
- Provide support and information to local organizations and coalitions for conducting Drug Take Back programs.
- Encourage health care and allied medical professional organizations and state boards to initiate education campaigns for their members regarding the problem of unintentional overdose deaths.
- Develop a tool kit for use by health care providers to educate all patients being prescribed pain medication.
- Adopt a Screening Brief Intervention Referral Treatment (SBIRT) protocol within health care and workplace settings to screen for misuse and/or abuse of prescribed medications.
- Initiate efforts to increase the capacity for treatment of opioid addiction.
- Promote collaborative efforts among law enforcement agencies to enforce prescription drug fraud statutes currently in effect in Ohio.

- Promote the coordination of investigations of fraud committed by individuals or pain clinics among local law enforcement, state regulating agencies, and state and federal investigative agencies.
- Improve linkage of data systems among state agencies (e.g. ODH, BOP, Medicaid/ODJFS, ODADAS, Ohio Department of Insurance, etc.)
- Collaborate with other states on drug monitoring systems.
- Provide funding for a statewide coroner reporting system.
- Create a data action group to review current surveys and data collection methods and identify gaps in knowledge and develop specific questions to address these needs.
- Explore the feasibility and potential benefits of legislation/regulations to:
    - Create licensing standards for pain management clinics.
    - Institute mandatory continuing education credits in pain management for health care professionals for licensure renewal.
    - Require course work in substance use disorders, prevention and treatment in the college curriculum for any medical professional or allied health care degree.
    - Require all physicians and other prescribers to register with and use the OARRS administered by the Board of Pharmacy (BOP).
    - Implement E-prescribing in Ohio.
    - Allow for reimbursement of SBIRT interventions from Medicaid and insurance companies.
    - Ensure the development, adoption, and implementation of pain management guidelines in all health care systems.
    - Create 911 Good Samaritan Immunity Laws that legalize the use of naloxone by lay persons and protect them from prosecution.
    - Increase the use of “Drug Courts” as an alternative to incarceration for illegal use/abuse of prescription drugs.
    - Require photo ID when picking up prescriptions for controlled substances.

SECTION 3:
POISONING-RELATED HOSPITAL DISCHARGES OF OHIOANS, 2003-2007

EXECUTIVE SUMMARY

- From 2003 through 2007, there were more than 54,000 hospital discharges of Ohio residents after treatment for poisoning
- The number of annual poisoning discharges increased 30 percent from 2003 to 2007
- More than 97 percent of poisoning hospitalizations involved drugs or medications.
- Of 8 substances likely to be abused, (that were examined in detail in this report), only cocaine and alcohol were associated with more male than female discharges.
- 72 percent of persons who used at least 1 of these 8 substances, used more than one.
- After adjusting for inflation, mean costs for treating poisoned inpatients increased only 6 percent from 2003 to 2007.
- Less than a third (31 percent) of poisoning cases had private insurance.
- The average length of stay for drug/medication poisoning cases decreased 6.1 percent from 2003 (2.79 days) to 2007 (2.63 days).
- Nearly 58 percent of hospital-treated poisoning cases were deemed to have purposely harmed themselves, (62.8 percent of females, 52.0 percent of males).
- 16,330 (30.2 percent of all cases) self-harmed using sedatives or tranquilizers.
- Persons who ingested cocaine were the most likely to be discharged home without further inpatient treatment, (63.3 percent), while those who were poisoned by tranquilizers, (50.6 percent) or benzodiazepines (52.9 percent) were the least likely.
- Drug/medication-related discharge rates were highest for metropolitan county residents (117.2 per 100,000 for females, 94.4 for males). Appalachian rates were nearly as high (108.5 for females, 78.0 for males), while suburban and rural rates were each about 70 per hundred thousand for females and about 52 for males.
- Among the high risk age groups (15-24, 25-34, 35-44, 45-54), rates for residents of Appalachian and metropolitan counties were each at least 50 percent higher than among rural and suburban county residents.
- The more urbanized a county, the longer the average treatment stay for hospitalized drug/medication-related poisoning cases, and the greater the average treatment charge
- Appalachian poisoning cases were the most likely to have public insurance, 54.1 percent or to be uninsured, 20.0 percent, while those living in non-Appalachian rural counties were the least likely to be uninsured, 17.8 percent.
- Methadone-related poisonings, though relatively scarce compared to other substances, increased dramatically from 2003 (126) to 2007 (622), 394 percent.
- The five Ohio counties with the highest average annual poisoning-related discharge rates were: Guernsey (178.8 per 100,000), Montgomery (152.1), Jefferson (150.9), Ross (143.8) and Columbiana (136.0), all considerably higher than the state as a whole (90.5).

LIMITATIONS OF POISONING-RELATED HOSPITAL DISCHARGE DATA

- Interpretation of these results is subject to the usual constraints inherent in research based on administrative data.
- Overall, only 80.6 percent of hospitalized poisoning cases were assigned an E-code. This most likely resulted in an underestimate of total charges and incidence rates, since not all poisonings could be identified and included.
- Only those who sought medical care were captured for this analysis.
- Discharges, not individuals, were the unit of measurement, thereby resulting in duplication when readmissions for the same initial event occurred.
- Race and ethnicity were not available in the hospital data.
- Ohio residents treated in out-of-state hospitals were not consistently included, thereby affecting rates, particularly of border counties.
- Medical charges were based on billing data and not actual costs.
- The ICD-9-CMs are plagued with vague coding and inconsistent delineation of detail for different intents. This likely resulted in some misclassification of the use of particular substances

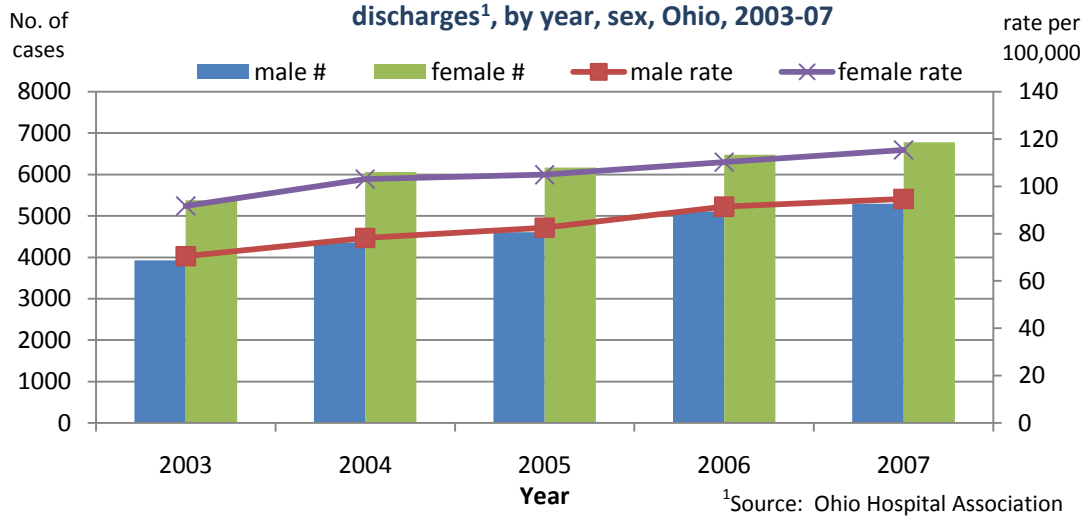
INTRODUCTION:

RECENT TRENDS IN POISONING DISCHARGES

The number of Ohioans discharged after inpatient treatment for poisoning has been increasing rapidly in recent years: from 9306 in 2003 to 12,070 in 2007. Although the majority, (57.0 percent) were female, male hospitalizations have been increasing more rapidly: up 34.9 percent from 2003 to 2007, compared to 25.9 percent for females (*Figure 3.1*).

Rates for males ranged from 70.5 per 100,000 in 2003 to 94.7 in 2007. For the same period, female rates increased from 91.7 to 115.4 per 100,000.

Figure 3.1. Number and rate per 100,000 of poisoning-related hospital discharges[1], by year, sex, Ohio, 2003-07



More than three fourths (78.0 percent) of hospitalized poisoning cases were 15 to 54 years old, while only 4.5 percent were younger than 15 (Table 3.1). After age four, more females than males were treated for each age group.

The greatest proportional increases from 2003 to 2007 for males were among 55-64 year olds (63.7 percent) and 45-54 year olds (60.5 percent). For females, the largest increases were seen among those 85 or older (47.1 percent) and 45-54 year olds (43.6 percent).

Table 3.1. Number of poisoning-related inpatient discharges by age group, sex, year, Ohio, 2003-07[1,2]

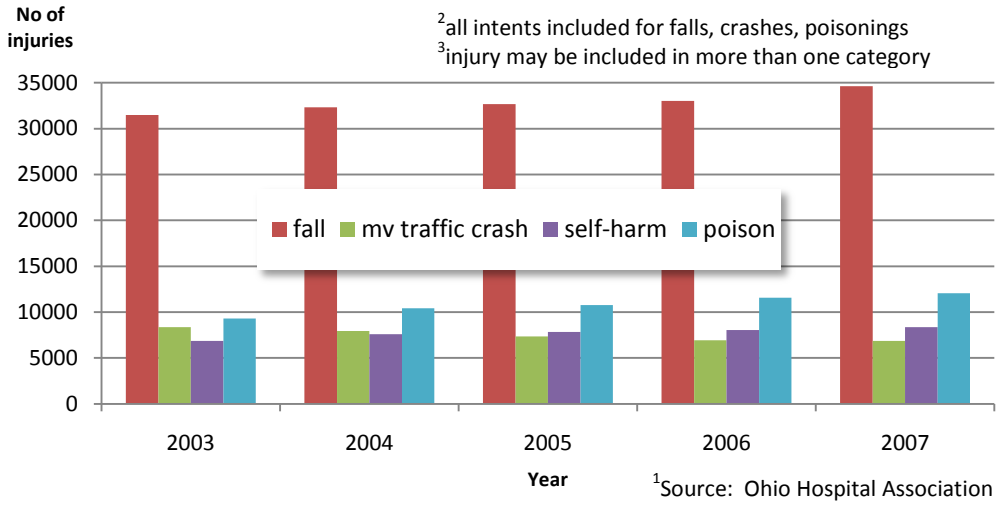
	Year Discharged											
	2003		2004[2]		2005		2006		2007		Total	
age group	M	F	M	F	M	F	M	F	M	F	M	F
<1	7	17	14	7	14	6	18	11	13	13	**66**	**54**
1-4	130	91	106	92	104	71	135	78	135	107	**610**	**439**
5-14	80	164	85	181	93	175	82	164	89	170	**429**	**854**
15-24	799	1,066	813	1,260	860	1,225	934	1306	907	1,222	**4,313**	**6,079**
25-34	701	970	847	1,064	883	1,050	917	1,134	1,005	1178	**4,353**	**5,396**
35-44	893	1,187	954	1,329	1,042	1,396	1,093	1,291	1,163	1456	**5,145**	**6,659**
45-54	717	915	834	1,048	912	1,100	1,096	1,217	1,151	1,314	**4,710**	**5,594**
55-64	273	402	316	460	344	521	452	625	447	557	**1,832**	**2,565**
65-74	144	251	182	274	186	297	199	313	174	355	**885**	**1,490**
75-84	140	232	151	233	113	223	133	228	147	278	**684**	**1,194**
85+	40	87	57	109	55	101	46	109	61	128	**259**	**534**
Total	**3,924**	**5,382**	**4,359**	**6,057**	**4,606**	**6,165**	**5,105**	**6,476**	**5,292**	**6,778**	**23,286**	**30,858**

[1]**Source: Ohio Hospital Association**
[2]**1 person of unknown gender, aged 25-34 was omitted from table**

THE ROLE OF POISONINGS AMONG ALL INJURY-RELATED HOSPITALIZATIONS

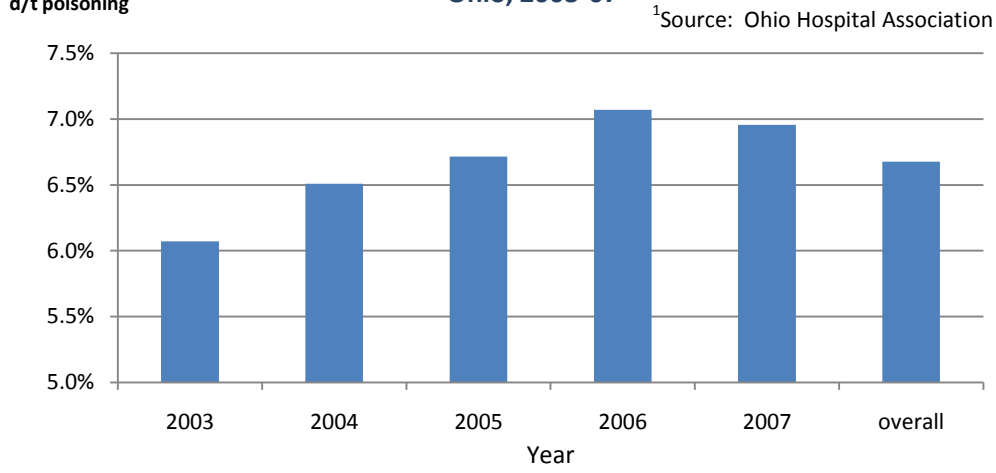
Falls continue to be responsible for the majority of injury-related hospitalizations. However, from 2003 through 2007, the proportion of discharges attributed to poisonings continued to grow when compared to injuries from motor vehicle crashes or an intentionally inflicted self-injury (i.e. self-harm) (*Figure 3.2*).

Figure 3.2. Number of hospital discharges[1] for selected injuries[2,3], by year, Ohio 2003-07



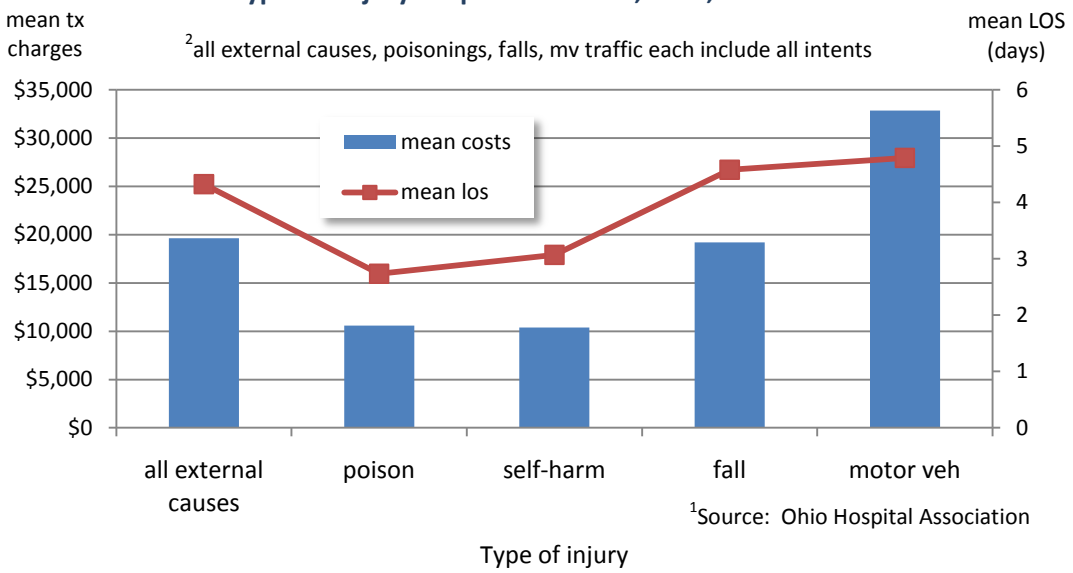
Poisonings made up 6.7 percent of all injury-related hospitalizations from 2003-07 and were responsible for an increasingly larger proportion until 2007 (*Figure 3.3*).

Figure 3.3. Proportion of all injury-related hospitalizations attributable to poisoning, by year and overall for the period, Ohio, 2003-07[1]



Among the principal types of injuries requiring hospital treatment, poisoning cases were generally associated with shorter stays and lower treatment charges, (*Figure 3.4*). Treatment charges, on average, were 2 percent greater than for overall cases of self-harm, even though stays were 12 percent shorter. Persons injured in motor vehicle crashes had 75 percent longer stays (4.79 days vs. 2.74) and were three times as costly to treat ($32,845 vs. $10,594), when compared to poisoning cases.

Figure 3.4. Mean treatment costs and length of stay for selected types of injury hospitalizations[1,2], Ohio, 2003-07



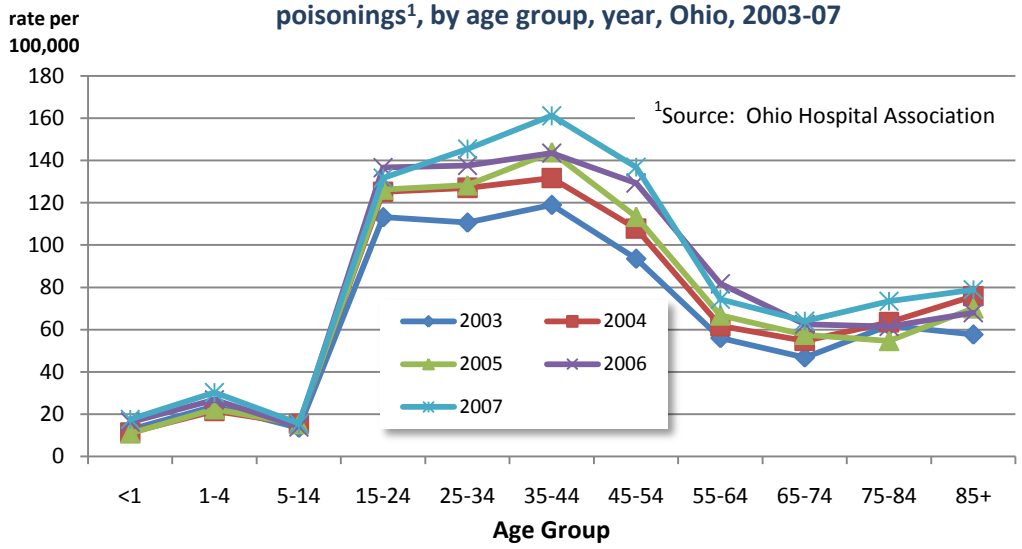
DRUG/MEDICATION-RELATED POISONINGS

Drugs and/or medications were involved in 95.7 percent of 2003-07 poisoning-related discharges in Ohio, (n=51,793). This subgroup includes all poisonings associated with illicit and/or medicinal drugs, whether prescribed or not. (Please see Appendix B for complete list of qualifying substance codes and the Drug/Medication-Related Poisonings portion of the Limitations section of this report for discussion of methodology).

Although recent Ohio drug/medication-related (DMR) poisoning death rates have been highest among 45-54 year olds, (please see accompanying report on fatal poisonings), overdose hospitalizations, for each of the years covered in this report, occurred more frequently among the next younger age group, 35-44 year olds (*Figure 3.5*).

Overall, DMR poisoning discharge rates increased 31.0 percent from 2003 (77.4 per 100,000) to 2007 (101.4). This increase was driven by 25-74 year olds: 25-34 year olds increased 31.5 percent, 35-44 (+35.4), 45-54 (+46.3), 55-64 (+32.9), and 65-74 (+36.8 from 2003 to 2007), (data not shown). Except for the 'Other Substances' section, subsequent chapters focus solely on these DMR cases.

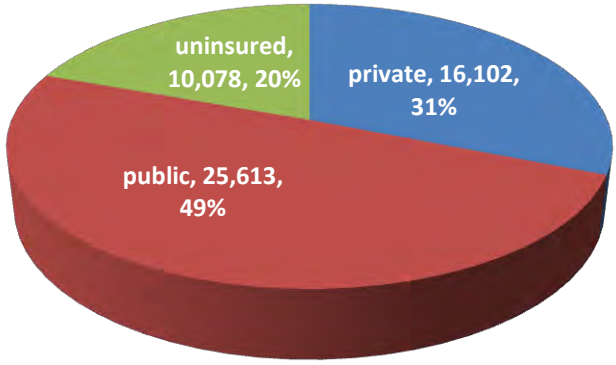
Figure 3.5. Hospital discharge rate per 100,000 for drug/medication-related poisonings[1], by age group, year, Ohio, 2003-07



INSURANCE STATUS

Half of all hospital discharges involving drug/medication-related poisonings were covered by public insurance (*Figure 3.6*) while 19 percent were uninsured (*See Appendix C for insurance status classifications*).

Figure 3.6. Insurance status of hospital discharged, drug/medication-related poisoning cases[1], Ohio, 2003-07

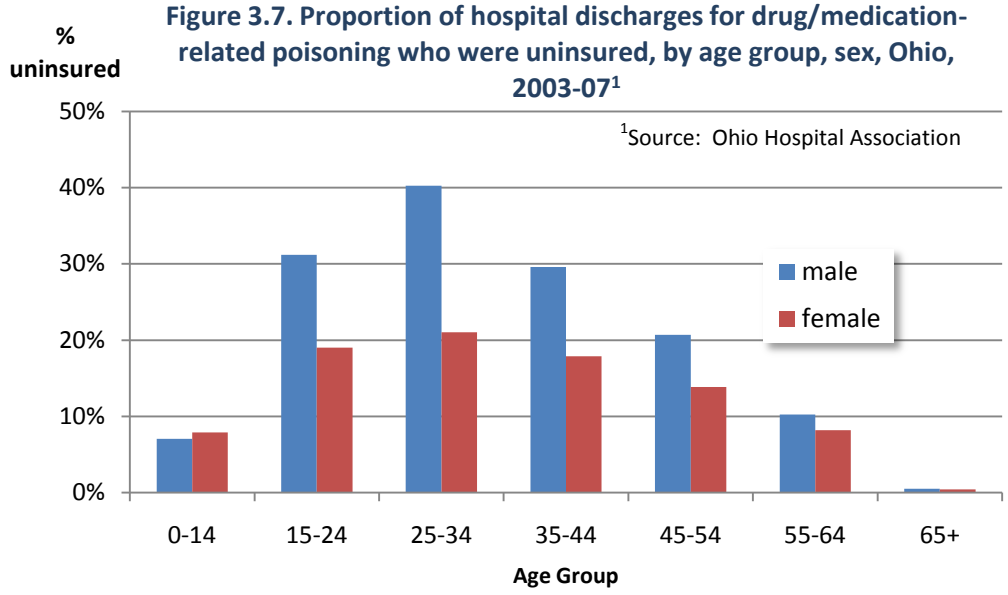


[1]Source: Ohio Hospital Association

AGE AND SEX

Seventy-eight percent of the uninsured poisoning cases were aged 15-44 years, with the highest proportion among the 25-34 year olds. Less than half a percent of persons 65 or older were uninsured. Males were more likely to be uninsured than females for every age group except those 0-14 years of age (*Figure 3.7*).

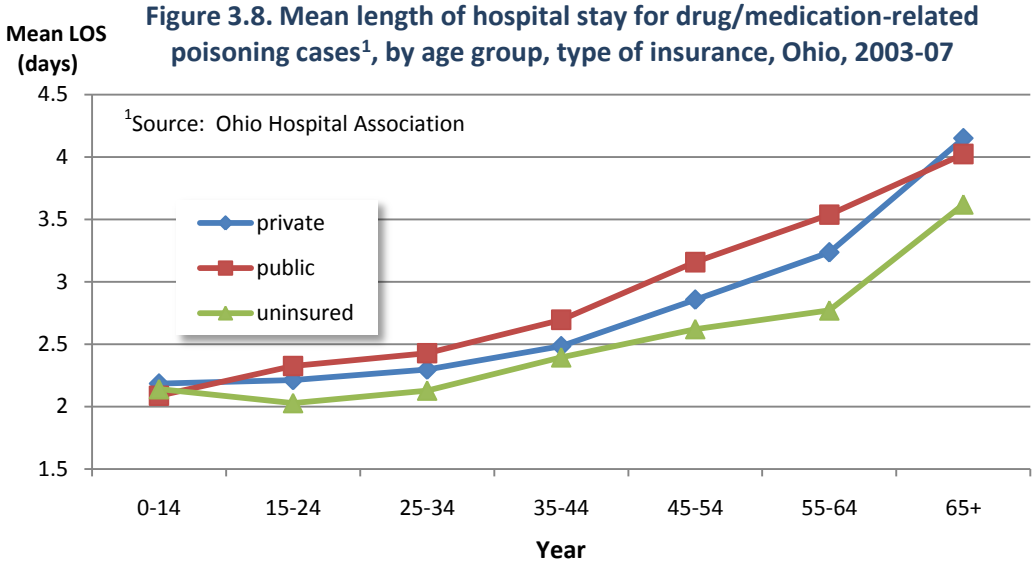
Figure 3.7. Proportion of hospital discharges for drug/medication-related poisoning who were uninsured, by age group, sex, Ohio, 2003-07[1]



LENGTH OF STAY AND TREATMENT CHARGES

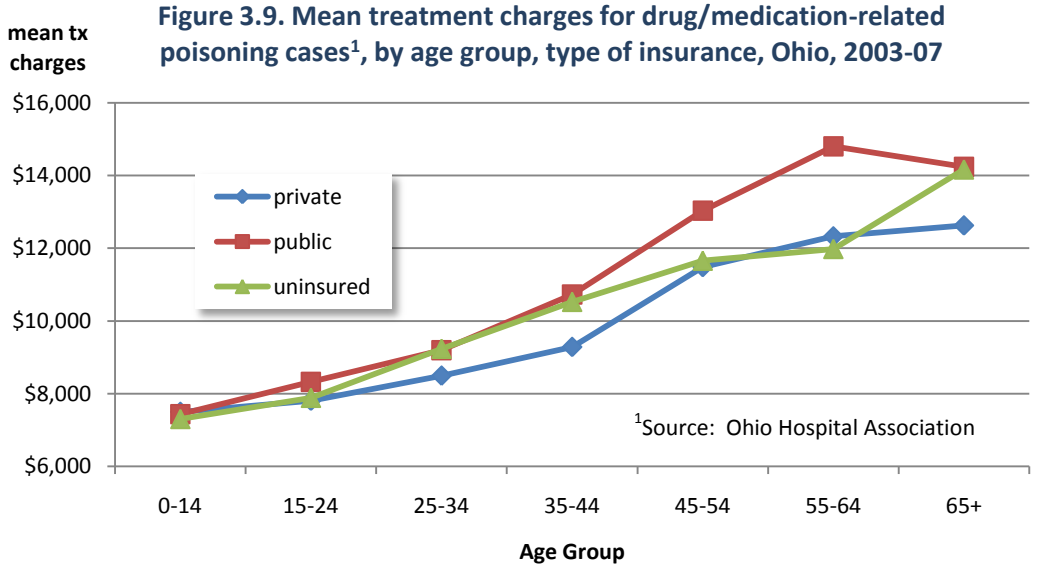
For ages 15-64, hospital-treated poisoning cases who had public insurance had slightly longer hospital stays than the uninsured and those with private insurance (*Figure 3.8*). After age 14, the uninsured had the shortest average stays for the remainder of the lifespan.

Figure 3.8. Mean length of hospital stay for drug/medication-related poisoning cases[1], by age group, type of insurance, Ohio, 2003-07



Through age 34, treatment charges were fairly equivalent, no matter what the poison victim's insurance status (*Figure 3.9*). For most stages of life, the uninsured were charged as much or more to treat than those with private insurance.

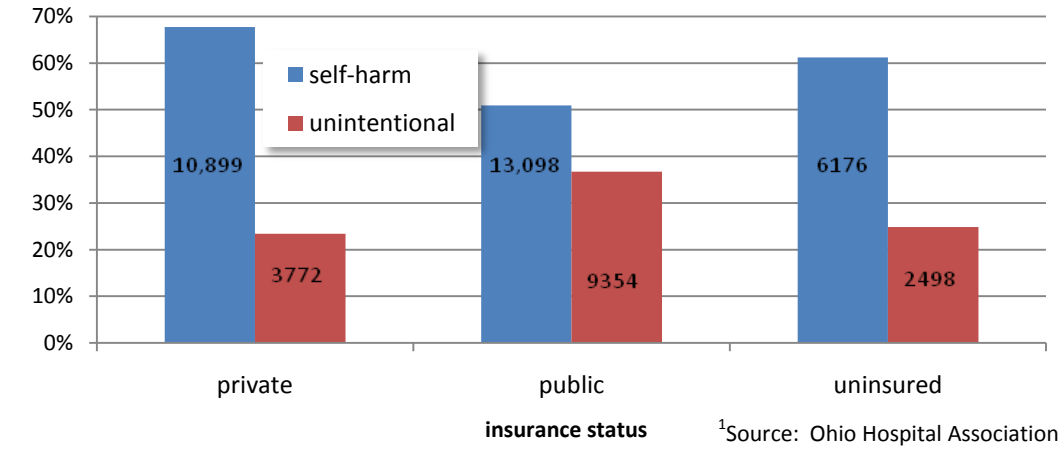
Figure 3.9. Mean treatment charges for drug/medication-related poisoning cases[1], by age group, type of insurance, Ohio, 2003-07



INTENT BY INSURANCE STATUS

Poisoned persons who had public insurance were the most likely to have their injury classified as unintentional (36.6 percent) and least likely as self-harm (51.2 percent), while the reverse is seen among those with private insurance: 23.0 percent unintentional and 68.3 percent self-harm, (*Figure 3.10*).

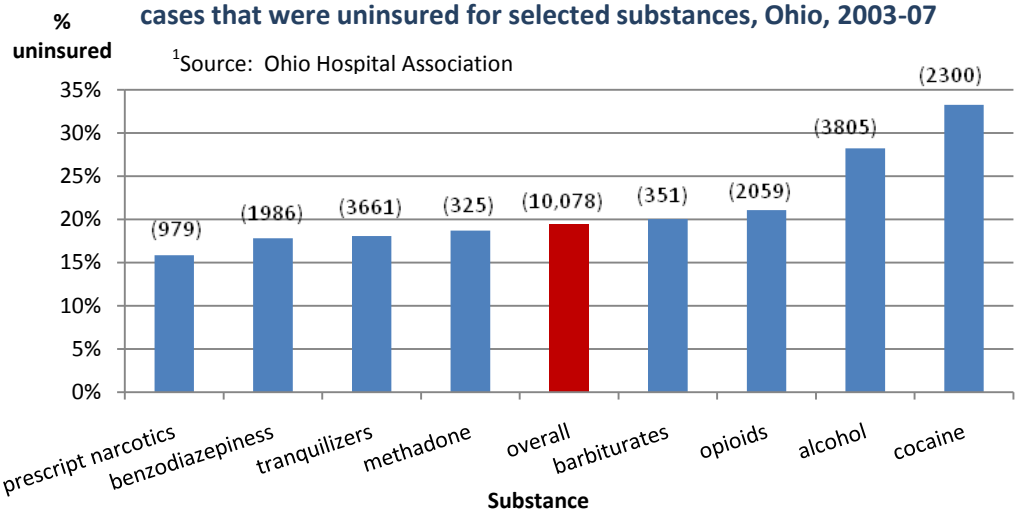
Figure 3.10. Proportion of hospitalized, drug/medication-related poisonings[1] deemed to be unintentional or self-harming, by type of insurance, Ohio, 2003-07



USE OF SPECIFIC SUBSTANCES AND INSURANCE STATUS

As would be expected, poisonings due to frequently prescribed drugs, (narcotics, benzodiazepines, tranquilizers, methadone or barbiturates), were unlikely to be uninsured, 15.8-19.8 percent, (*Figure 3.11*). Twenty-eight percent of persons who had consumed alcohol were uninsured, as were a third of cocaine users. (More than 3,600 cases were poisoned by tranquilizers or alcohol, while less than 400 were by barbiturates or methadone.)

Figure 3.11. Proportion of drug/medication-related poisoning cases that were uninsured for selected substances, Ohio, 2003-07



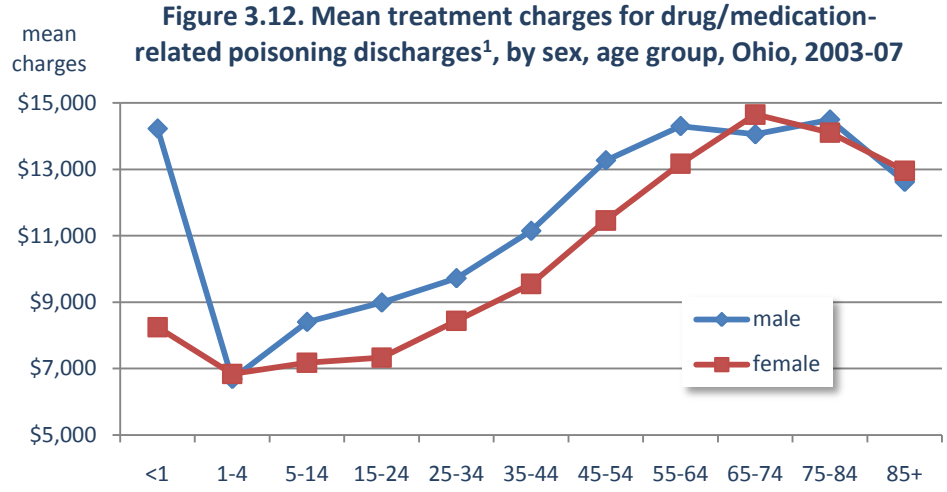
TREATMENT CHARGES

CHARGES BY AGE, SEX

Inpatient treatment charges for 2003-07 drug/medication-related poisoning cases totaled $540,472,369 and ranged from $35 to $510,545 with a mean of $10,488 and a median of $7000 (data not shown). Males had mean treatment costs more than 13 percent greater than females ($11, 248 vs. $9930) (*data not shown*).

Although there were only 56 males younger than one year, they were much more costly to treat than any other age*sex group younger than 55, - nearly 73 percent greater than comparably aged females ($14,224 vs. $8244), (*Figure 3.12*). After age 4, costs for treating males increased steadily until age 64, but decreased substantially (15 percent) from the 75-84 to the 85 or older age groups. Female treatment costs were fairly steady until age 24, then climbed through ages 65-74 to peak at $14,650, afterward decreasing 9 percent by the time age 85 was reached.

Figure 3.12. Mean treatment charges for drug/medication-related poisoning discharges[1], by sex, age group, Ohio, 2003-07

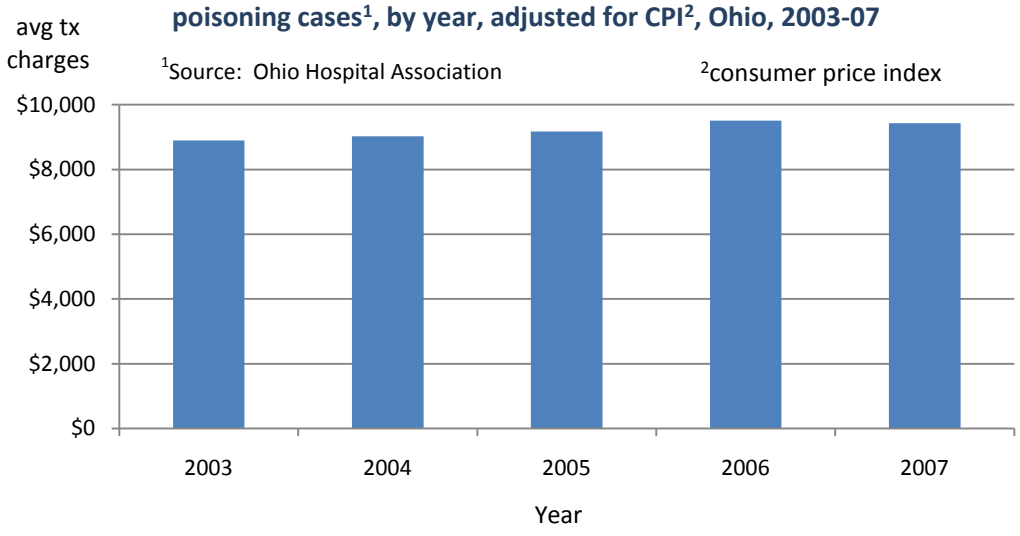


[1]Source: Ohio Hospital Association

CONSUMER PRICE INDEX (CPI) ADJUSTED CHARGES BY YEAR

Information from the Bureau of Labor Statistics' Consumer Price Index Detailed Report on 'hospital and related services' (http://www.bls.gov/cpi/cpid07av.pdf), was used to adjust for the effects of inflation when examining changes in treatment charges from 2003-07 (*Figure 3.13*). After this correction, charges remained fairly stable, ranging from $8,894 in 2003 to $9,431 in 2007, an increase of 6.0 percent.

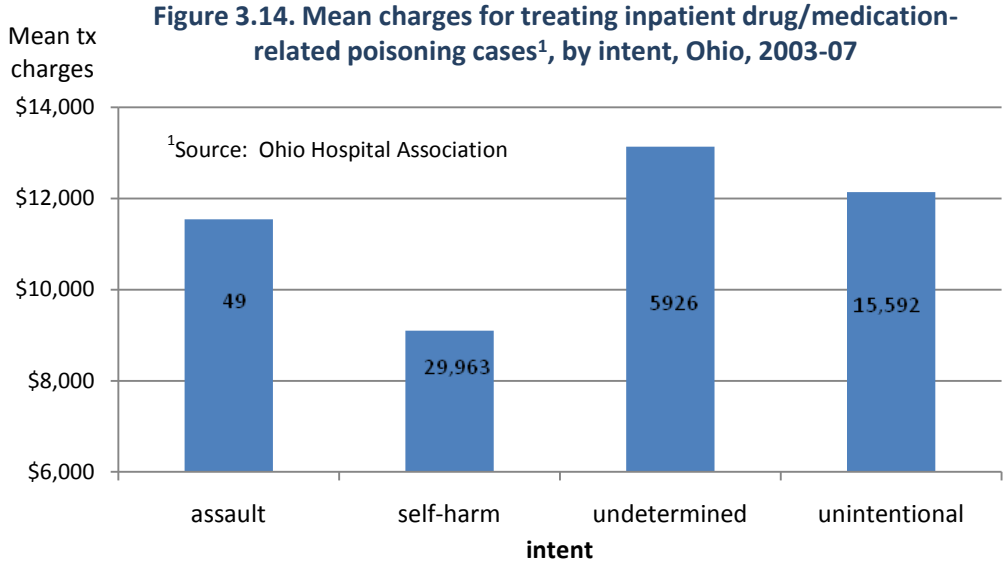
Figure 3.13. Mean treatment charges for drug/medication-related poisoning cases[1], by year, adjusted for CPI[2], Ohio, 2003-07



CHARGES BY INTENT

Treatment charges varied by the intent of the poisoning: ranging from $9,229 for persons who self-harmed to $13,265 for cases of undetermined intent, a difference of 44 percent, (*Figure 3.14*). Cases for whom intent was unable to be determined may have been more seriously injured, while the other variations in charges are likely to be at least partially attributable to the substances most likely to be associated with each intent (*please see 'Intent' section of this report*.) (Nearly 30,000 cases were associated with self-harm, thus having a major influence on bringing down average charge.)

Figure 3.14. Mean charges for treating inpatient drug/medication-related poisoning cases[1], by intent, Ohio, 2003-07

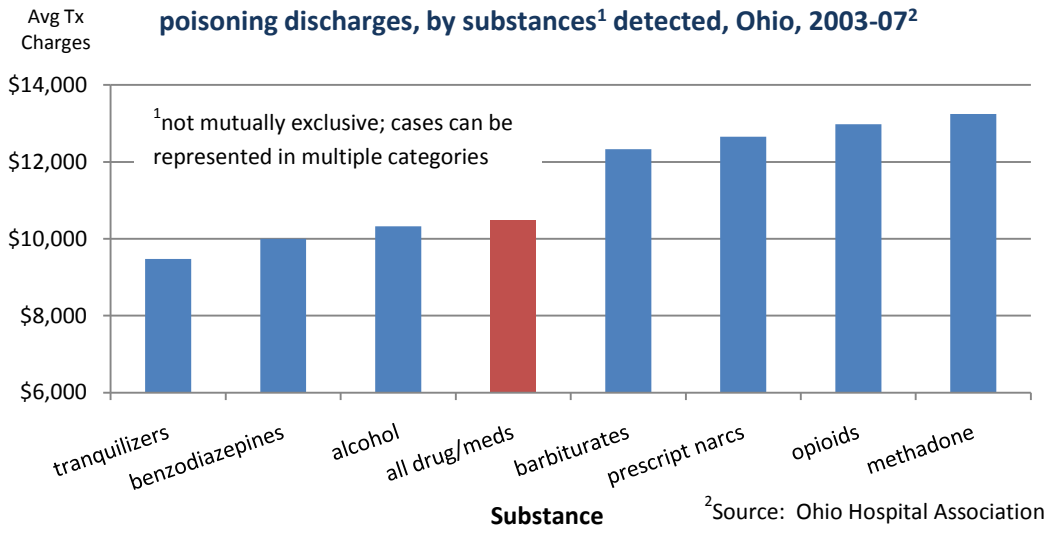


TREATMENT CHARGES ASSOCIATED WITH SELECTED SUBSTANCES

Mean treatment charges varied widely by substances involved, ranging from $9,476 for tranquilizers to $13,241 for methadone, (39.3 percent greater). In the 'Intent' section of this report, data is presented that demonstrates that tranquilizer and benzodiazepine poisonings were more likely to be deemed self-harm while opioid and methadone poisonings were more likely to be identified as unintentional poisonings, (the former of which, we have just seen (Figure 3.14) are associated with lower mean charges).

(Caution to readers: More than 72 percent of the 10,078 cases who used any of the substances represented in Figure 3.15 were associated with two or more of these substances.)

Figure 3.15. Mean treatment charges for drug/medication-related poisoning discharges, by substances[1] detected, Ohio, 2003-07[2]

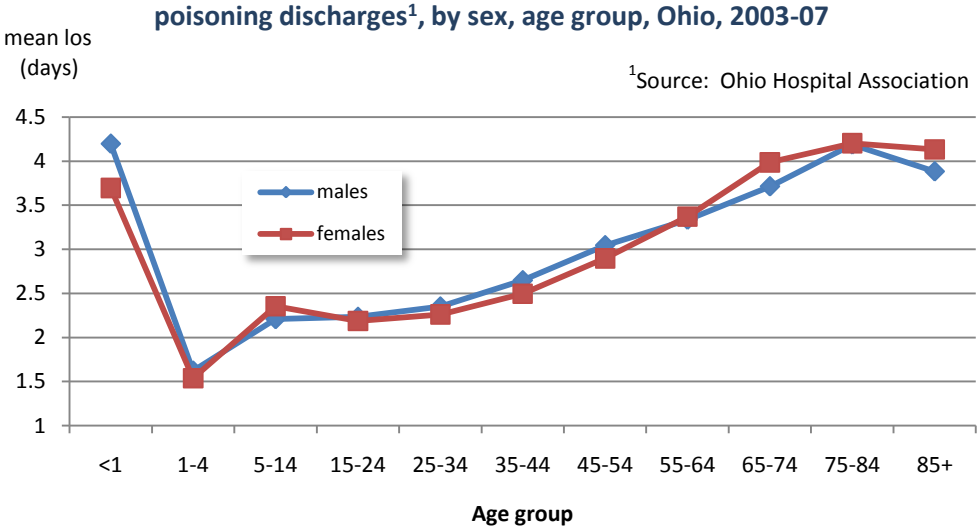


LENGTH OF STAY

LENGTH OF STAY BY AGE, SEX

Drug/medication-related poisoning cases treated as hospital inpatients from 2003-07 stayed a total of 139,928 days, with a range of 0 to 137, a median of 2 and a mean of 2.7. The few poisoned infants (56 males and 46 females) were held for extended treatment: 4.2 and 3.7 days, respectively (*Figure 3.16*). After age 1, length of stay (LOS) generally increased over the lifespan, with little differences between the sexes.

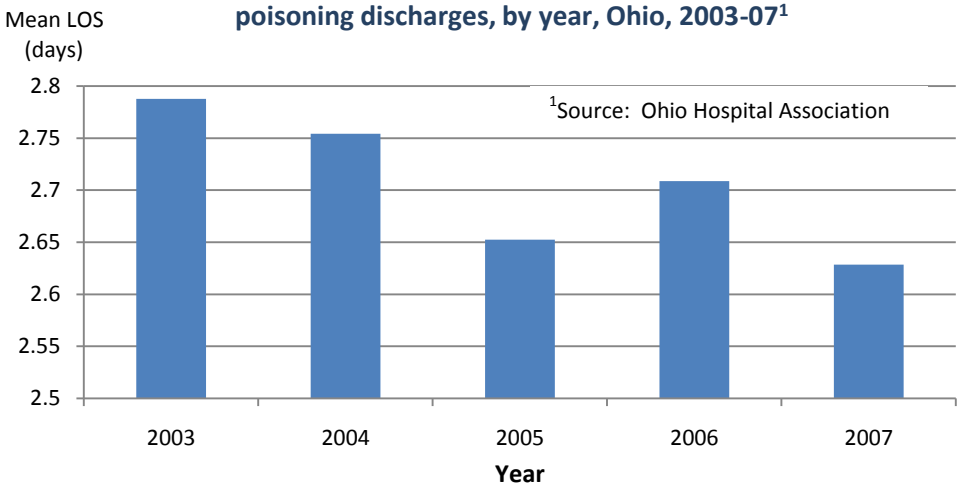
Figure 3.16. Mean length of stay for drug/medication-related poisoning discharges[1], by sex, age group, Ohio, 2003-07



LENGTH OF STAY BY YEAR

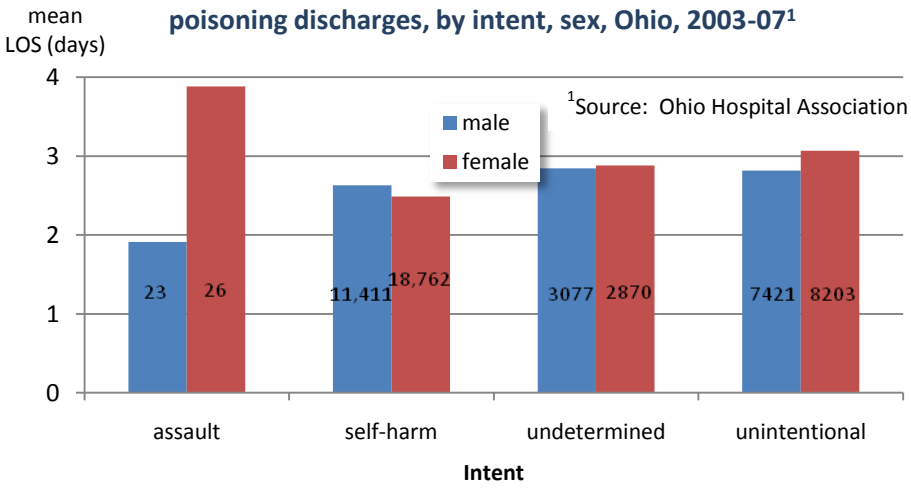
The average LOS for drug/medication poisoning cases exhibited a slight trend towards shorter treatment periods over the study period, decreasing 6.1 percent from 2003 (2.79 days) to 2007 (2.63 days) (*Figure 3.17*).

Figure 3.17. Mean length of stay for drug/medication-related poisoning discharges, by year, Ohio, 2003-07[1]



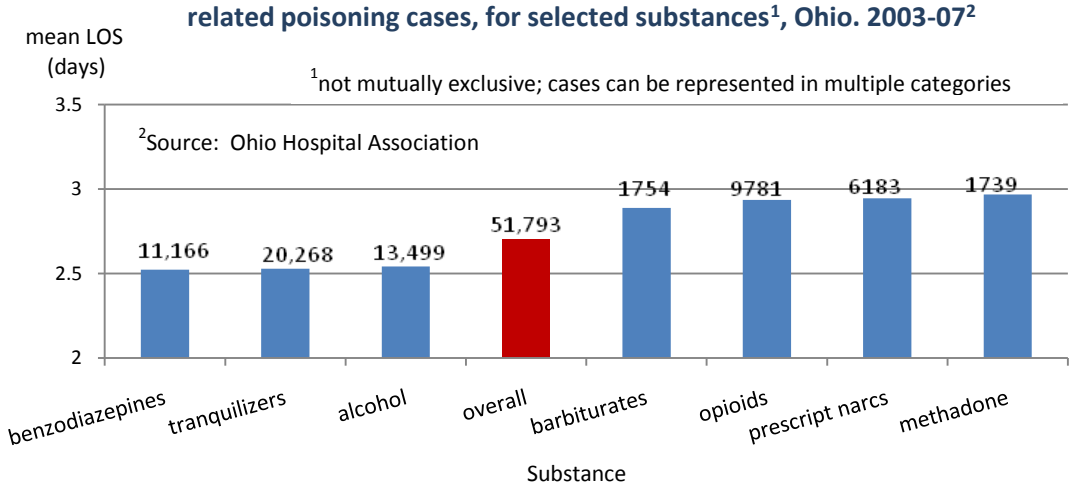
Excluding assaults, of which there were very few, (total=49), mean length of stay varied between 2.5 days for female self-harmers to 3.1 days for females who were unintentionally poisoned. For males, self-harmers also had the shortest average LOS, 2.6 days (*Figure 3.18*).

Figure 3.18. Mean length of stay for drug/medication-related poisoning discharges, by intent, sex, Ohio, 2003-07[1]



The distribution pattern for mean length of stay for selected substances was similar to what we saw with mean treatment charges, with slight variations (*Figure 3.19*): benzodiazepine-, tranquilizer, and alcohol-related poisonings were associated with shorter stays while opioid-, prescription narcotic-, and methadone-related poisonings involved longer stays. Cases involving methadone had 17.9 percent longer stays than those who suffered benzodiazepine-related poisoning (2.97 vs. 2.52 days, respectively).

Figure 3.19. Mean length of stay and number of drug/medication-related poisoning cases, for selected substances[1], Ohio. 2003-07[2]

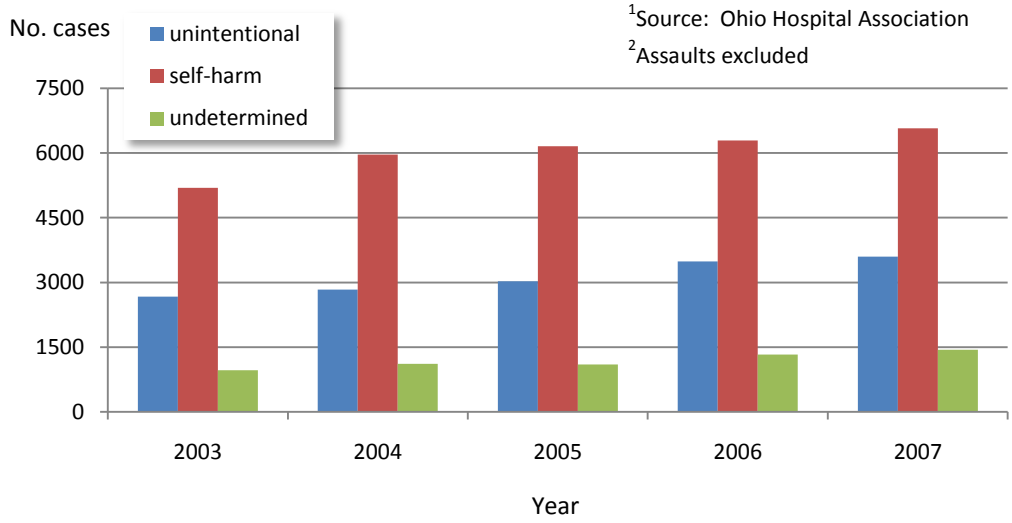


INTENT

INTENT BY YEAR

The first listed ICD-9CM external cause (E-) code was used to establish intent, (please see Appendix B). None of the drug/medication-related poisonings were attributed to legal intervention and only 49 (<0.1 percent) were deemed to be assaults. Except for assaults in general, (data not shown) and undetermined poisonings from 2004 to 2005, there was an across the board increase in number of discharges each year for poisonings of each intent (*Figure 3.20*).

Figure 3.20. Number of drug/medication-related poisoning discharges[1], by year, intent[2], Ohio 2003-07

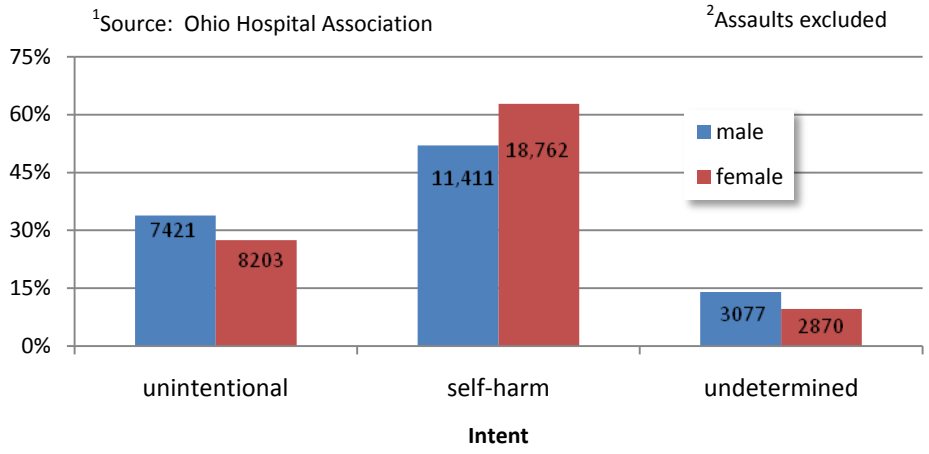


SEX AND AGE BY INTENT

Nearly 58 percent of hospital-treated poisoning cases were deemed to have purposely harmed themselves, (62.8 percent of females, 52.0 percent of males) (*Figure 3.21*). More than a third, (33.8 percent) of males who were admitted for drug/medication-related poisoning were classified as unintentional, compared to 27.5 percent of females.

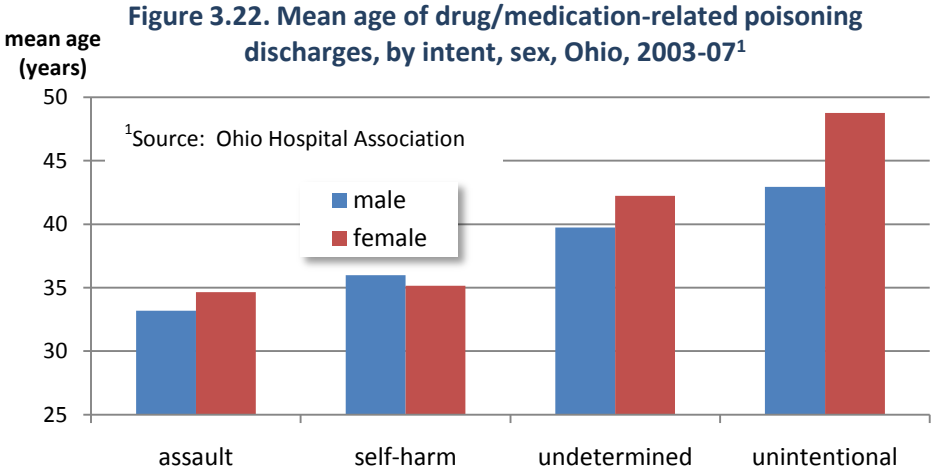
Among the 6000 undetermined, a greater proportion was male.

Figure 3.21. Proportion of drug/medication-related poisoning discharges[1] attributable to each intent[2], by sex, Ohio, 2003-07



Persons who unintentionally poisoned themselves were older, on average, than those with other intentions, (males=42.9 years, females=48.8) (*Figure 3.22*). Victims of assault were the youngest (males=33.2 years, females=34.7). Except for the self-harmers, females were older than males for each intention.

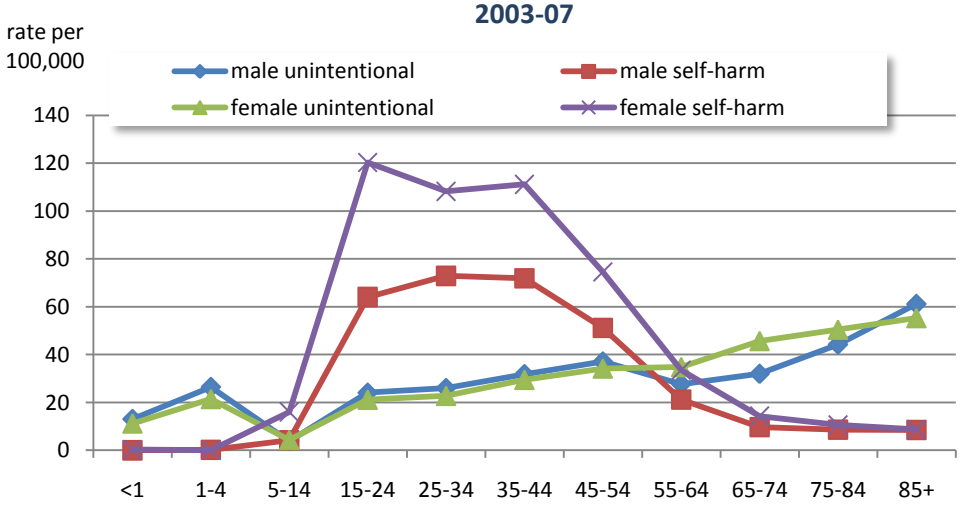
Figure 3.22. Mean age of drug/medication-related poisoning discharges, by intent, sex, Ohio, 2003-07[1]



However, when we examine unintentional and self-inflicted DMR poisoning treatment rates by age group (*Figure 3.23*), we see that rates of unintentional and self-harm poisonings follow very different patterns throughout the lifespan. Rates of unintentional poisoning climbed fairly steadily after age 15 and were very similar for males and females, while self-harm poisonings were greatly elevated for older teens through young and middle aged adults and much lower for the very young and the old.

Rates for female self-poisonings peaked among the 15-24 year age group and remained very high (greater than 100 per 100,000 per year) until age 44 (3½ to 5½ times higher than unintentional poisoning rates among this population) then dropping off rapidly. Male unintentional poisoning rates followed a similar pattern, although not as extremely as among females, remaining above 50 per 100,000 from 15 through the 45-54 age group.

Figure 3.23. Average annual drug/medication-related poisoning discharge rates per 100,000[1], by intent[2], sex, age group, Ohio, 2003-07



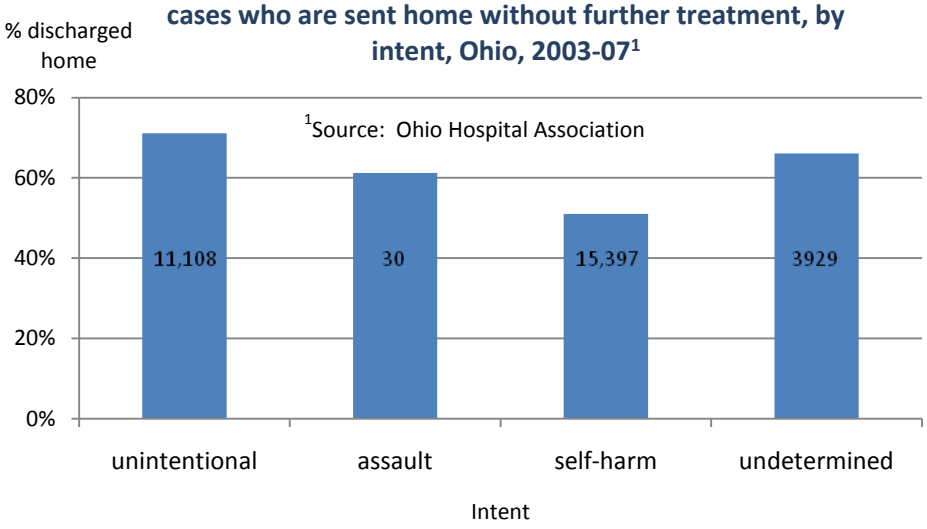
[2]Excluding assaults and undetermined

[1]Source: Ohio Hospital Association

DISCHARGE DESTINATION BY INTENT

Overall, among DMR poisoning hospitalizations, 58.8 percent of patients were discharged home without further treatment. Persons who were unintentionally poisoned were the most likely to be discharged home, 71.1 percent, while persons who were trying to harm themselves were the least likely, 51.0 percent, (*Figure 3.24*). Despite the lower proportion of self-harmers sent home, they still constituted the largest number of such discharges (15,397).

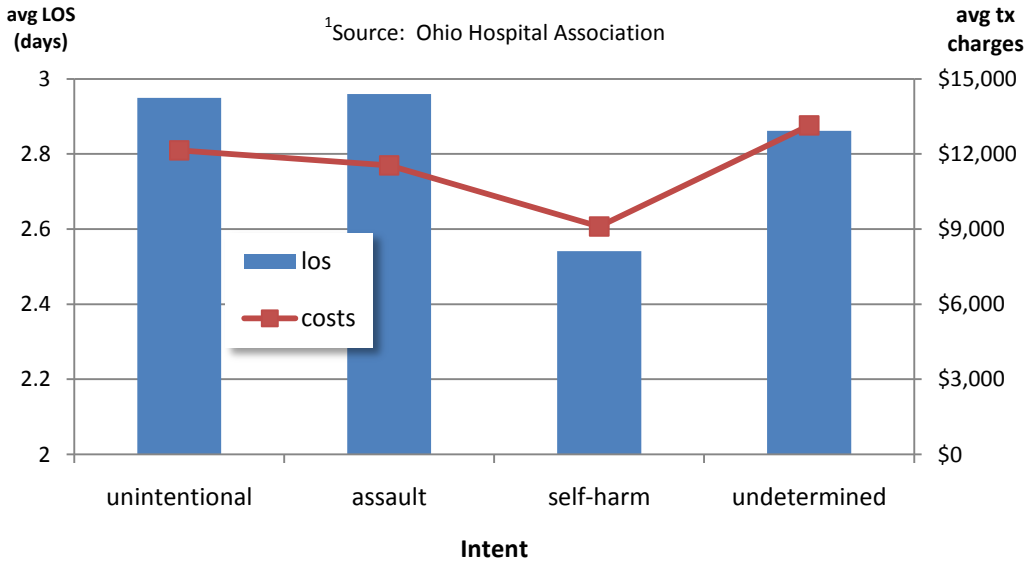
Figure 3.24. Proportion of drug/medication-related poisoning cases who are sent home without further treatment, by intent, Ohio, 2003-07[1]



LENGTH OF STAY AND TREATMENT CHARGES BY INTENT

The relationship between length of stay and treatment charges followed a slightly irregular pattern for the different intentions. Self-harmers had the shortest average stay (2.54 days) and lowest treatment charges ($9,103), while assault victims had the longest lengths of stay (2.96 days), but lower mean costs ($11,547) than poisonings of undetermined intent ($13,139) and unintentional poisonings ($12,141) (*Figure 3.25*).

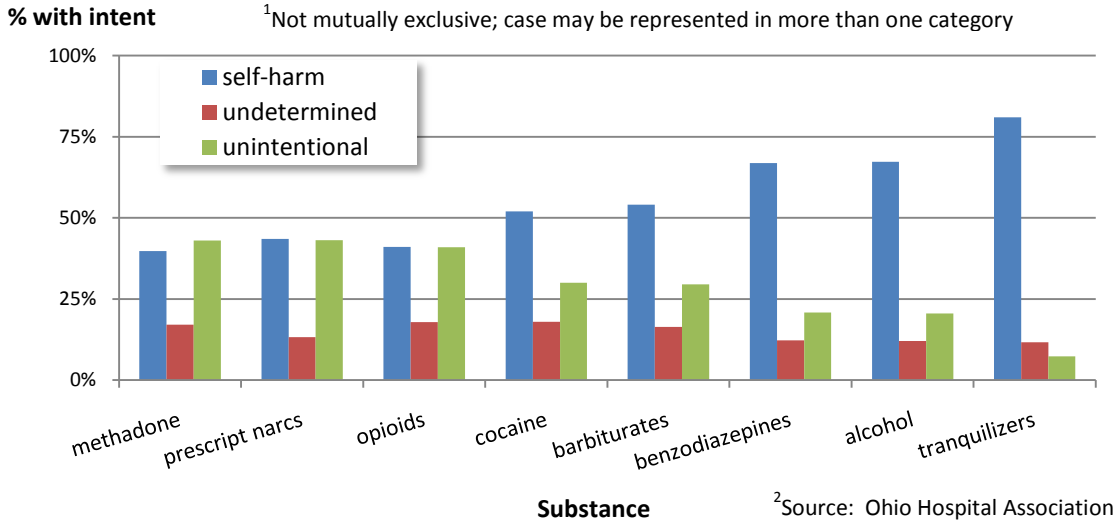
Figure 3.25. Mean length of stay and treatment charges[1] for drug/medication-related poisoning discharges, by intent, Ohio, 2003-07



INTENT ASSOCIATED WITH SELECTED SUBSTANCES

Hospitalized cases involving tranquilizers (81.0 percent), benzodiazepines (66.9 percent), or alcohol (67.3 percent), were the most likely to have their poisoning attributed to intentional self-harm (*Figure 3.26*). More than half (52.0 percent) of the cases involving cocaine were also classified as self-harm. Opioid and prescription narcotic-related poisonings were about as likely to be deemed self-harm as unintentional, while methadone cases were slightly more likely to be defined as unintentional (43.1 percent vs. 39.8 percent).

Figure 3.26. Distribution of intent, for substances[1] associated with poisoning discharges[2], by intent, Ohio, 2003-07



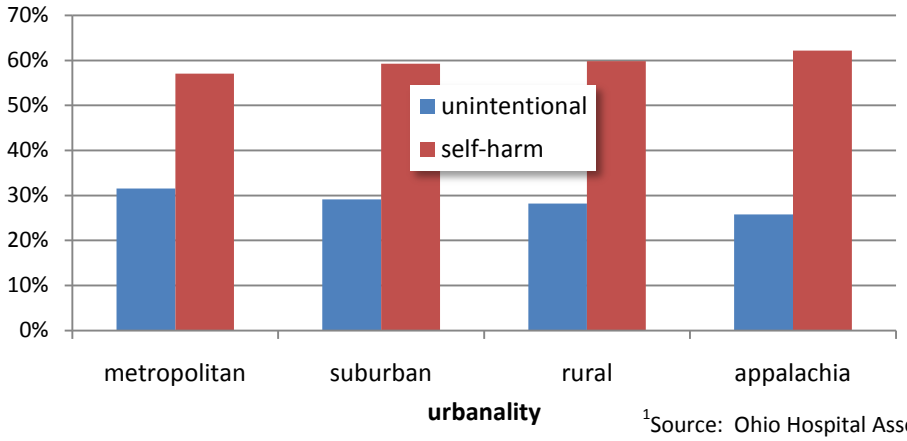
[1]Not mutually exclusive; case may be represented in more than one category

[2]Source: Ohio Hospital Association

URBANALITY AND INTENT

Sixty-five percent (32,529) of hospitalizations for drug/medication-related poisonings during the study period occurred in counties of residence that were considered metropolitan, while 12 percent occurred in suburban, 10 percent in rural and 13 percent in counties that are located in Appalachia. There was a very slight trend for the poisonings to be attributed to self-harm as counties became more rural: 57.0 percent in metro counties, 62.2 percent in Appalachian counties (*Figure 3.27*). The opposite was seen with classification of poisonings as unintentional: 31.6 percent in metropolitan counties, 25.8 percent in Appalachian.

Figure 3.27. Proportion of discharges for drug/medication-related poisonings attributable to self-harm or unintentional intent, by urbanality, of resident count, Ohio, 2003-07



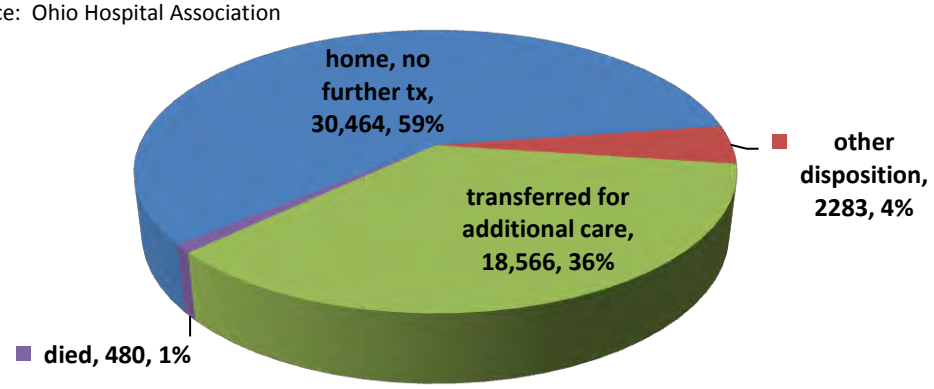
[1]Source: Ohio Hospital Association

DISCHARGE STATUS

The majority of Ohio DMR poisoning cases treated in hospitals were sent home without additional care, while a little more than a third were transferred for additional treatment, Figure 3.28.

Figure 3.28. Distribution of hospital discharge status of persons treated for drug/medication-related poisoning[1], Ohio, 2003-07

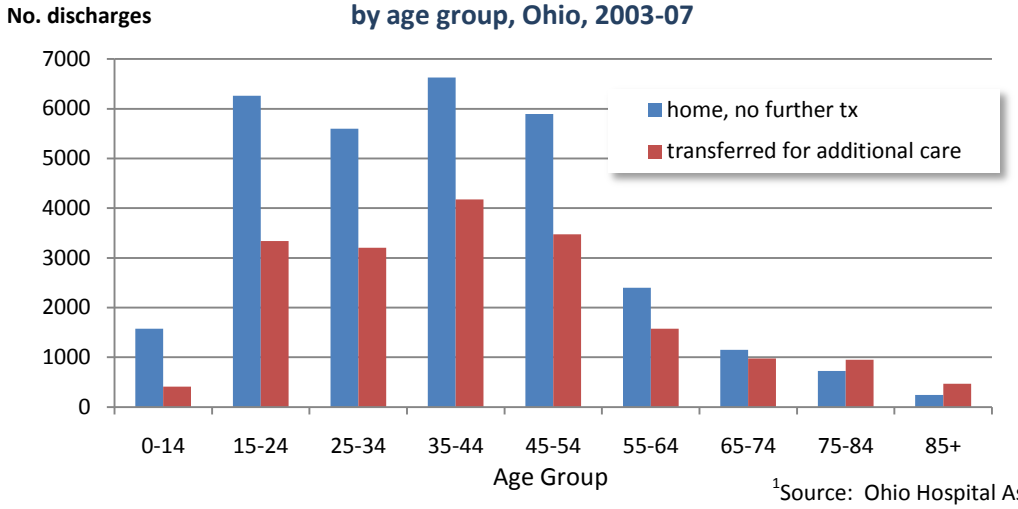
[1]Source: Ohio Hospital Association



DISCHARGE STATUS BY AGE AND SEX

The likelihood of being discharged home after treatment for drug overdose steadily decreases with age: 78.8 percent of persons 14 or younger, 32.7 percent of those 85 or older, (data not shown). Up until age 75, more than half are discharged home without further treatment in hospital, while after age 75, more than half are transferred for further treatment (*Figure 3.29*).

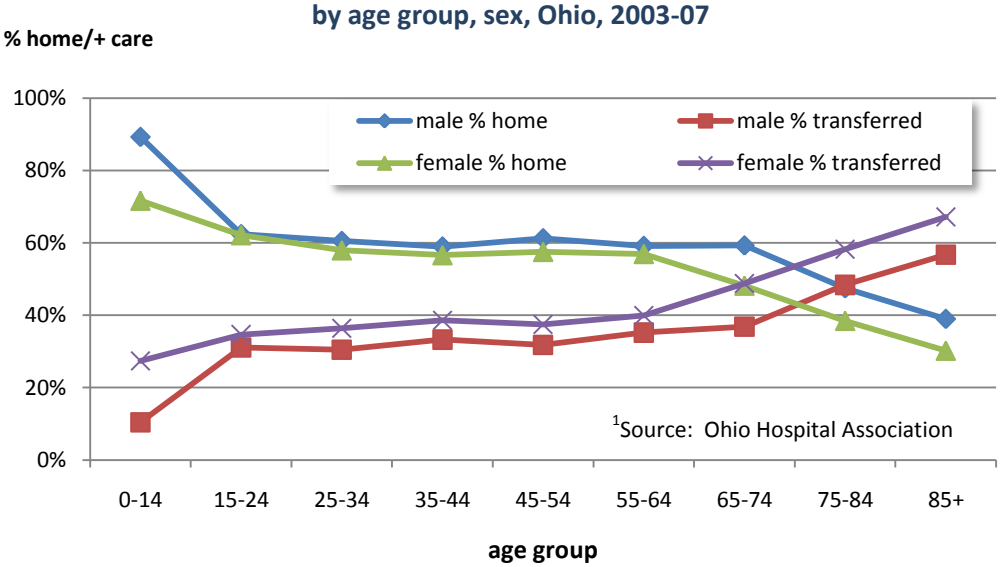
Figure 3.29. Number of drug/medication-related poisoning cases[1] who are discharged home or transferred for additional treatment, by age group, Ohio, 2003-07



[1]Source: Ohio Hospital Association

After the data from Figure 3.29 are further stratified by sex, we can see that, for most of the lifespan, male poisoning victims are more likely than females to be discharged home without further care and less likely to be transferred for additional treatment (*Figure 3.30*).

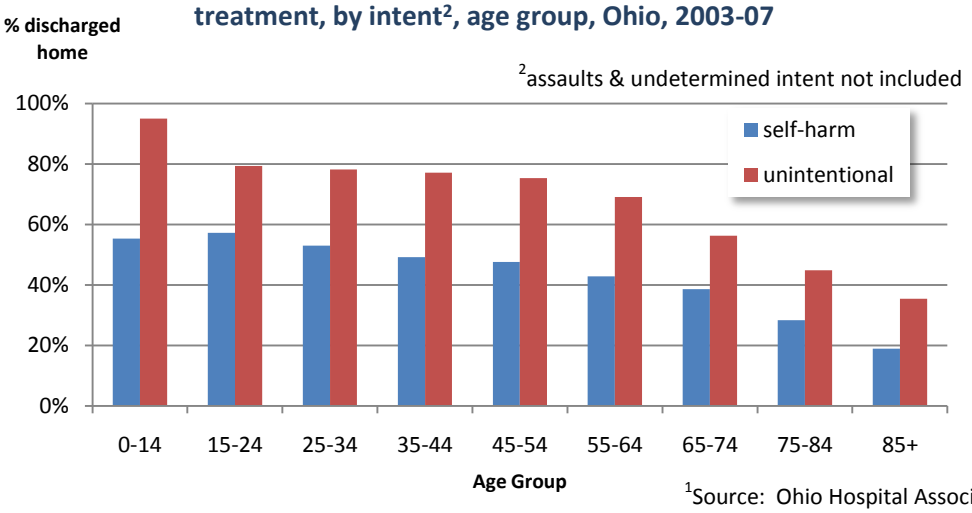
Figure 3.30. Proportion of drug/medication-related poisoning cases who are discharged home or transferred for additional care, by age group, sex, Ohio, 2003-07



DISCHARGE STATUS BY INTENT, AGE

As was made known in the 'Intent' section of this report, unintentional poisoning cases are more likely to be discharged home without further treatment than those who self-harm. *Figure 3.31* demonstrates that this is true regardless of age.

Figure 3.31. Proportion of hospitalized drug/medication-related poisoning cases[1] discharged home without further treatment, by intent[2], age group, Ohio, 2003-07

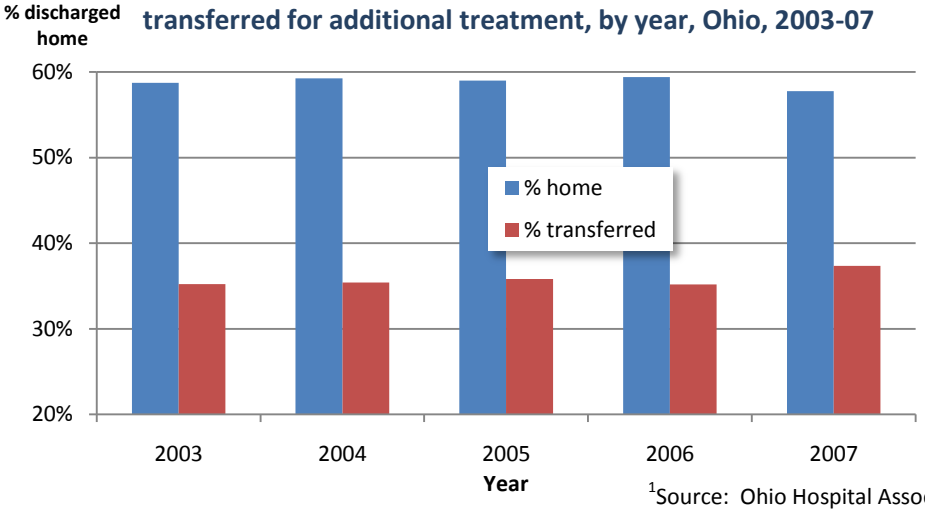


[1]Source: Ohio Hospital Association

DISCHARGE STATUS BY YEAR

Discharge status for poisoning cases remained steady during the study period: each year between 57.4 percent and 59.1 percent were discharged home and between 35.8 percent and 38.1 percent transferred for additional treatment (*Figure 3.32)*.

Figure 3.32. Proportion of drug/medication-related poisoning cases[1] discharged home without further treatment or transferred for additional treatment, by year, Ohio, 2003-07

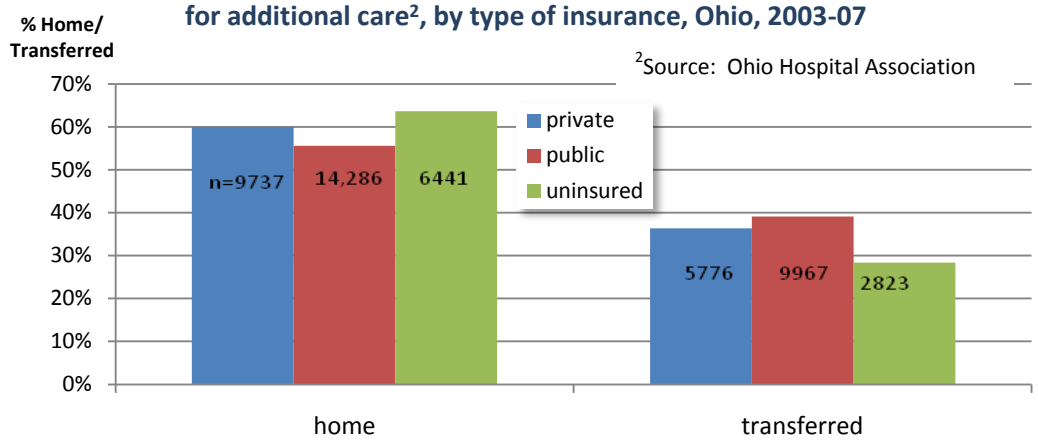


[1]Source: Ohio Hospital Association

Impact of Insurance Status on Discharge Destination

Poisoning cases who were uninsured, (please see Appendix C for insurance classifications), were 15 percent more likely to be discharged home without further treatment than were persons with public insurance and 6 percent more likely than those with private insurance (*Figure 3.33*). The uninsured were also 39 percent less likely to be transferred for additional treatment than cases with public insurance and 28 percent less likely than those with private insurance.

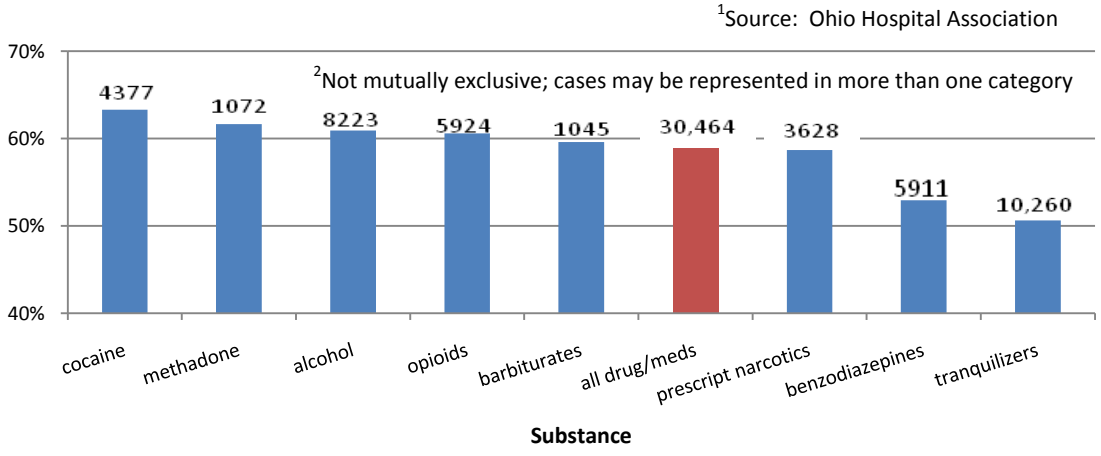
Figure 3.33 Proportion of drug/medication-related poisoning cases discharged home without further treatment or transferred for additional care[2], by type of insurance, Ohio, 2003-07



Likelihood of Being Discharged Home by Substance

Likelihood of being discharged home without further treatment varied considerably by substance, (although there may have been multiple substances involved and it is usually not known which drug was most responsible for the overdose). As was demonstrated in *Figure 3.28*, 58.8 percent of all drug/medication poisonings were discharged home without further treatment. Persons who ingested cocaine were the most likely to be sent home, (63.3 percent), while those who were poisoned by tranquilizers, (50.6 percent) or benzodiazepines (52.9 percent) were the least likely, Figure 3.34.

Figure 3.34. Proportion of drug/medication-related poisoning cases[1] discharged home without further treatment, by substance[2], Ohio, 2003-07

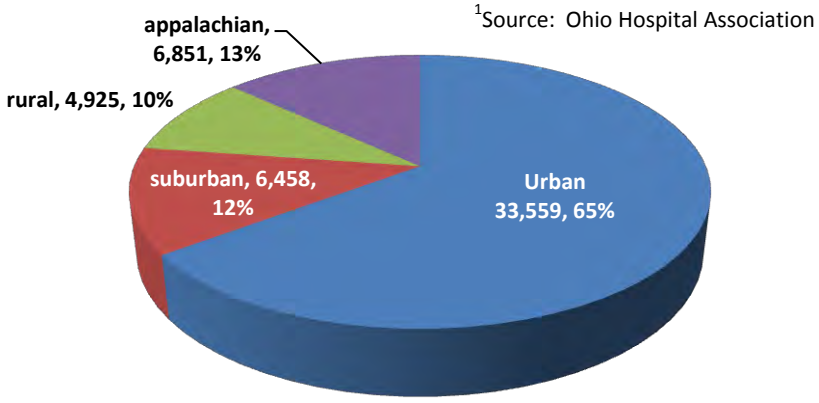


COUNTY URBANALITY

Nearly two-thirds of the discharges were among residents of metropolitan counties while the remaining third was split fairly evenly among suburban, rural, and Appalachian counties(*Figure 3.35*). (*Please see Appendix D for urbanality categorizations*).

Figure 3.35. Distribution of resident county urbanality of persons treated for drug/medication-related poisoning, Ohio, 2003-07[1]

[1]Source: Ohio Hospital Association

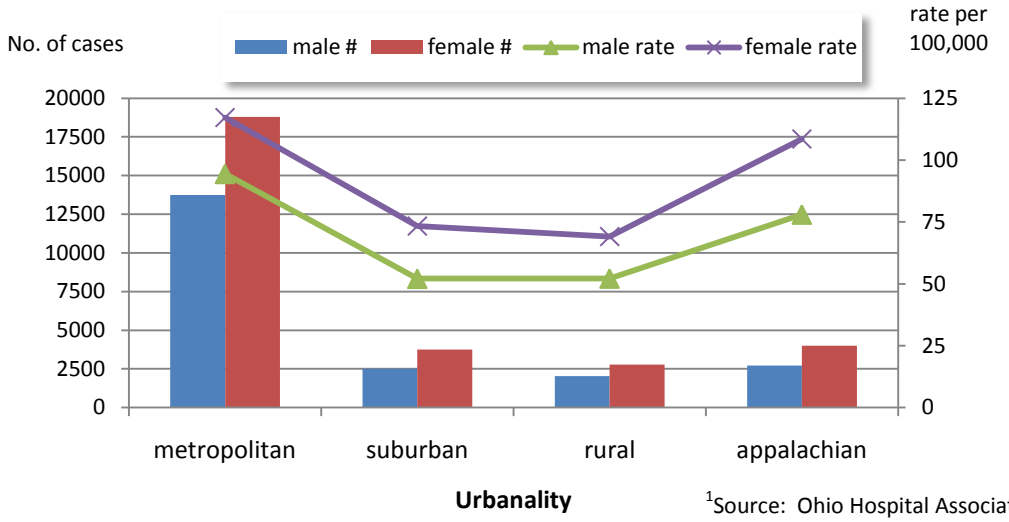


NUMBER AND RATE OF DRUG/MEDICATION POISONING DISCHARGES BY URBANALITY

Assigning an entire county to an urbanality category certainly results in some misclassification. Despite this limitation, rates of drug/medication-related poisonings varied markedly by urbanality, with persons living in Ohio's metropolitan or Appalachian counties much more likely to be hospitalized (*Figure 3.36)*.

Rates were highest for metropolitan county residents: 117.2 per hundred thousand for females, 94.4 for males. Appalachian rates were nearly as high, 108.5 for females, 78.0 for males, while suburban and rural rates were each about 70 per hundred thousand for females and about 52 for males (*Figure 3.36*).

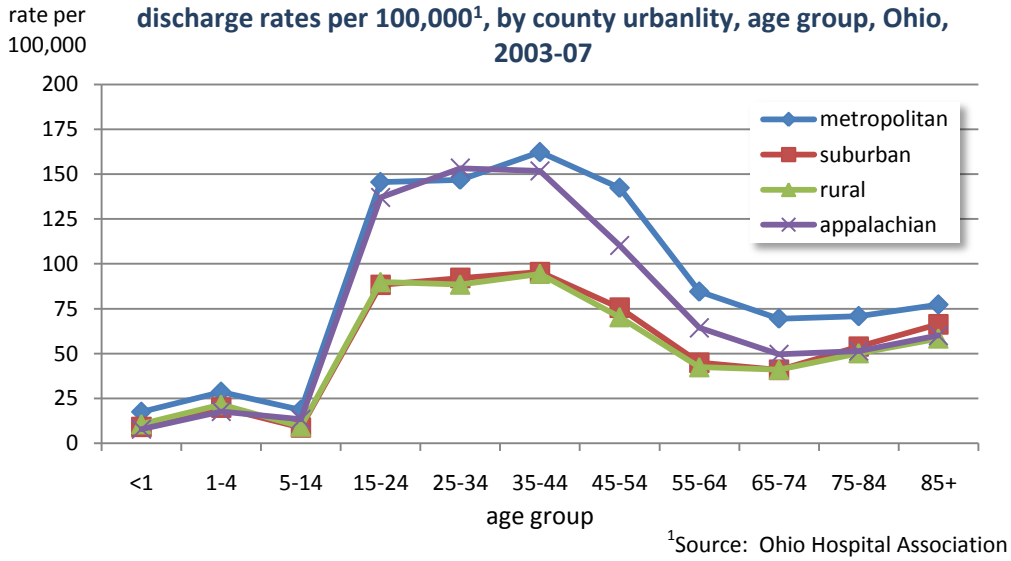
Figure 3.36. Five year total and average annual rate of drug/medication-related poisoning discharges[1], by county urbanlity, sex, Ohio, 2003-07



[1]Source: Ohio Hospital Association

Hospital discharge rates for specific age groups follow the overall pattern identified earlier in 'Introduction', with rates climbing rapidly after age 14, peaking among those 35-44 and then dropping until age 74 (*Figure 3.37)*. However, among the high risk age groups (15-54), rates for residents of Appalachian and metropolitan counties are at least 50 percent higher than among rural and suburban county residents. For example, metropolitan 35-44 year olds were discharged at a rate of 162.2 per 100,000, compared to about 95 per 100,000 among equivalent rural and suburban county residents.

Figure 3.37. Average annual drug/medication-related poisoning discharge rates per 100,000[1], by county urbanlity, age group, Ohio, 2003-07

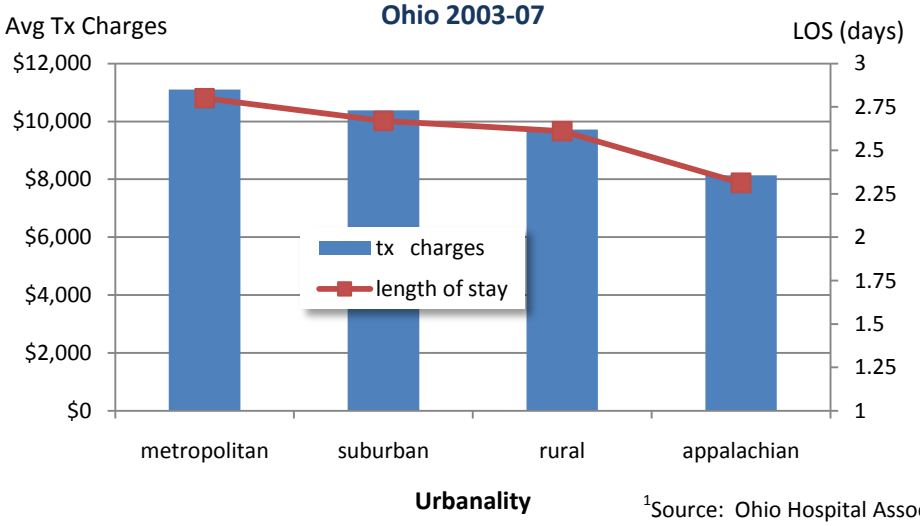


[1]Source: Ohio Hospital Association

LENGTH OF STAY AND TREATMENT CHARGES BY URBANALITY

The higher urbanization category that a county belongs to, the longer the average treatment stay for hospitalized drug/medication-related poisoning cases, and the greater the average treatment charge (*Figure 3.38)*. Poisoning victims from metropolitan counties stayed 2.80 days and cost $11,096 to treat, compared to 2.31 days and $8,143 for their counterparts that resided in Appalachian counties.

Figure 3.38. Mean hospital treatment charges and length of stay, for drug/medication-related poisoning cases[1], by county urbanality, Ohio 2003-07

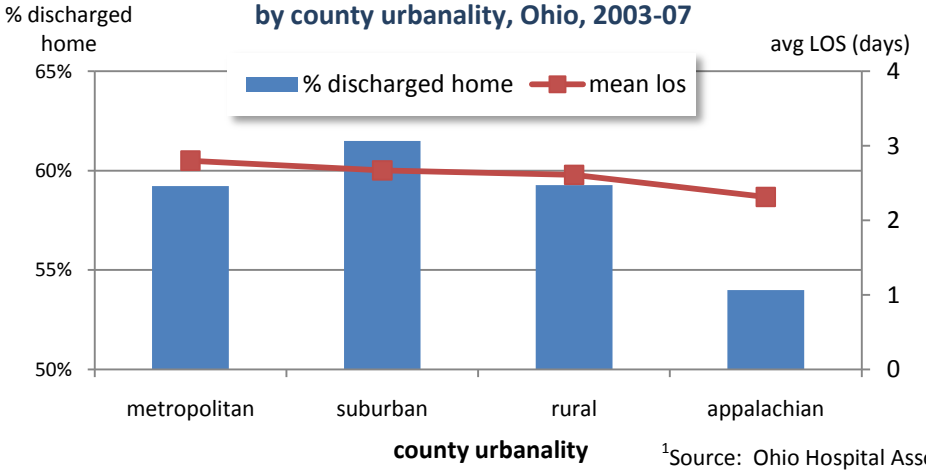


[1]Source: Ohio Hospital Association

DISCHARGE STATUS AND URBANALITY

However, although Appalachian poisoning patients have shorter stays and lower treatment costs, Figure 38, they are also 14 percent less likely to be discharged home without further treatment than are suburban county residents (53.6 percent vs. 61.2 percent, respectively) (*Figure 3.39)*. This may be due to, at least in part, more severe substance abuse among Appalachian county residents.

Figure 3.39. Proportion of drug/medication-related poisoning cases[1] discharged home and mean length of stay, by county urbanality, Ohio, 2003-07

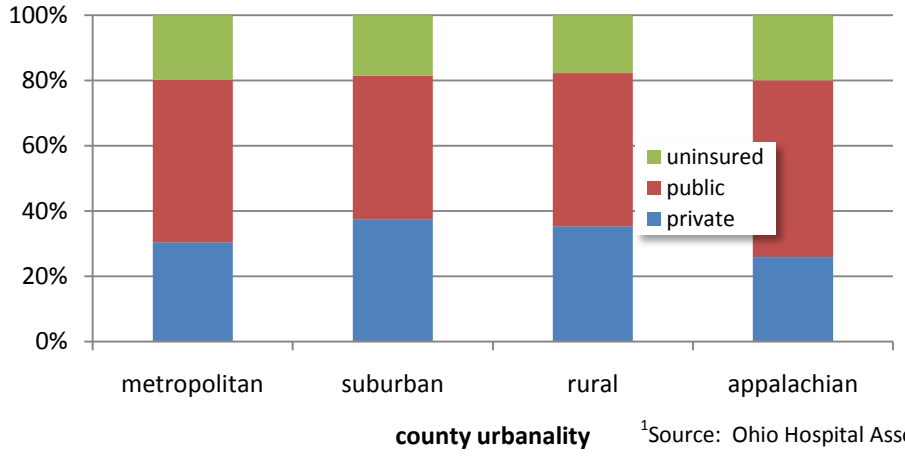


[1]Source: Ohio Hospital Association

INSURANCE STATUS BY URBANALITY

Overall, 31.0 percent of drug/medication-related poisoning dischargees had private insurance, 49.9 percent had some form of public insurance, and 19.2 percent were uninsured, (please see Appendix C for insurance categorization). Suburban overdoses were the most likely to have private insurance, 37.1 percent, while Appalachians were the least likely, 25.9 percent (*Figure 3.40)*. Appalachian poisoning cases were the most likely to have public insurance, 54.1 percent or to be uninsured, 20.0 percent, while those living in non-Appalachian rural counties were the least likely to be uninsured, 17.8 percent.

Figure 3.40. Distribution of insurance status among drug/medication-related poisoning discharges[1], by county urbanality, Ohio, 2003-07



[1]Source: Ohio Hospital Association

SELECTED SUBSTANCES LIKELY TO BE ABUSED

METHODOLOGY FOR IDENTIFYING AND CLASSIFYING SUBSTANCE USE

Identifying Poisoning Cases/Determining Involvement of Substances

All discharges included in these analyses had a poisoning-related, first-listed International Classification of Diseases 9th Revision Clinical Modification E-code of E850–E858, E860–E869, E950–E952, E962, E972, E980–E982, or E979 (.6–.7). All 15 available diagnosis fields were then examined to determine if a substance, e.g. heroin, was detected at admission or during treatment. (*Please see Appendix E for codes that were used to identify specific drug/medication involvement*).

Please also see http://www.cdc.gov/ncipc/dir/StateInjIndicators.htm for CDC's definition of poisoning related hospital discharges, http://www.cdc.gov/nchs/icd/icd9cm.htm to access ICD-9-CM codes and Appendix B for complete list of specific E-codes included in this study.

Rationale for this Approach

The ICD-9-CMs are plagued with vague coding and inconsistent delineation of detail for different intents. For example, unintentional poisoning from heroin can be identified, by the presence of code E850.0 in one of the 15 diagnostic fields, since this code is specific to heroin. On the other hand, no such unique code is available to identify heroin poisonings of undetermined intent or for persons who are intentionally poisoned by themselves or others. If the treating physician recognized that heroin was used to self-harm, the most specific E-code available to capture this would be E950.0 *analgesics, antipyretics, and antirheumatics.*

However, the physician can establish a record of the presence of heroin by including an ICD-9-CM 'N' code specific to heroin, e.g. 965.01 (Appendix E). Therefore, the findings presented in this report are based on the widest possible interpretation of "involvement" of a substance, - without concluding that the poisoning resulted directly from ingestion of this substance. This approach was undertaken to avoid the severe undercounts that would result if only direct, incontrovertible evidence of a causal relationship between the substance and the admission was available in the data (i.e. assignment of a substance-specific E-code).

LIMITATIONS

The primary danger introduced with this approach is that it may be conveyed to the reader that a particular substance played a larger role in poisoning-related hospital admissions than was truly warranted. At the most extreme, in some cases, this distortion of the contribution of the substance may even be attributable to therapeutic administration of, e.g. tranquilizers to treat anxious self-harmers. However, the researchers felt this approach was the most appropriate method for assuring that the impact of particular substances on likelihood of admission to a hospital for poisoning was not underestimated. Accordingly, they have taken great care throughout this document to not assign causality, only presence.

SEX AND AGE OF LIKELY SUBSTANCE ABUSERS

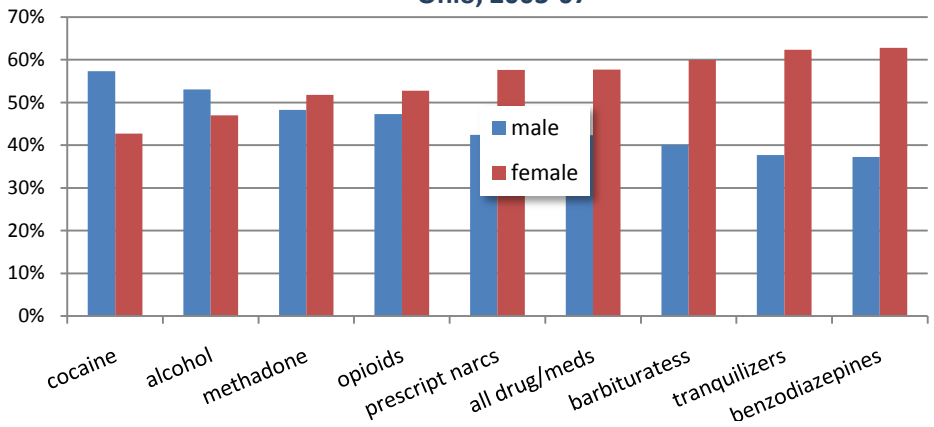
Table 3.2. Number of inpatient discharges[1] after treatment for poisoning by substance[2], sex, age group, Ohio, 2003-07

[1]Source: Ohio Hospital Association
[2]not mutually exclusive, cases may be represented in multiple substance categories

Substance	Sex	Age Group							Total
		0-14	15-24	25-34	35-44	45-54	55-64	65+	
tranquilizers	**male**	172	1,490	1,668	2,022	1,555	463	265	**7,635**
	female	317	2,211	2,651	3,368	2,546	936	604	**12,633**
	total	489	3,701	4,319	5,390	4,101	1,399	869	**20,268**
alcohol	**male**	33	1,086	1,465	2,099	1,783	529	162	**7,157**
	female	21	984	1393	2,059	1,418	339	128	**6,342**
	total	54	2,070	2,858	4,158	3,201	868	290	**13,499**
prescription opioids	**male**	43	396	496	568	650	253	215	**2,621**
	female	51	407	547	799	763	475	520	**3,562**
	total	94	803	1,043	1,367	1,413	728	735	**6,183**
opioids	**male**	43	789	979	1,015	1,118	398	279	**4,621**
	female	43	623	979	1,015	1,118	398	279	**4,455**
	total	86	1,412	1,958	2,030	2,236	796	558	**9,076**
cocaine	**male**	2	474	847	1,284	1,070	238	48	**3,963**
	female	2	376	818	1,051	622	73	12	**2,954**
	total	4	850	1,665	2,335	1,692	311	60	**6,917**
barbiturates	**male**	6	128	148	204	155	45	17	**703**
	female	7	122	217	292	269	87	57	**1,051**
	total	13	250	365	496	424	132	74	**1,754**
benzodiazepines	**male**	53	731	905	1,058	925	310	173	**4,155**
	female	66	755	1,406	2,012	1,674	672	426	**7,011**
	total	119	1,486	2,311	3,070	2,599	982	599	**11,166**
methadone	**male**	10	139	175	175	213	77	50	**839**
	female	9	97	149	227	232	94	92	**900**
	total	19	236	324	402	445	171	142	**1,739**

Of the inpatient populations who ingested substances likely to be abused, only those who used cocaine (57.3 percent) or alcohol (53.0 percent) were majority male (*Figure 3.41*). Females made up 62.3 percent of the tranquilizer users and 62.8 percent of those who took benzodiazepines.

Figure 3.41. Distribution of sex for selected substances[1] associated with drug/medication-related poisoning discharges[2], Ohio, 2003-07

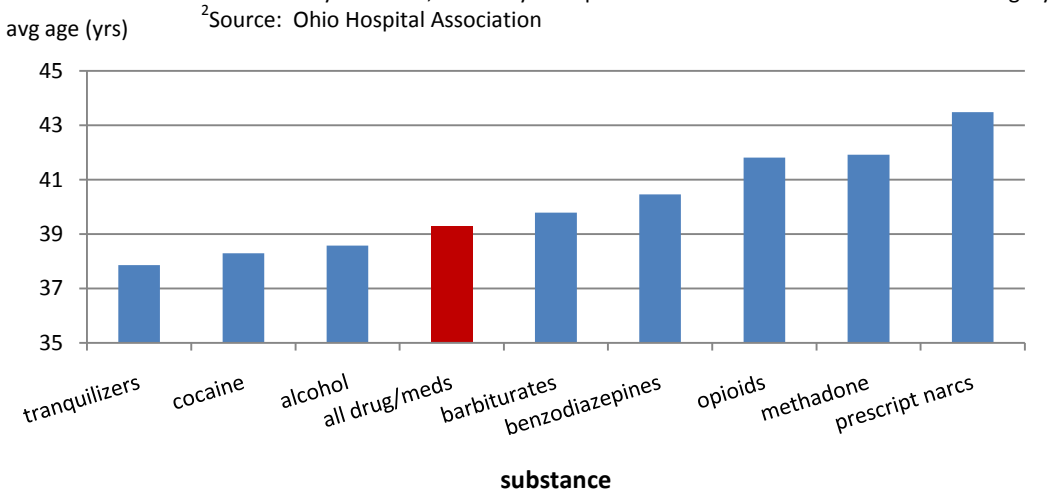


[1]not mutually exclusive; case may be represented in more than one substance category
[2]Source: Ohio Hospital Association

Mean age varied little by substance abused, from 37.9 years for tranquilizer users to 43.5 for prescription narcotic users (*Figure 3.42)*. Cocaine (38.3) and alcohol (38.6) users were also younger than the average for all drug/medication poisonings (39.3 years.)

Figure 3.42. Mean age of drug/medication-related poisoning cases who used specific substances[1], Ohio, 2003-07[2]

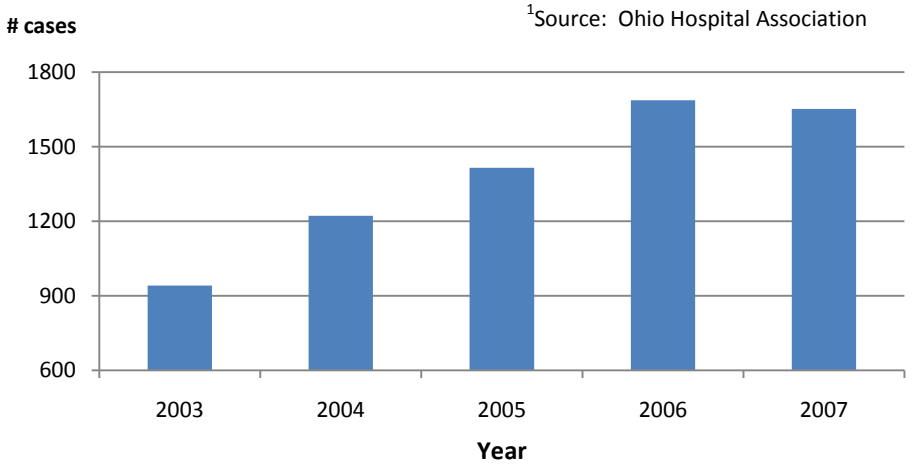
[1]not mutually exclusive; case may be represented in more than one substance category
[2]Source: Ohio Hospital Association



COCAINE

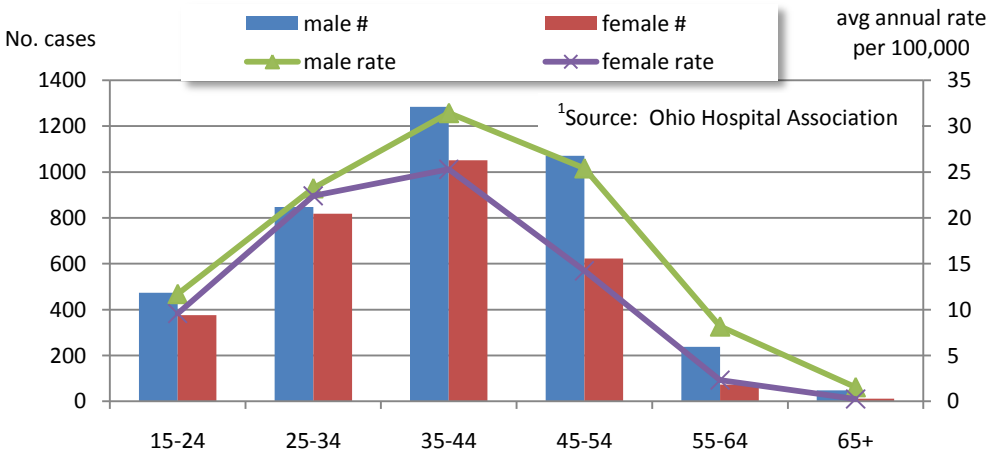
The number of cocaine-related poisoning inpatient discharges increased 79.3 percent from 2003 (941) to 2006 (1687**)**, dipping slightly to 1652 in 2007 (*Figure 3.43*).

Figure 3.43. Number of cocaine-related hospital discharges[1] for poisoning, by year, Ohio, 2003-07



Eighty-two percent of the 6917 cocaine-related poisoning discharges from 2003-07 occurred among persons 25-54 years old (*Figure 3.44)*. Annual rates were highest among 35-44 year old males, 31.4 per 100,000. Female rates were also highest for this age group: 25.3 per 100,000. After age 65, less than one female per 100,000 is admitted for cocaine-related poisoning, while for comparable males the rate is 1.5.

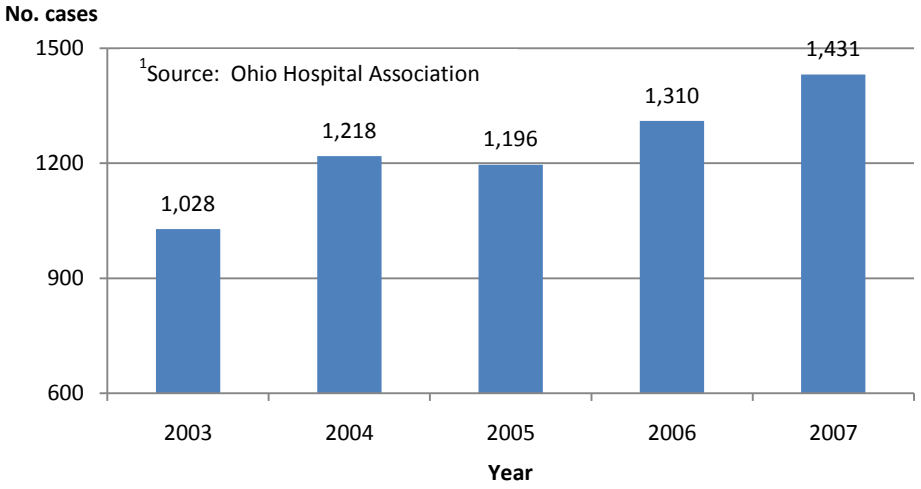
Figure 3.44. Number and average annual rate of cocaine-related poisoning discharges, Ohio, 2003-07[1]



PRESCRIPTION OPIOIDS

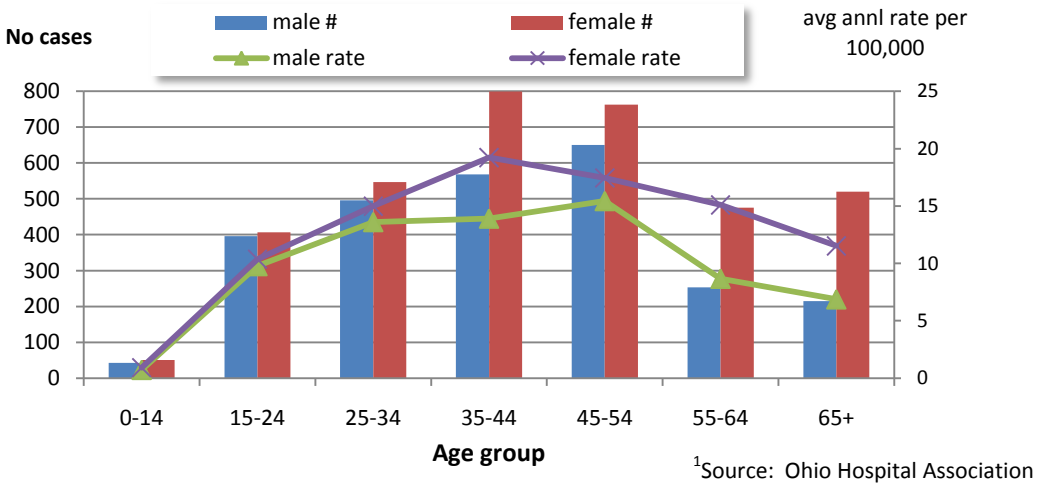
The number of inpatients discharged after treatment for prescription opioid-related poisoning increased 39.2 percent from 2003 (1,028) to 2007 (1,431) (*Figure 3.45)*.

Figure 3.45. Number of prescription opioid-related hospital discharges for poisoning, by year, Ohio, 2003-07



More females than males were hospitalized for prescription opioids for every one of our defined age groups, with the biggest gap occurring among 35-44 year olds: female rate = 19.2 per 100,000, males = 13.9 (*Figure 3.46)*. Male rates dropped rapidly after ages 45-54 (by 78 percent for ages 55-64), while female rates decreased much more gradually, and were still 11.5 per 100,000 for persons 65 or older.

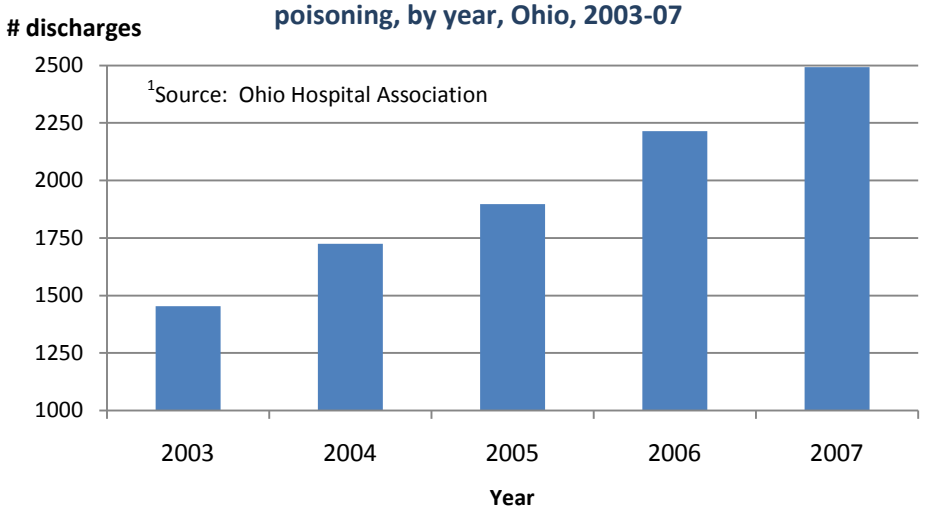
Figure 3.46. Five year total and average annual rate per 100,000 of prescription opioid-related poisoning discharges[1], Ohio, 2003-07



OPIOIDS

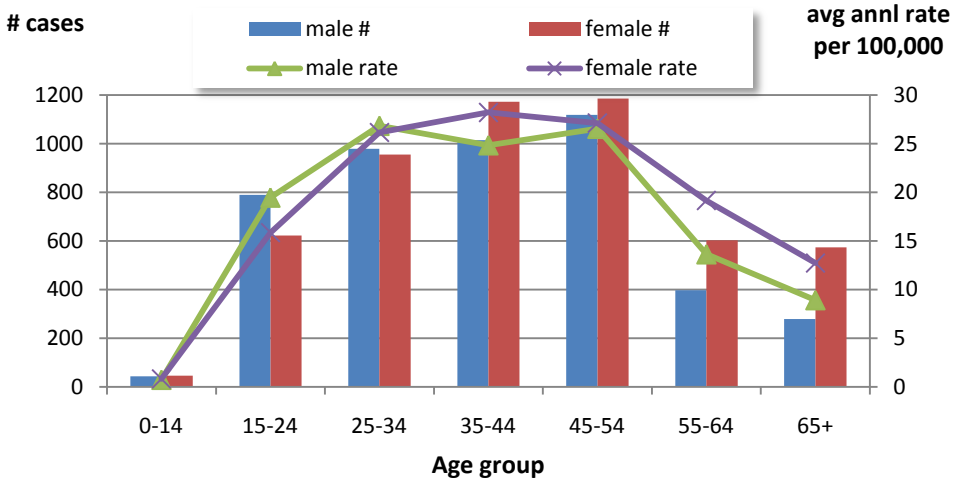
The number of cases involving opioids, (please see Appendix F for definition) increased steadily each year of the observation period (*Figure 3.47*). In 2003 there were 1,453 opioid-related poisoning discharges, jumping to 2,492 in 2007, a 71.5 percent increase.

Figure 3.47. Number of opioid-related hospital discharges[1] for poisoning, by year, Ohio, 2003-07



Rates of opioid-related poisoning remained high (around 25 per 100,000) and fairly constant from ages 25-54, for both males and females (*Figure 3.48*). After age 34, female rates were higher than males for the remainder of the lifespan.

Figure 3.48. Five year total and average annual rate of opioid-related poisoning discharges, Ohio, 2003-07[1]

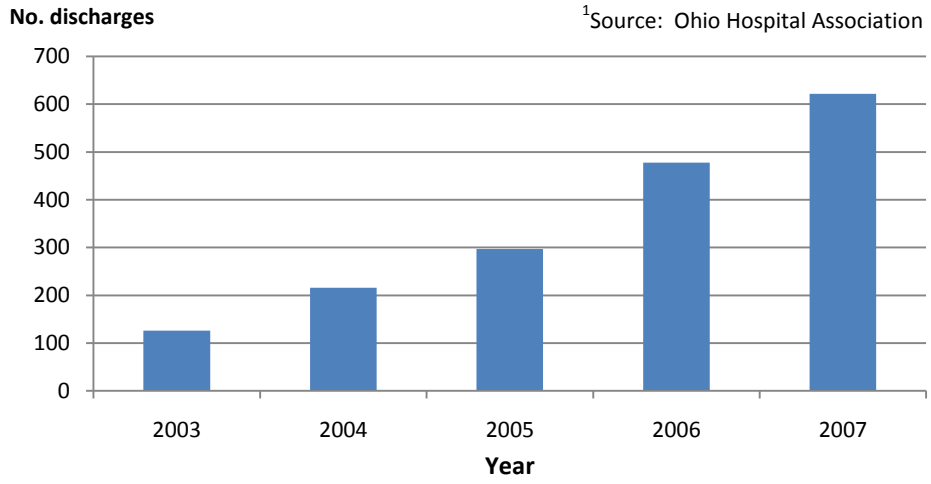


[1]Source: Ohio Hospital Association

METHADONE

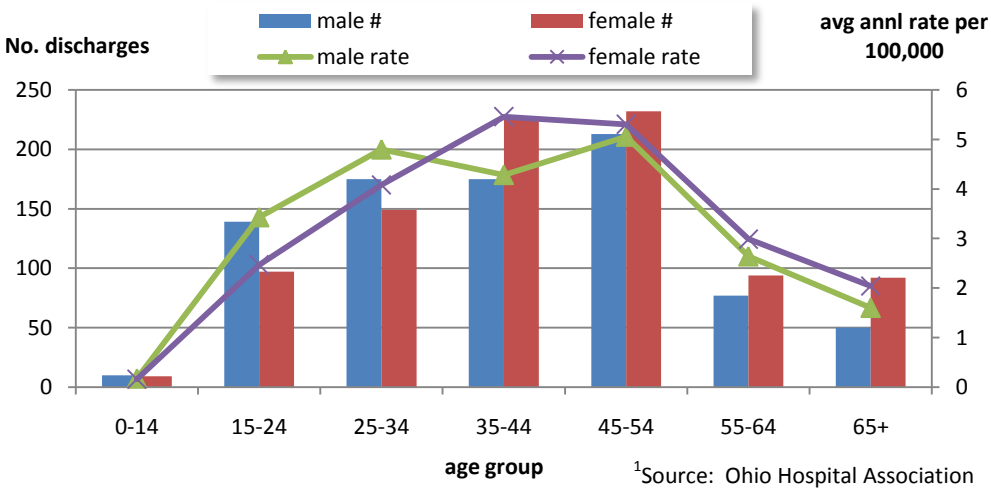
Methadone-related poisonings, though relatively scarce compared to poisonings from other substances, increased dramatically from 2003 (126) to 2007 (622), 394 percent (*Figure 3.49)*.

Figure 3.49. Number of methadone-related hospital discharges for poisoning, by year, Ohio, 2003-07[1]



Less than six persons per 100,000 are discharged each year after treatment for methadone-related poisoning, for each age group (*Figure 3.50)*. Starting with age 35, a higher rate and greater number of females are discharged than males.

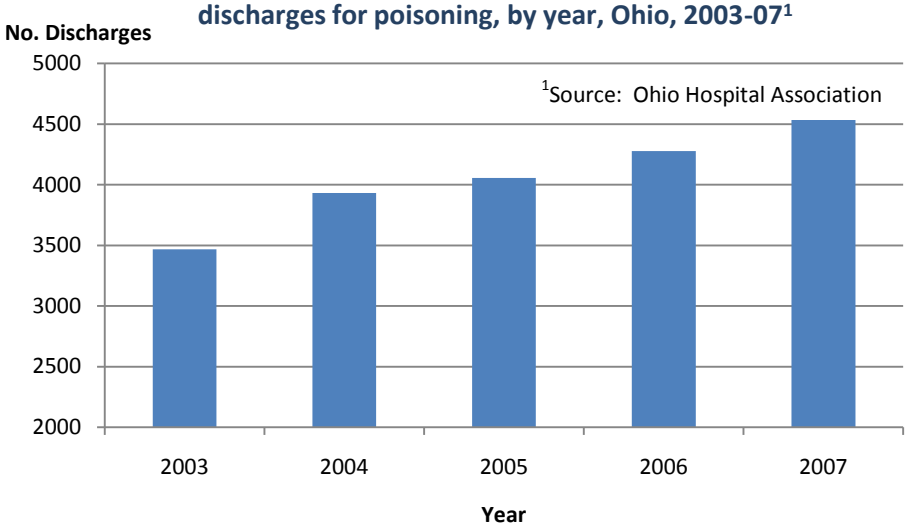
Figure 3.50. Five year total and average annual rate per 100,000 of methadone-related poisoning discharges[1], Ohio, 2003-07



TRANQUILIZERS

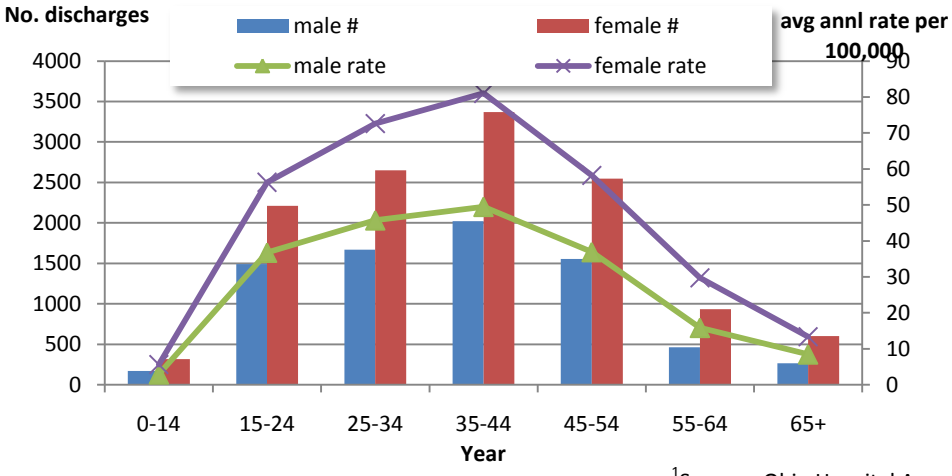
Tranquilizers were the most frequently identified substance among poisoning patients, although it is not certain that, in some instances, they were not prescribed as a course of treatment. Use of tranquilizers increased steadily: from 3,468 in 2003 to 4,535 in 2007, a 30.8 percent increase (*Figure 3.51)*.

Figure 3.51. Number of tranquilizer-related hospital discharges for poisoning, by year, Ohio, 2003-07[1]



Sixty-two percent of the 20,268 tranquilizer-related poisonings occurred among females. Female rates were above 56.3 per 100,000 by ages 15-24 and remained so through the 45-54 age group, peaking among 35-44 year olds at 81.0 (*Figure 3.52*). Male rates followed a similar pattern, although female rates were at least 50 percent higher for each age group.

Figure 3.52. Five year total and average annual rate of tranquilizer-related poisoning discharges, Ohio, 2003-07

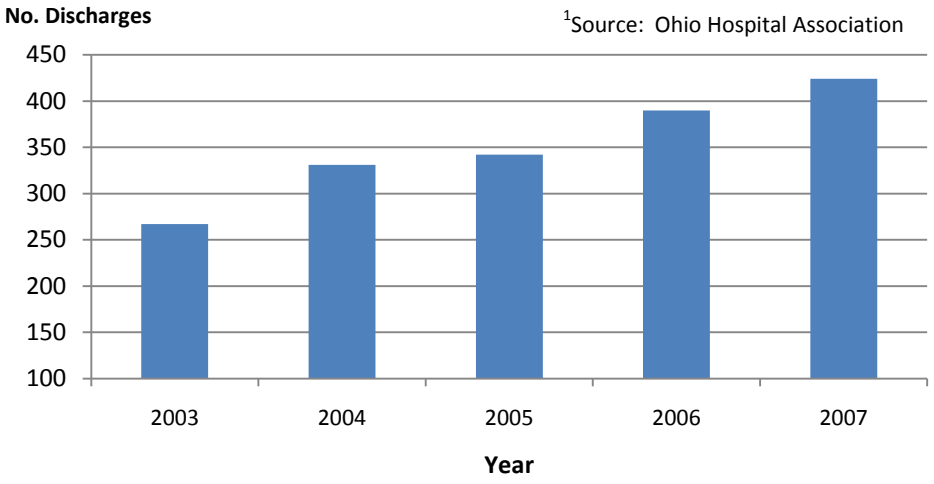


[1]Source: Ohio Hospital Association

BARBITURATES

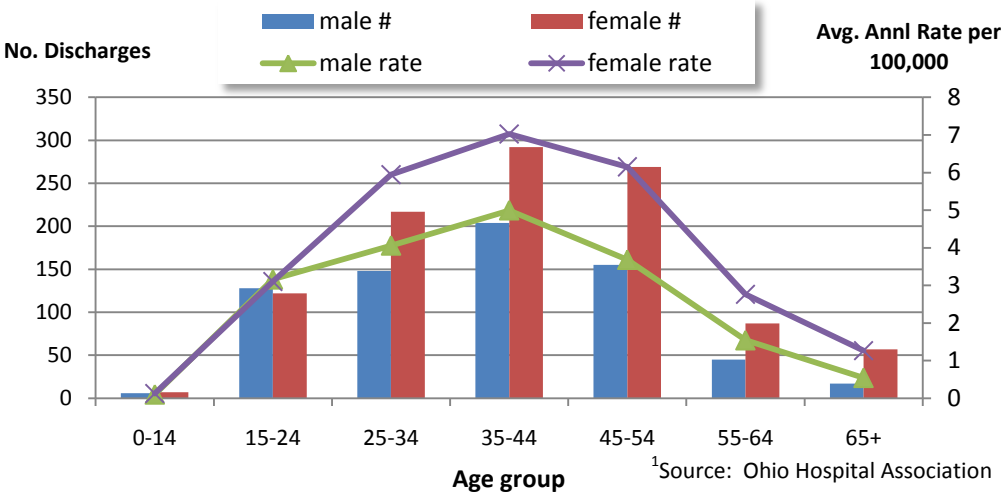
Among the eight substances examined in depth in this section, barbiturates were the next most infrequent source of poisoning, after methadone. However, their impact on hospitalizations did increase over the study period (*Figure 3.53*). The total for 2007, (424), was 58.8 percent higher than that for 2003, (267).

Figure 3.53. Number of barbiturate-related hospital discharges for poisoning, by year, Ohio, 2003-07[1]



As with our general classification of tranquilizers, most (59.9) barbiturate-related poisonings were female. Beginning with 25-34 year olds, female rates are 50 percent or greater than males throughout the remainder of life (*Figure 3.54*).

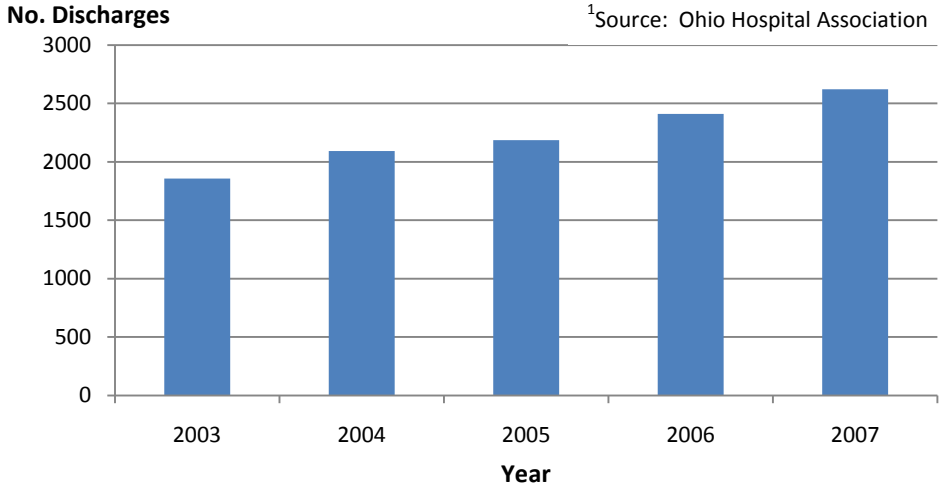
Figure 3.54. Five year total and average annual rate per 100,000 of barbiturate-related poisoning discharges[1], Ohio, 2003-07



BENZODIAZEPINES

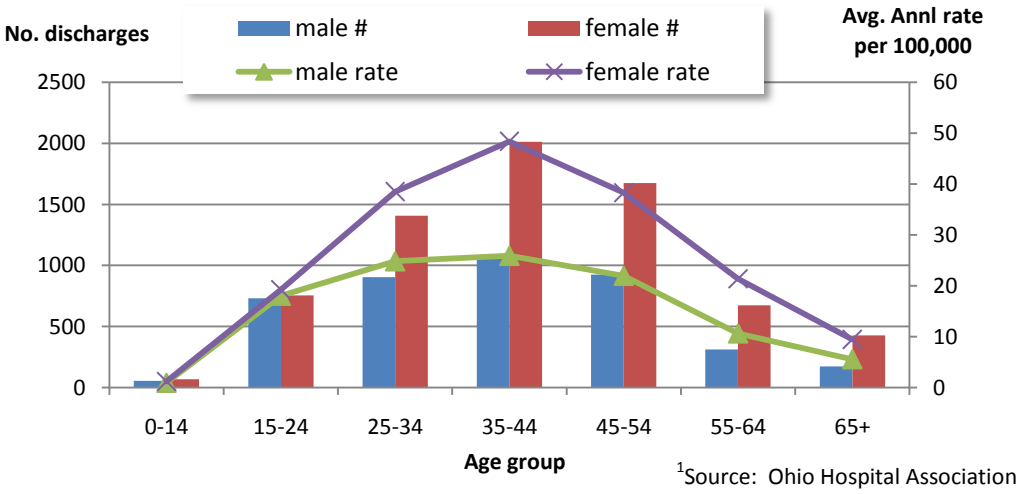
Detection of benzodiazepine among substances used by poisoning victims also increased significantly over the review period: in 2007, (2,621), 41.1 percent more cases exhibited benzodiazepine use than in 2003, (1,857) (*Figure 3.55*).

Figure 3.55. Number of benzodiazepine-related hospital discharges[1] for poisoning, by year, Ohio, 2003-07



Benzodiazepines are also a substance that is more likely to be ingested by female rather than male poisoning cases (*Figure 3.56*). Females 35-44 years old are particularly vulnerable, with rates in the preceding and following age group more than 20 percent lower. Male rates on the other hand are fairly steady from ages 25-54.

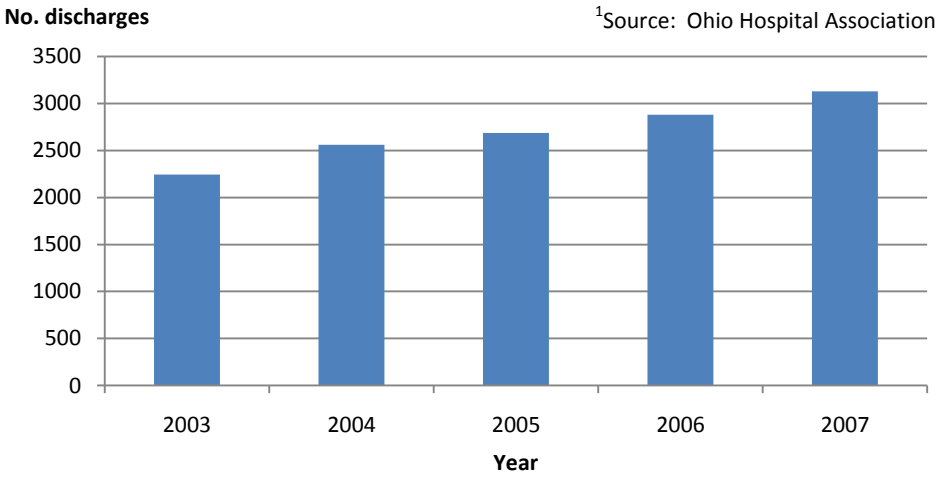
Figure 3.56. Five year total and average annual rate per 100,000 of benzodiazepine-related poisoning discharges[1], Ohio, 2003-07



ALCOHOL

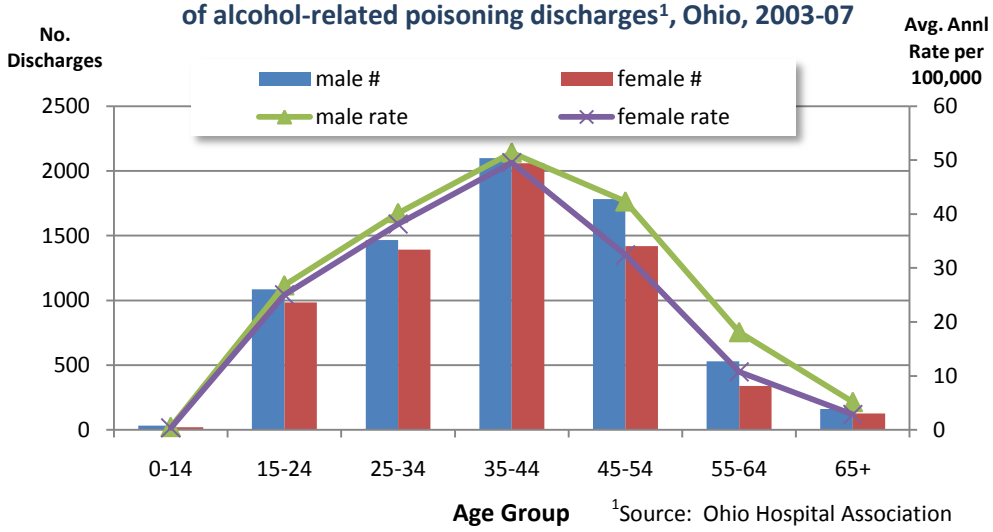
As with most of the other substances examined in this section, alcohol's association with poisoning hospitalizations expanded each year from 2003 to 2007, increasing 39.4 percent from 2003 (2,245) to 2007 (3,130) (*Figure 3.57*).

Figure 3.57. Number of alcohol-related hospital discharges for poisoning, by year, Ohio, 2003-07



Sixty-nine and a half percent of the poisoning cases who had ingested alcohol also used at least one of the other seven7 substances depicted in this section (data not shown). Alcohol was the only substance of interest, other than cocaine, that was more likely to be associated with male poisoning victims, although rates were fairly equivalent until ages 45-54 (*Figure 3.58*).

Figure 3.58. Five year total and average annual rate per 100,000 of alcohol-related poisoning discharges[1], Ohio, 2003-07

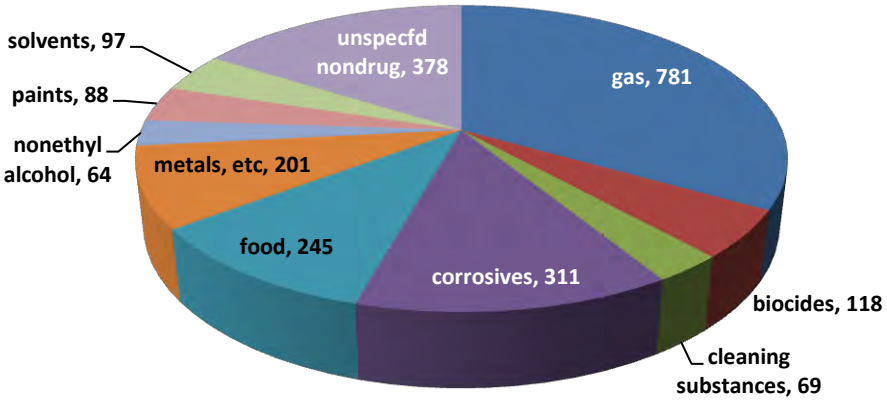


I. Substances Other Than Drugs/Medications

Types of Substances

The non-drug substances most frequently implicated among the study's case population were: gas (33.2 percent), unspecified non-drugs (16.1 percent), corrosives (13.2 percent), and food (10.4 percent)(*Figure 3.59*). Gas poisonings were deemed unintentional 67.9 percent of the time and as self-harm 24.1 percent of the time (data not shown).

Figure 3.59. Number of inpatient poisoning cases[1] from non-drugs/medicants, by substance, Ohio, 2003-07

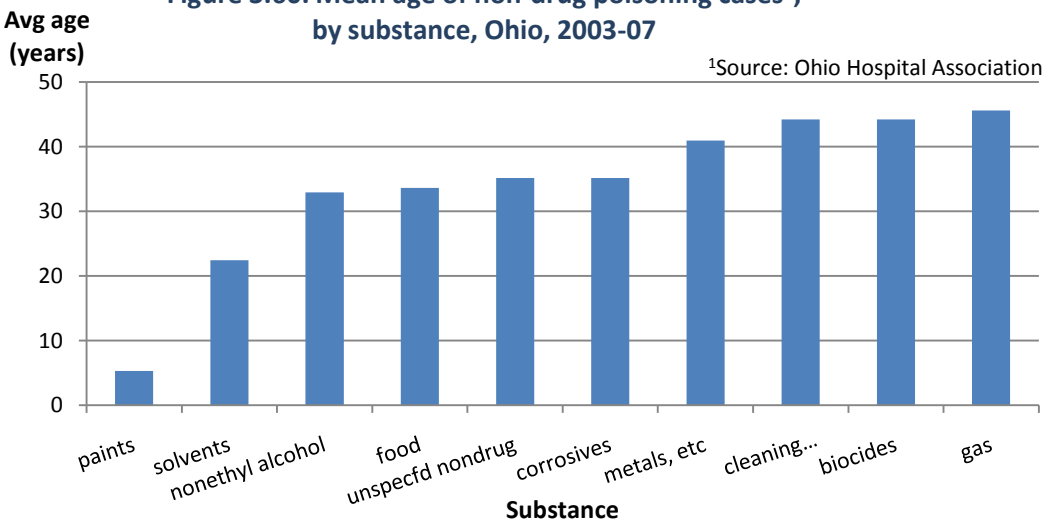


[1]Source: Ohio Hospital Association

Age and Sex

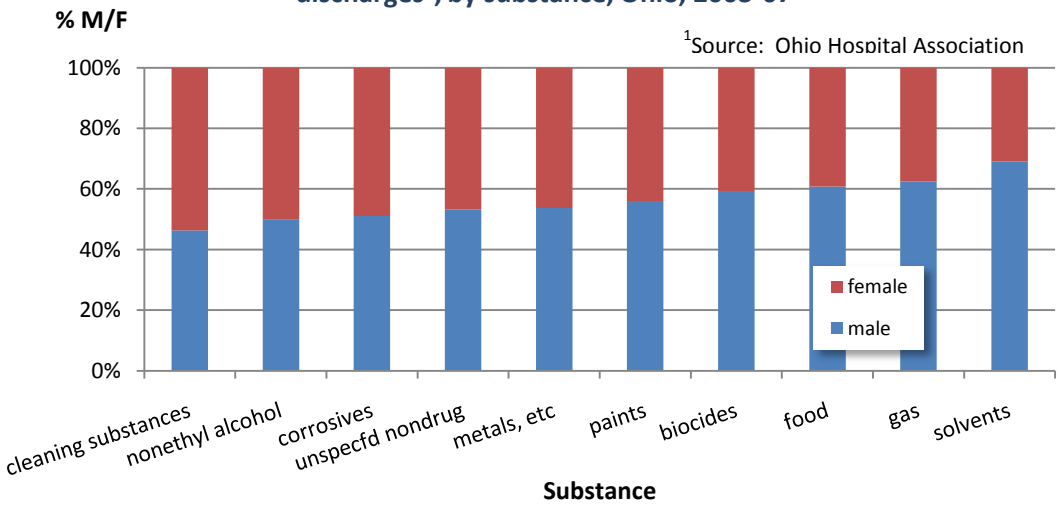
The average age of non-drug poisoning cases varied dramatically by age, ranging from 5.3 years for paints to 45.6 for gas (*Figure 3.60*). Eighty-three percent of the persons poisoned from paint were 4 or younger, as were 50.5 percent of those who ingested solvents, but only 2.0 percent of those who suffered from food poisoning (data not shown).

Figure 3.60. Mean age of non-drug poisoning cases[1], by substance, Ohio, 2003-07



More than 53 percent of the poisonings from cleaning substances occurred among females, while those due to non-ethyl alcohol were equally distributed between the sexes (*Figure 3.61*). For all other non-drug poisonings, more males were victims, including 69.1 percent of solvent poisonings.

Figure 3.61. Distribution of sex for non-drug poisoning discharges[1], by substance, Ohio, 2003-07

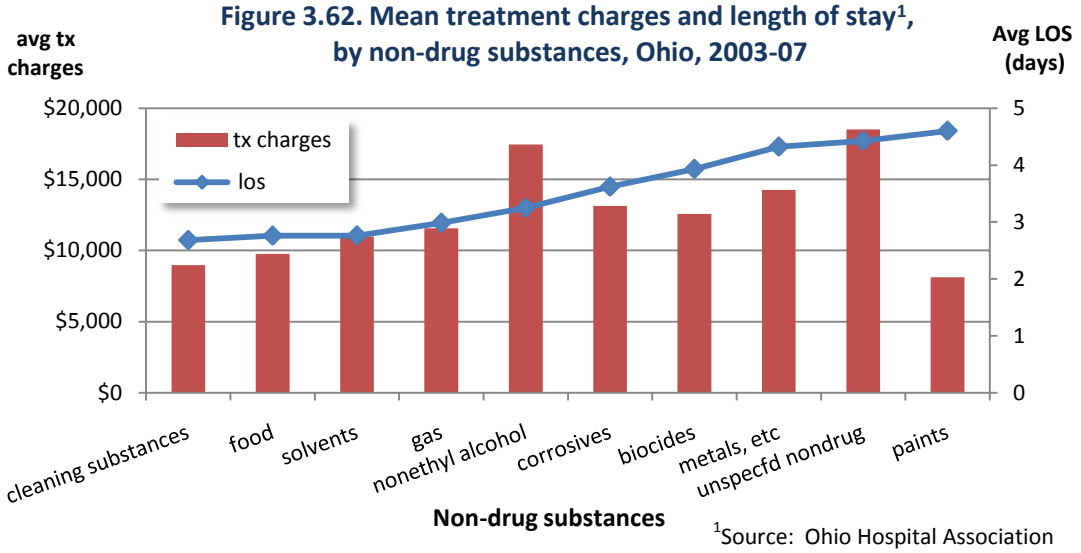


LENGTH OF STAY AND TREATMENT CHARGES

Overall, non-drug poisonings cost more to treat ($12,910) and result in longer hospital stays (3.49 days) than do drug/medication cases ($10,489 and 2.91, respectively) (data not shown).

Poisonings from cleaning substances, food, solvents, and gas were all relatively less expensive to treat and had corresponding shorter lengths of stay (*Figure 3.62*). Non-ethyl alcohol poisonings had especially high charges ($17,459) with modest lengths of stay (3.25 days). These measures were particularly discordant for poisonings from paint, which had the longest average lengths of stay (4.60 days) and the lowest treatment charges ($8120). This incongruency was likely associated with their extremely young age.

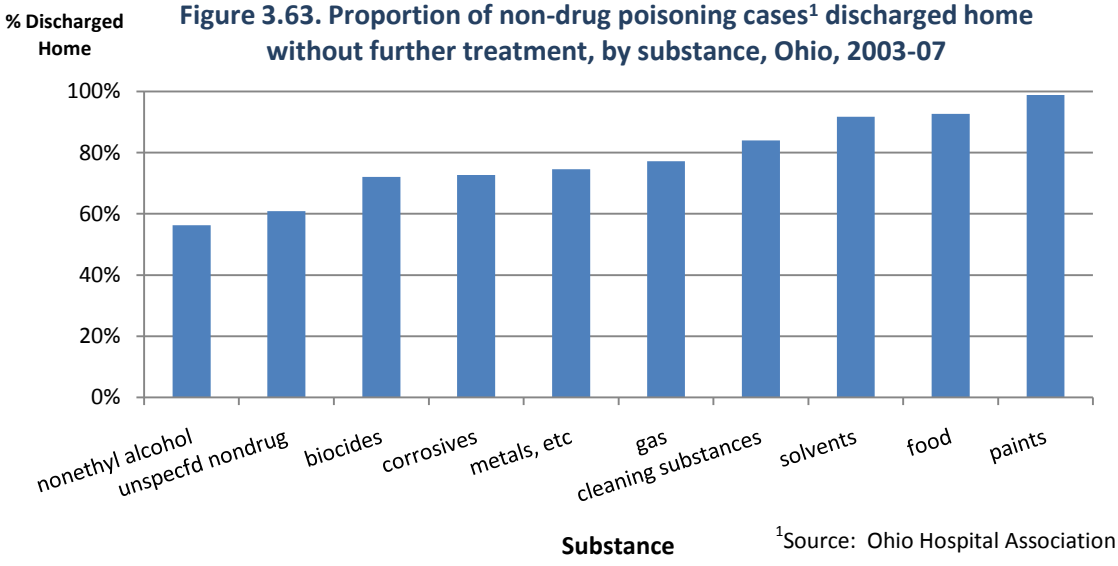
Figure 3.62. Mean treatment charges and length of stay[1], by non-drug substances, Ohio, 2003-07



[1]Source: Ohio Hospital Association

The proportion of non-drug poisoning cases discharged home without further treatment varied widely by substance (*Figure 3.63*). Non-ethyl alcohol cases (56.2 percent home) and unspecified non-drugs (60.8 percent) had the least likelihood of being discharged home and the highest proportion of poisonings deemed to be self-harm, 53.1 percent and 63.0 percent, respectively (latter data not shown). More than 90 percent of persons poisoned from paints, food, or solvents were discharged home without further treatment.

Figure 3.63. Proportion of non-drug poisoning cases[1] discharged home without further treatment, by substance, Ohio, 2003-07



[1]Source: Ohio Hospital Association

COUNTY LEVEL POISONING-RELATED HOSPITAL DISCHARGE DATA

Cuyahoga County had the largest number of drug/medication-related (7,016) and total poisoning discharges (7,400) from 2003-07 (*Table 3.3*). The five counties with the highest average annual rate of drug/medication poisoning discharges were: Guernsey (178.8 per 100,000), Montgomery (152.1), Jefferson (150.9), Ross (143.8) and Columbiana (136.0), all considerably higher than the state as a whole (90.5 per 100,000).

The five counties with the lowest rates (which weren't calculated for counties with less than 2/3 of poisonings assigned ICD-9 E-codes) were: Holmes (14.6 per 100,000), Delaware (33.1), Meigs (35.5), Williams (38.0), and Putnam (39.3).

Table 3.3. Proportion of 2003-07 hospital discharged poisoning cases[1] that were E-coded[2], total number[3] and average annual rate[4] of drug/medication and total poisonings, by Ohio county of residence, 2003-07

[1]Source: Ohio Hospital Association
[2]proportion of cases with a primary diagnosis of poisoning that also had a poisoning E-code
[3]total number for the 5 year study period
[4]average annual rate per 100,000 population
* rate not calculated because less than 2/3 of poisoning cases E-coded

County	Percent E-coded	No. Drug/ Medication Poisonings	No. Total Poisonings	2005 Population	Rate[4] of Drug/ Medication Poisonings	Rate[4] of Total Poisonings
Adams	81.9%	82	88	28,191	58.2	62.4
Allen	80.0%	525	555	105,550	99.5	105.2
Ashland	90.1%	131	134	53,978	48.5	49.6
Ashtabula	88.6%	443	465	102,005	86.9	91.2
Athens	90.3%	175	185	63,175	55.4	58.6
Auglaize	76.3%	193	225	46,620	82.8	96.5
Belmont	87.8%	286	290	68,675	83.3	84.5
Brown	87.1%	212	219	43,681	97.1	100.3
Butler	89.3%	2,058	2141	348,243	118.2	123.0
Carroll	93.9%	105	111	28,883	72.7	76.9
Champaign	73.8%	88	102	39,193	44.9	52.1
Clark	76.5%	701	725	141,554	99.0	102.4
Clermont	93.9%	1,055	1,091	189,313	111.5	115.3
Clinton	80.1%	157	164	42,074	74.6	78.0
Columbiana	88.9%	745	774	109,529	136.0	141.3
Coshocton	75.0%	194	197	36,653	105.9	107.5
Crawford	73.1%	119	122	45,164	52.7	54.0

County	Percent E-coded	No. Drug/ Medication Poisonings	No. Total Poisonings	2005 Population	Rate[4] of Drug/ Medication Poisonings	Rate[4] of Total Poisonings
Cuyahoga	76.2%	7,016	7,400	1,325,424	105.9	111.7
Darke	87.0%	112	123	52,639	42.6	46.7
Defiance	69.1%	122	135	38,597	63.2	70.0
Delaware	73.0%	247	267	149,334	33.1	35.8
Erie	82.7%	364	381	77,786	93.6	98.0
Fairfield	90.7%	576	606	137,511	83.8	88.1
Fayette	85.0%	110	114	28,217	78.0	80.8
Franklin	81.3%	4,543	4,705	1,098,818	82.7	85.6
Fulton	69.5%	105	111	42,633	49.3	52.1
Gallia	73.3%	89	92	30,922	57.6	59.5
Geauga	86.3%	202	217	94,323	42.8	46.0
Greene	87.1%	749	774	156,129	95.9	99.1
Guernsey	83.2%	363	373	40,614	178.8	183.7
Hamilton	91.1%	4,863	5,078	846,725	114.9	119.9
Hancock	88.6%	256	265	73,260	69.9	72.3
Hardin	71.7%	101	112	31,710	63.7	70.6
Harrison	82.7%	43	46	15,589	55.2	59.0
Henry	49.2%	38	40	29,185	*	*
Highland	75.4%	111	114	42,124	52.7	54.1
Hocking	74.3%	90	96	28,733	62.6	66.8
Holmes	81.1%	30	34	41,237	14.6	16.5
Huron	83.7%	214	230	59,897	71.5	76.8
Jackson	83.0%	158	162	33,284	94.9	97.3
Jefferson	89.4%	529	551	70,091	150.9	157.2
Knox	87.3%	197	206	58,009	67.9	71.0
Lake	86.0%	679	713	232,008	58.5	61.5
Lawrence	3.3%	8	9	62,443	*	*
Licking	70.7%	448	467	153,974	58.2	60.7
Logan	83.2%	106	116	46,286	45.8	50.1
Lorain	87.1%	1,262	1,321	298,889	84.4	88.4
Lucas	72.5%	1,977	2,056	446,458	88.6	92.1
Madison	80.8%	120	129	40,809	58.8	63.2
Mahoning	57.1%	972	1,015	245,669	*	*
Marion	65.5%	219	233	65,716	66.7	70.9
Medina	85.1%	372	397	165,660	44.9	47.9
Meigs	71.4%	41	43	23,072	35.5	37.3

County	Percent E-coded	No. Drug/ Medication Poisonings	No. Total Poisonings	2005 Population	Rate[4] of Drug/ Medication Poisonings	Rate[4] of Total Poisonings
Mercer	71.3%	83	91	40,761	40.7	44.7
Miami	91.7%	558	591	100,595	110.9	117.5
Monroe	41.2%	15	17	14,551	*	*
Montgomery	87.8%	4,140	42,78	544,475	152.1	157.1
Morgan	90.6%	62	64	14,718	84.3	87.0
Morrow	64.9%	48	52	34,027	*	*
Muskingum	94.0%	670	695	85,138	157.4	163.3
Noble	88.0%	49	51	13,990	70.1	72.9
Ottawa	77.3%	112	118	41,294	54.2	57.2
Paulding	61.7%	45	50	19,409	*	*
Perry	88.5%	173	179	34,791	99.5	102.9
Pickaway	80.6%	240	258	52,384	91.6	98.5
Pike	54.4%	87	90	27,782	*	*
Portage	45.5%	367	381	155,056	*	*
Preble	90.1%	170	178	41,880	81.2	85.0
Putnam	73.1%	68	73	34,648	39.3	42.1
Richland	83.4%	678	712	126,935	106.8	112.2
Ross	89.8%	538	551	74,808	143.8	147.3
Sandusky	32.1%	56	61	61,233	*	*
Scioto	82.4%	332	343	76,194	87.1	90.0
Seneca	75.9%	126	135	57,246	44.0	47.2
Shelby	85.1%	137	142	48,462	56.5	58.6
Stark	92.1%	2,369	2,453	378,672	125.1	129.6
Summit	86.9%	3,156	3,305	545,347	115.7	121.2
Trumbull	34.1%	560	580	217,111	*	*
Tuscarawas	91.6%	350	368	91,309	76.7	80.6
Union	36.3%	36	42	45,391	*	*
Van Wert	81.0%	67	71	29,031	46.2	48.9
Vinton	77.6%	37	44	13,228	55.9	66.5
Warren	92.5%	700	738	194,076	72.1	76.1
Washington	89.6%	222	232	61,971	71.6	74.9
Wayne	91.2%	439	455	113,155	77.6	80.4
Williams	75.3%	73	78	38,387	38.0	40.6
Wood	79.2%	305	324	123,975	49.2	52.3
Wyandot	55.3%	24	26	22,668	*	*
Ohio	**80.6%**	**51,793**	**54,145**	**1,1450,954**	**90.5**	**94.6**

SECTION 4:
PRESCRIPTION HISTORY OF UNINTENTIONAL DRUG POISONING DECEDENTS

INTRODUCTION

The following report utilized data from The Ohio State Board of Pharmacy's Prescription Monitoring Program (PMP) and Ohio death certificate data to study prescription fill history among Ohio residents who died from drug poisoning in 2008.

DEFINITIONS

DIVERSION

Diversion is the unlawful channeling of regulated pharmaceuticals from medical sources to the illicit market place. Diversion can occur along all points in the drug delivery process including:

- Manufacturing site
- Wholesale distributor
- Physician/prescriber
- Dispensing institution
- Retail pharmacy
- Hospitals
- Patient

DOCTOR SHOPPING

Doctor shopping is a form of diversion conducted by patients. Doctor shopping typically involves a patient going to a few different doctors complaining of a range of symptoms in order to obtain multiple prescriptions.[24] Previous studies have defined doctor shopping as obtaining prescriptions for medications from at least five or more different physicians within one year.[9]

CAUSE OF DEATH PER DEATH CERTIFICATE

Prescription Opioid: Prescription opioid cited as cause of death on death certificate

No Prescription Opioid*:* No prescription opioid cited as cause of death on death certificate. "Other and unspecified drugs" may be listed.

Other and Unspecified Only: No specific drug cited as cause of death on death certificate.

METHODS

DATA SOURCES

Death Records

Death records are maintained by the ODH's office of Vital Statistics. A death was determined to be due to poisoning when the coroner or certifying physician identified poisoning as the underlying cause of death. Drug/medication-related poisonings were identified through ICD-10 codes X40-X44 in the death certificate files.

Ohio State Board of Pharmacy's Prescription Monitoring Program (PMP)

The Prescription Monitoring Program (PMP) collects prescription dispensing information through the Ohio Automated Rx Reporting System (OAR_xRS). Ohio pharmacies submit weekly reports to OAR_xRS regarding medications dispensed. The PMP provided de-identified data from 2006 to 2008 on medications dispensed to Ohio residents who died from poisoning in 2008.[25]

LIMITATIONS

- Prescription drug information in this report is limited to substances dispensed in the state of Ohio. Therefore, the number of prescriptions and number of prescribers of controlled substances may be underestimated (e.g. Doctor Shopping), while the estimates of drug diversion may be overestimated.
- In some cases we were unable to link the identity of the drug poisoning decedent to a record in the OAR_xRS. Therefore, analysis is confined to 1,488 (95 percent) of the 1,568 unintentional drug poisoning decedents.
- While this report is confined to Ohioans who died of drug poisoning in 2008, confidentiality restrictions dictated that the exact date of death be unavailable for this analysis. Therefore, we were unable to determine precisely how close to the date of death prescriptions were filled. However, in all cases, prescriptions discussed in this report were filled in less than the three years preceding date of death (2006-2008), hereafter referred to as: 'the two-plus year monitoring period'.

RESULTS

OVERVIEW OF PRESCRIPTION DRUG HISTORY AND BEHAVIOR AMONG UNINTENTIONAL DRUG POISONING DECEDENTS

Opioids were involved in at least 37 percent of all drug poisoning deaths in Ohio in 2008 and at least 75 percent of unintentional poisoning deaths involved a prescription opioid or other/unspecified drug. *(See Section 2)* More than one-quarter of Ohio unintentional drug poisoning decedents in 2008 had a history of filling at least one prescription for an opioid per month in the two years prior to their death. More than one-third of decedents filled prescriptions for at least four different types of opioids between 2006 and 2008 *(Table 4.1).*

Decedents frequently obtained their medication through doctor shopping and diversion. Sixteen percent of decedents obtained prescriptions from at least five unique prescribers per year between 2006 and 2008 (i.e., doctor shopped). Of those decedents whose death was attributed to a prescription opioid, at least 25 percent obtained the opioid through some form of diversion (i.e., no record of filling a prescription in Ohio for an opioid during the two-plus year monitoring period prior to death). Consistent with data from other states, methadone appears to be more frequently obtained through diversion than other opioids, with nearly three-quarters of decedents with methadone listed as cause of death having no record of filling a prescription for methadone[9] (*Table 4.1).*

Table 4.1. Overview of prescription drug history and behavior of 2008 unintentional drug poisoning decedents in Ohio[5,6]

	At least one opioid script per month[1]	At least 4 different types of opioids filled[1,2]	Doctor Shopping[1-3]	Opioid Diversion (All Prescription Opioids)[4]	Methadone Diversion[4]
Male	22%	31%	14%	31%	76%
Female	40%	47%	20%	15%	57%
Total	29%	37%	16%	25%	71%

1. *Prescriptions filled in Ohio from 1/1/06 to 12/31/08*
2. *Among decedents with at least one opioid prescription filled between 1/1/06 and 12/31/08*
3. *Average 5 unique prescribers per year from 1/1/06 to 12/31/08*
4. *No record of prescription filled in Ohio from 1/1/06 to 12/31/08*
5. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).*
6. *Source: ODH Office of Vital Statistics*

PRESCRIPTION DRUG HISTORY AMONG UNINTENTIONAL DRUG POISONING DECEDENTS

The average prescription drug fill rates among 2008 unintentional drug poisoning decedents *(Column C)* in the year prior to their death (2007) were higher than the fill rates among the general population of Ohio *(Column B)* that year *(Table 4.2)*. Among 2008 decedents, the average number of hydrocodone prescriptions per person was five times the average rate of prescriptions in the general Ohio population *(Column D).* Similarly the average number of methadone prescriptions per person among decedents was more than 15 times the rate among general Ohioans.

Table 4.2. Average rate of prescriptions[1,2] among 2007 Ohioans and 2008 Unintentional Poisoning Decedents[3]

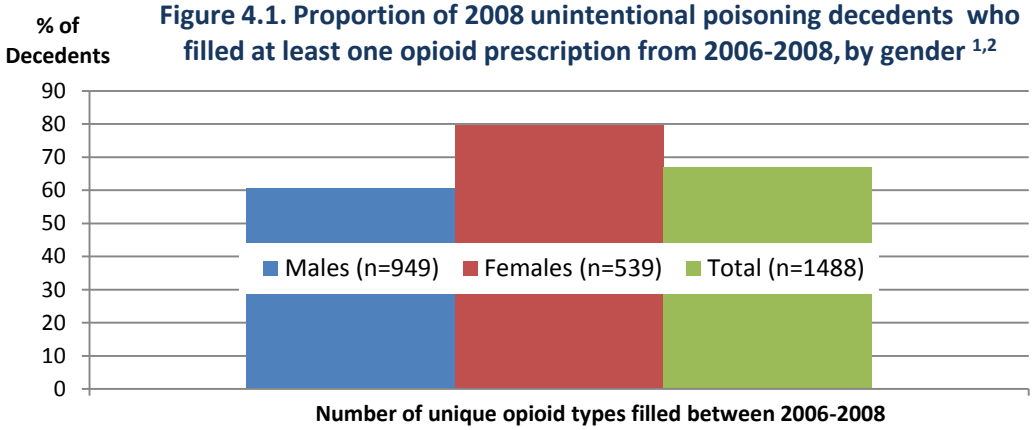
COLUMN A	COLUMN B		COLUMN C		COLUMN D
Drug Type	2007 Ohioans (n=11,477,641)[4] (Scripts filled in 2007)[1,2]		2008 Unintentional Poisoning Decedents (n=1488)[3] (Scripts filled in 2007)[1,2]		Ratio of age adjusted rate of decedent scripts to Ohio scripts[4]
	Number of Scripts Filled	Average Scripts per Person	Number of Scripts Filled	Age Adjusted[4] Average Scripts per Person	
Hydrocodone	4,617,154	0.40	4,497	2.00	5.0
Oxycodone	2,499,724	0.22	4,652	2.11	9.59
Tramadol	1,067,438	0.09	772	0.38	4.22
Carisoprodol	236,939	0.02	990	0.50	25.0
Methadone	167,389	0.02	572	0.31	15.5

1. *Prescriptions filled in Ohio*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).*
3. *Source: ODH Office of Vital Statistics*
4. *Decedent age distribution adjusted to match age distribution of state of Ohio. Source: http://www.census.gov/popest/counties/tables/CO-EST2008-03-39.csv*

Prescription Pain Medications

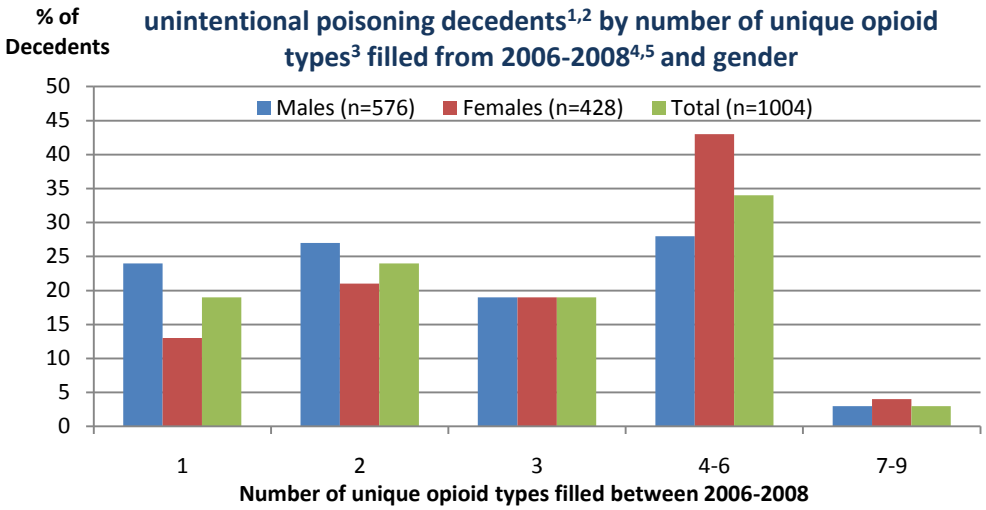
A recent West Virginia study found that opioids account for the largest proportion of unintentional drug poisoning deaths attributed to single-drug intoxication.[9] Among the 2008 unintentional poisoning decedents in Ohio, nearly 80 percent of females and 61 percent of males had at least one opioid prescription filled between 2006 and 2008 *(Figure 4.1).* Consistent with other studies, more decedents filled prescriptions for opioids than any other drug class in the two-plus years prior to death.[3,4] Of those with at least one prescription filled, nearly 50 percent of females and 31 percent of males filled prescriptions for at least four different types of opioids in the two years prior to their death *(Figure 4.2).*

Figure 4.1. Proportion of 2008 unintentional poisoning decedents who filled at least one opioid prescription from 2006-2008, by gender [1,2]



1. Opioid types included: Buprenorphine, butorphanol, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone, pentazocine, propoxyphene, tramadol
2. Prescriptions filled outside of Ohio not included
3. Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).
4. Source: ODH Office of Vital Statistics

Figure 4.2. Opioid prescription fill history among 2008 unintentional poisoning decedents[1,2] by number of unique opioid types[3] filled from 2006-2008[4,5] and gender



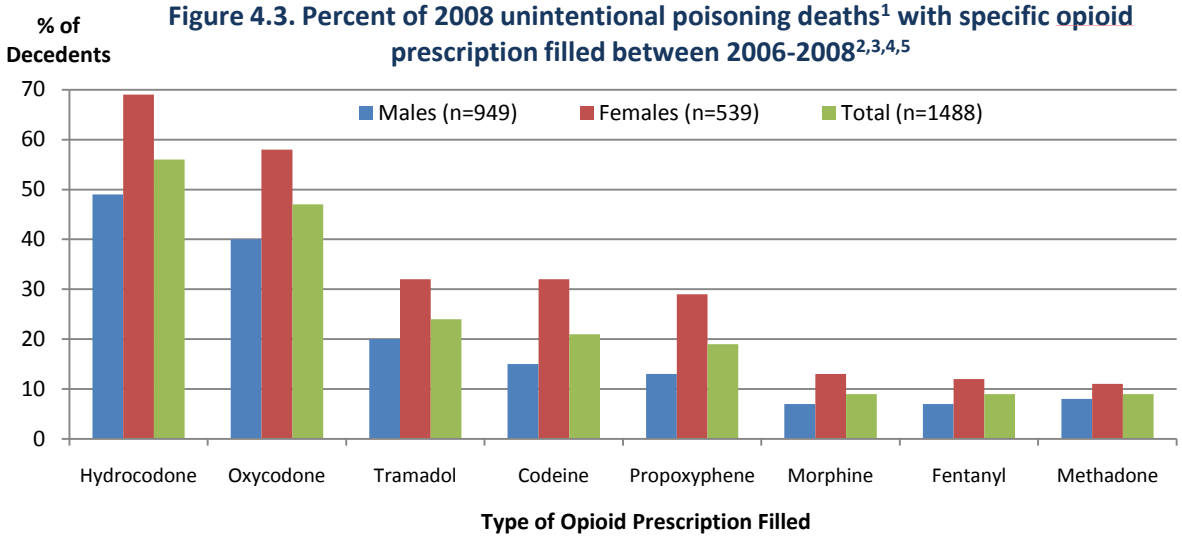
1. *Decedents with at least one opioid script filled from 1/1/06-12/31/08*
2. *Source: ODH Office of Vital Statistics*
3. *Opioid types included: Buprenorphine, butorphanol, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone, pentazocine, propoxyphene, tramadol*
4. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).*
5. *Prescriptions filled outside of Ohio not included*

In 2008, hydrocodone was the most frequently prescribed opioid in Ohio.[25] Similarly, among the 2008 unintentional poisoning deaths, decedents were most likely to have filled a prescription for hydrocodone between 2006 and 2008, followed by oxycodone, and tramadol *(Figure 4.3).* Approximately 70 percent of female and 50 percent of male decedents had at least one prescription for hydrocodone during the two-plus year monitoring period before death.

HISTORY OF DRUG COMBINATIONS

Multiple drug intoxication is a major factor in unintentional drug poisoning deaths *(Section 2).* Prescription opioids and other/unspecified drugs accounted for at least 75 percent of unintentional poisoning deaths in 2008 in Ohio and most other/unspecified drug deaths are associated with multiple drug use.

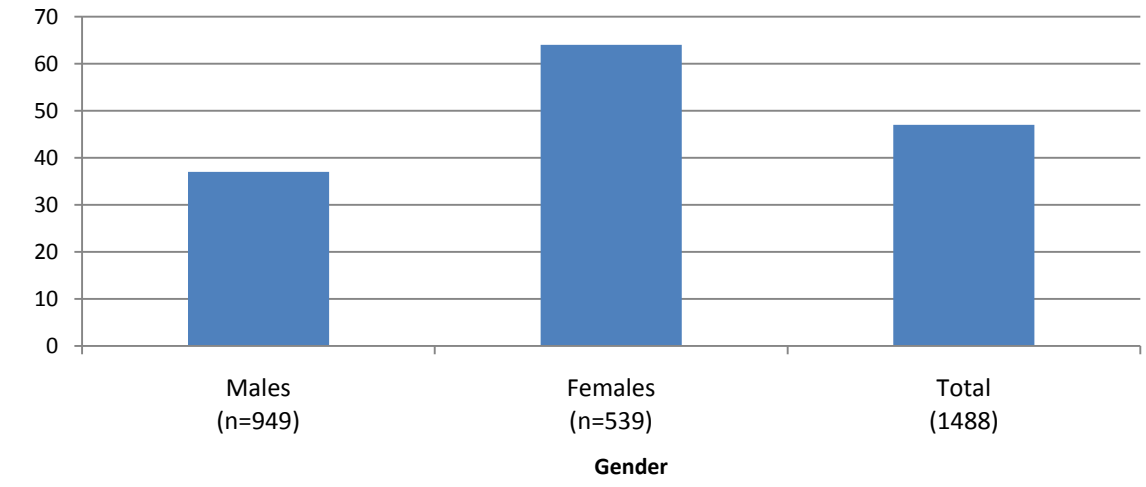
Figure 4.3. Percent of 2008 unintentional poisoning deaths[1] with specific opioid prescription filled between 2006-2008[2,3,4,5]



1. Source: ODH Office of Vital Statistics
2. Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).
3. At least one prescription from 1/1/06 to 12/31/08
4. Decedents may have filled prescriptions for multiple opioid types
5. Prescriptions filled outside of Ohio not included

The combination of benzodiazepines and opioids, particularly methadone, has been identified as one of the most common drug combinations found in multiple drug intoxication.[26] Nearly half of the 2008 poisoning decedents in Ohio filled a prescription for at least one opioid and one benzodiazepine in the two-plus years prior to their death *(Figure 4.4).* Females (64 percent) were more likely to fill this combination of medications than males (37 percent).

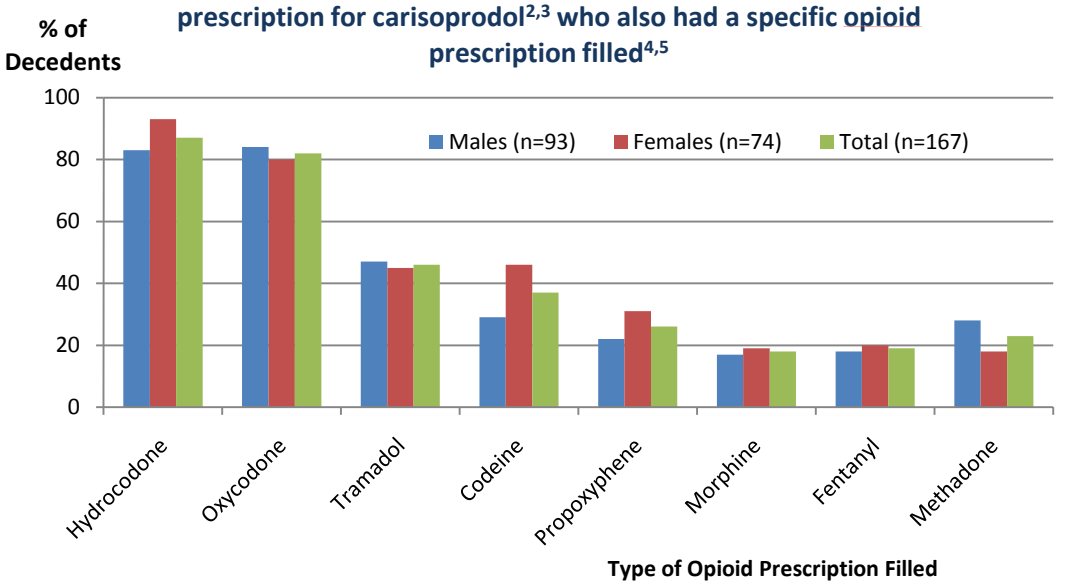
Figure 4.4. Percent of 2008 unintentional poisoning decedents[1] with at least one opioid and one benzodiazepine filled between 2006-2008[2,3] by gender



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).*
3. *Prescriptions filled outside of Ohio not included*

Abuse of carisoprodol, a muscle relaxant, has escalated over the past decade.[27] Benzodiazepines and opioids are frequent co-intoxicants of carisoprodol.[28, 29] Ninety-six percent of female 2008 unintentional poisoning decedents and eighty-six percent of males who filled a prescription for carisoprodol within the two-plus years prior to death also had a prescription filled for a benzodiazepine during that time. All of the decedents who had a prescription filled for carisoprodol also filled at least one prescription for an opioid. Hydrocodone and oxycodone were among the most frequently filled prescription opioids among carisoprodol users *(Figure 4.5).*

Figure 4.5. Percent of 2008 unintentional poisoning decedents[1] with a prescription for carisoprodol[2,3] who also had a specific opioid prescription filled[4,5]



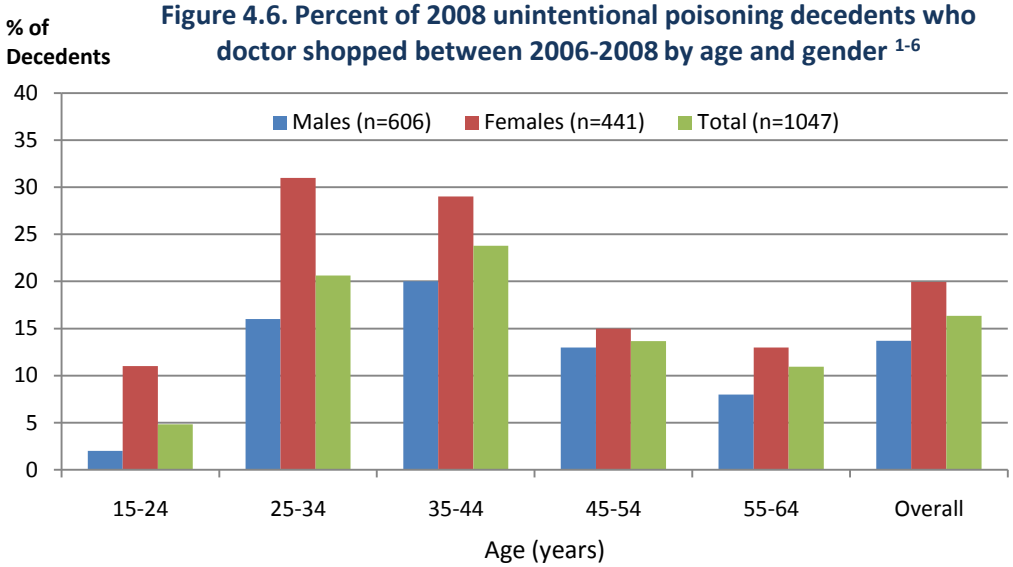
1. Source: ODH Office of Vital Statistics
2. Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).
3. Prescriptions filled outside of Ohio not included
4. At least one prescription from 1/1/06 to 12/31/08
5. Decedents may have filled prescriptions for multiple opioid types

How were Drugs obtained?

Doctor Shopping

In 2008, 16 percent of the unintentional poisoning decedents in Ohio, who filled a prescription for at least one controlled substance within the two-plus years monitoring period before death, had a history of doctor shopping (average of at least five unique prescribers per year). Consistent with reports from other states, a higher proportion of females than males demonstrated doctor shopping behavior[9] *(Figure 4.6).* Doctor shopping was most common between ages 25 and 44 years of age in both genders.

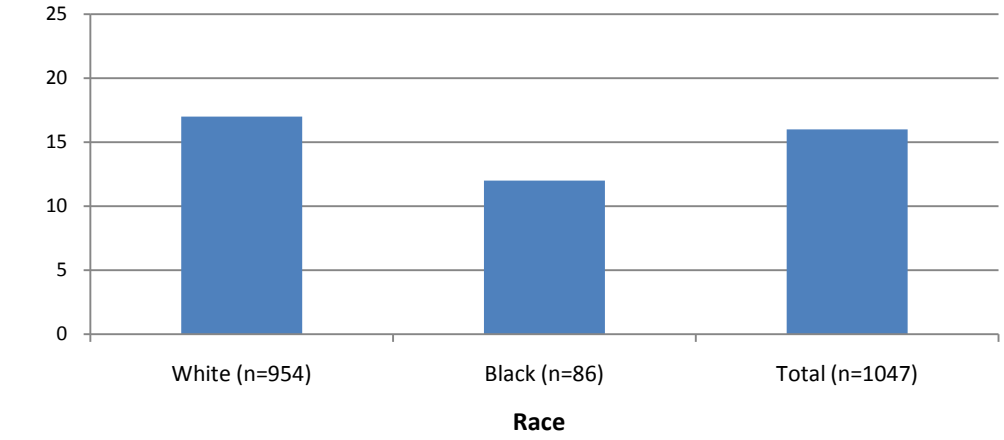
Figure 4.6. Percent of 2008 unintentional poisoning decedents who doctor shopped between 2006-2008 by age and gender [1-6]



1. Source: ODH Office of Vital Statistics
2. Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).
3. Doctor Shopping: Average 5 or more prescribers per year from 1/1/06 to 12/31/08.
4. No doctor shoppers over age 65 for males or females
5. Prescriptions filled outside of Ohio not included
6. Included decedents with at least one script filled 1/1/06-12/31/08

Among the 2008 unintentional poisoning decedents, a higher percentage of white decedents than black decedents obtained their medication through doctor shopping. Individuals of other races (n=7) had the highest proportion of doctor shoppers, with 29 percent of decedents doctor shopping in the two-plus years prior to death *(Figure 4.7).*

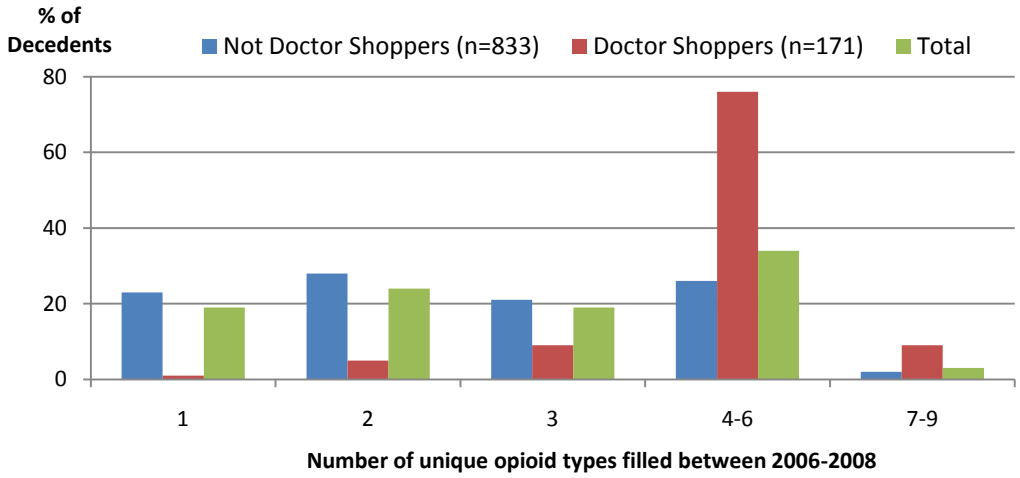
Figure 4.7. Percent of 2008 unintentional poisoning decedents who doctor shopped between 2006-2008 by race[1-5]



1. Source: ODH Office of Vital Statistics
2. Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).
3. Doctor Shopping: Average 5 or more unique prescribers per year between 1/1/06 and 12/31/08.
4. Prescriptions filled outside of Ohio not included.
5. Included decedents with at least one script filled between 1/1/06 and 12/31/08.

Unintentional poisoning decedents with a history of doctor shopping were more likely to fill prescriptions for a variety of opioid medications than decedents who did not doctor shop *(Figure 4.8).* Over 80 percent of doctor shoppers with at least one opioid prescription filled between 2006-2008 filled prescriptions for at least four different types of opioids, compared to less than 30 percent of decedents without a history of doctor shopping.

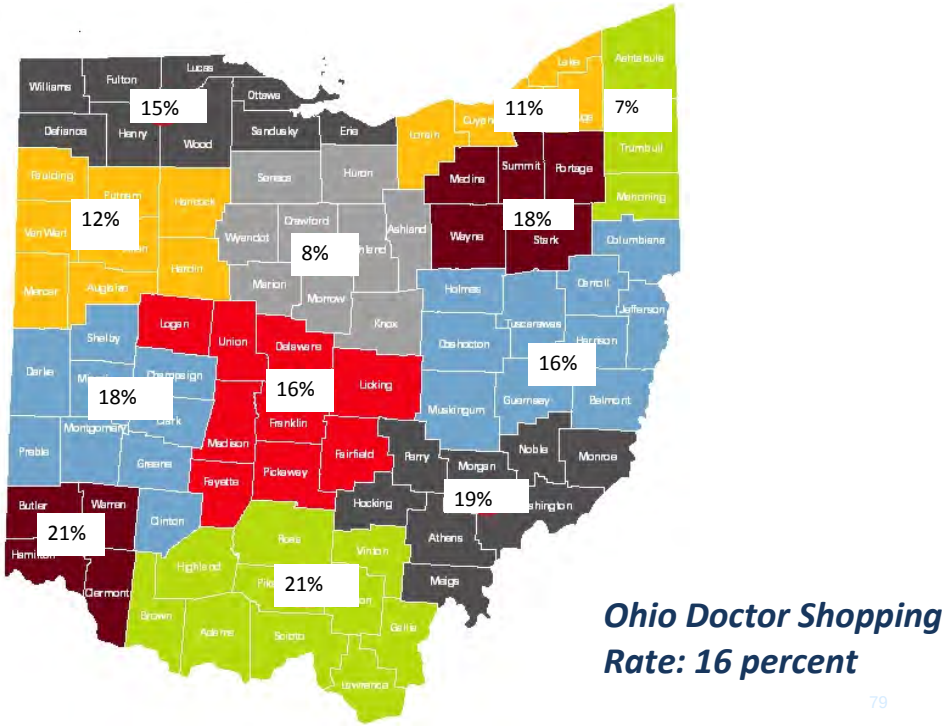
Figure 4.8. Opioid prescription fill history[1,2] among 2008 unintentional poisoning decedents[3] by doctor shopping history[3.4]



1. Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).
2. Opioid types included: Buprenorphine, butorphanol, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone, pentazocine, propoxyphene, tramadol
3. Source: ODH Office of Vital Statistics
4. Included only prescriptions filled in Ohio
5. Included decedents with at least one opioid script filled from 1/1/06-12/31/08
6. Doctor shopping: Average 5 or more prescribers per year from 1/1/06 to 12/31/08.

Counties in the Southern region of Ohio are among the counties with the highest rates of unintentional poisoning deaths (2000-2007) *(Section 2).* Residents from the southern region of Ohio also had the highest rates of doctor shopping among decedents, with a history of doctor shopping found in 21 percent of decedents in the southern and southwestern regions and 19 percent of decedents from counties in southeastern Ohio *(Figure 4.9).*

Figure 4.9. Doctor shopping[1-4] among unintentional poisoning decedents (2008)[5] in Ohio by region



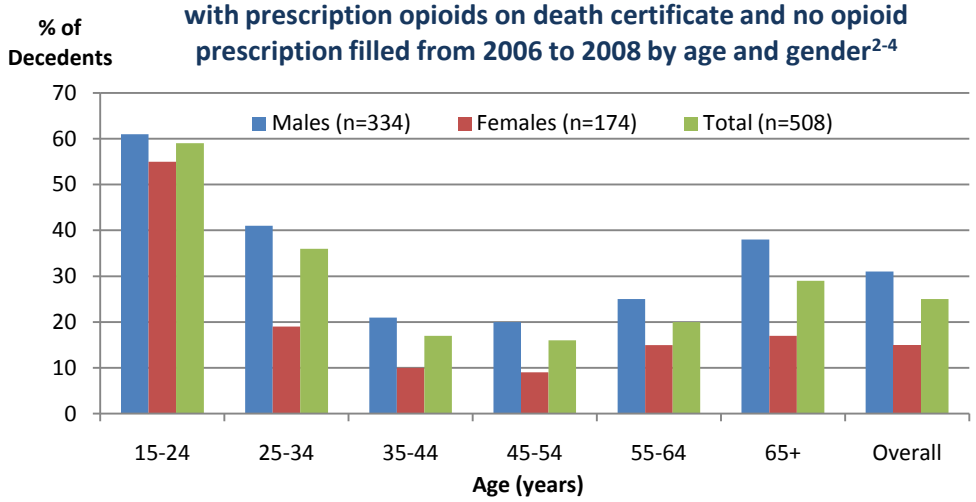
1. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).*
2. *Included only prescriptions filled in Ohio*
3. *Doctor shopping: Average 5 or more prescribers per year from 1/1/06 to 12/31/08.*
4. *Among Ohioans with at least one prescription in OARRS database between 1/1/06 and 12/31/08.*
5. *Source: ODH Office of Vital Statistics*

DIVERSION

Among Ohioans who died of unintentional poisoning in 2008, 508 had a prescription opioid documented on their death certificate, with 157 deaths specifically attributed to methadone. Overall, 25 percent of those with a prescription opioid on their death certificate obtained the opioid through diversion (no record of filling a prescription for an opioid in Ohio within the two-plus years prior to death.) Among those with methadone specified on their death certificate, nearly 71 percent obtained the methadone through diversion (no record of filling a prescription for methadone in Ohio within two-plus years prior to death.) These diversion rates may be overestimates, as this data is based on prescriptions filled in Ohio and decedents may have filled their prescriptions out-of-state. However, Ohio's diversion rate for methadone appears to be similar to the rate found in the bordering state of West Virginia (68 percent).[9]

In 2007, 26.5 percent of high school students reported using a prescription drug without a doctor's prescription one or more times in their life.[30] Ohioans between 15 and 24 years of age who died from unintentional poisoning in 2008 had the greatest proportion of individuals with evidence of prescription opioid diversion. Sixty-one percent of males and 55 percent of females in this age group with prescription opioid on their death certificate had no record of a prescription for an opioid in Ohio *(Figure 4.10).*

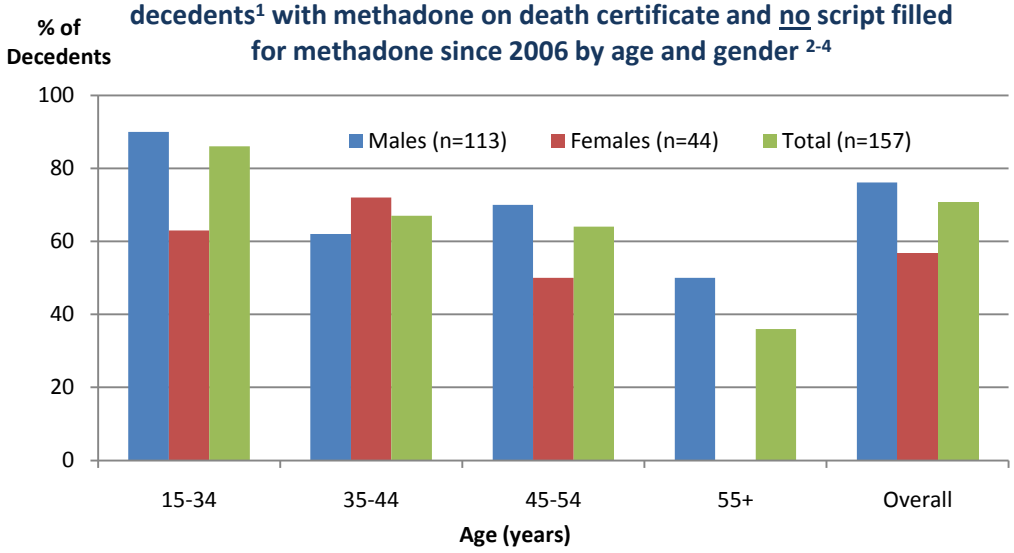
Figure 4.10. Percent of 2008 unintentional poisoning decedents[1] with prescription opioids on death certificate and no opioid prescription filled from 2006 to 2008 by age and gender[2-4]



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).*
3. *Analysis confined to decedents 15 years and older*
4. *Prescriptions filled outside of Ohio not included*

Figure 4.11 shows the percent of 2008 unintentional poisoning decedents with evidence of methadone diversion. Similar to the diversion pattern seen with all prescription opioids, younger individuals were more likely to obtain methadone through diversion. Approximately 90 percent of males under age 35 with methadone on their death certificate had evidence of diversion. Across three of our four age groups, a larger proportion of males than females had evidence of methadone diversion.

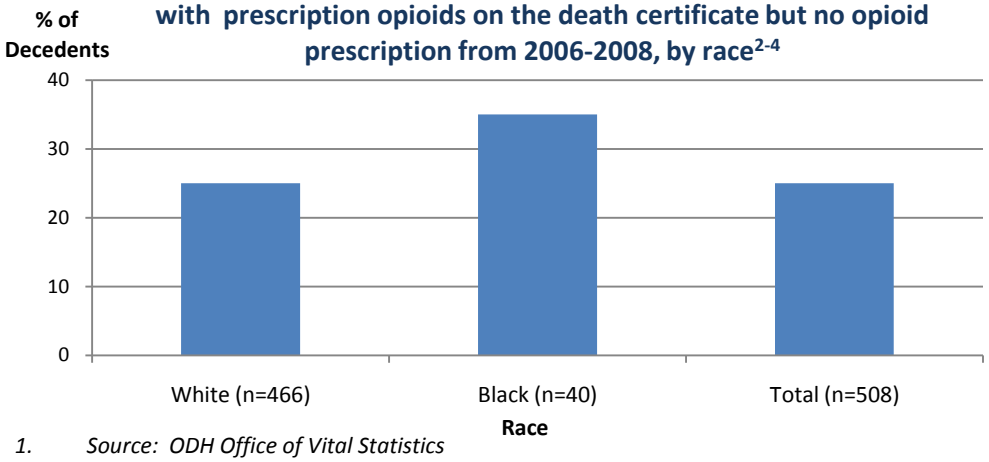
Figure 4.11. Percent of 2008 unintentional drug poisoning decedents[1] with methadone on death certificate and no script filled for methadone since 2006 by age and gender [2-4]



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).*
3. *Analysis confined to decedents 15 years and older*
4. *Prescriptions filled outside of Ohio not included*

While a greater proportion of white decedents obtained their medication through doctor shopping compared to black decedents, a greater percent of black decedents obtained their medication through diversion *(Figures 4.7, 4.12).* Among black decedents who had a prescription opioid on their death certificate, 35 percent had evidence of diversion, compared with 25 percent among white decedents.

Figure 4.12. Percent of 2008 unintentional poisoning decedents[1] with prescription opioids on the death certificate but no opioid prescription from 2006-2008, by race[2-4]

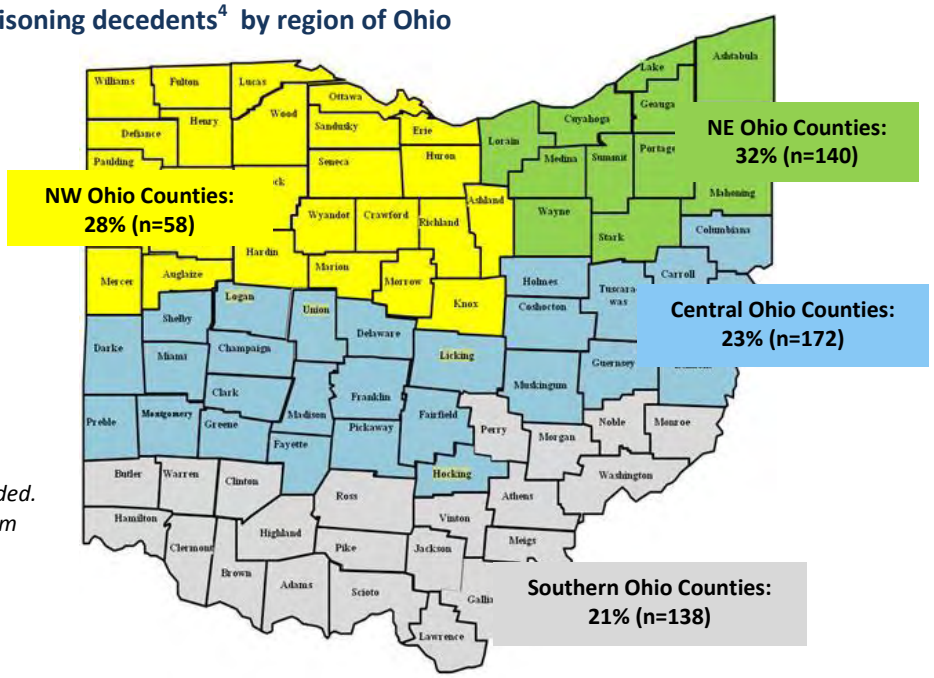


1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).*
3. *Prescriptions filled outside of Ohio not included.*
4. *Other" (n=2) race excluded from this analysis*

While doctor shopping among 2008 unintentional drug poisoning decedents was most common in the residents of southern counties of Ohio, opioid diversion was more common in the residents of northern counties. It is unknown whether the residents of these counties obtained their opioids in their region of Ohio, another region of Ohio, or out of state *(Figure 4.13).*

Figure 4.13. Diversion[1] of prescription opioids[2,3] among 2008 unintentional drug poisoning decedents[4] by region of Ohio

Ohio- 25% (n=508)



1. *No record of prescription filled in Ohio from 1/1/06 to 12/31/08*
2. *Prescriptions filled outside of Ohio not included.*
3. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, OH (August 12, 2009).*
4. *Source: ODH Office of Vital Statistics*

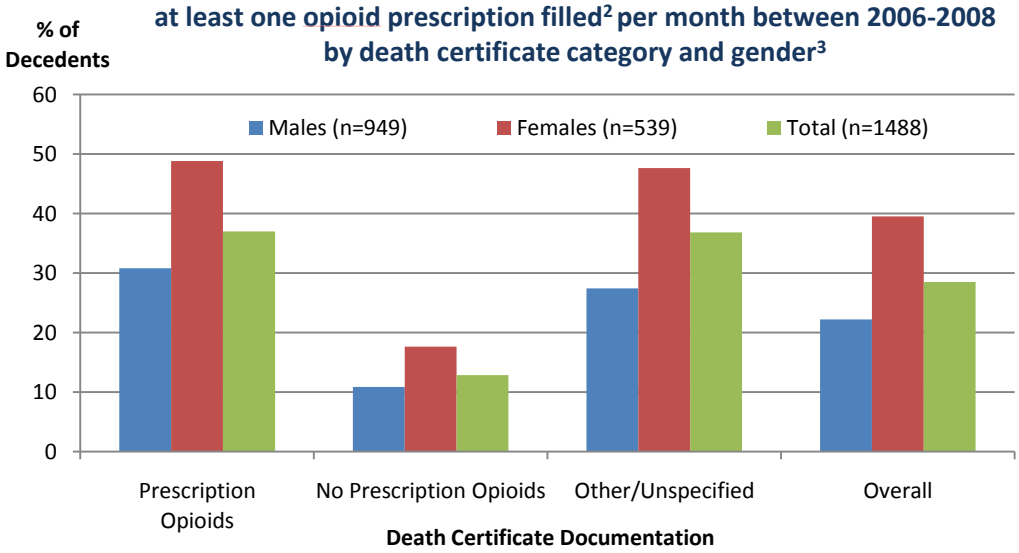
PROFILE OF UNINTENTIONAL DRUG POISONING DEATHS WITH UNSPECIFIED DRUGS

Among the 2008 unintentional drug poisoning deaths matched with the prescription drug history data, 34 percent of death certificates documented the presence of a prescription opioid at time of death and 35 percent of death certificates noted that no prescription opioids were present. The remaining 31 percent of decedents were labeled as "other and unspecified drugs" and the presence or absence of a prescription opioid was not noted. This "other and unspecified drug" category describes cases where no specific drug is identified and may include deaths where multiple drugs were involved, including prescription opioids.

The figures below provide information regarding the prescription history among the "other and unspecified drugs" decedents. In general, the prescription fill patterns in the "other and unspecified" group more closely match the prescription fill patterns of those with a prescription opioid documented on their death certificate than those with no prescription opioid recorded. **This may be an indication that prescription opioids are involved in a proportion of decedents whose death certificate only lists "other and unspecified drugs" as cause of death. This would ultimately result in an underestimation of the number of deaths caused by prescription opioids.**

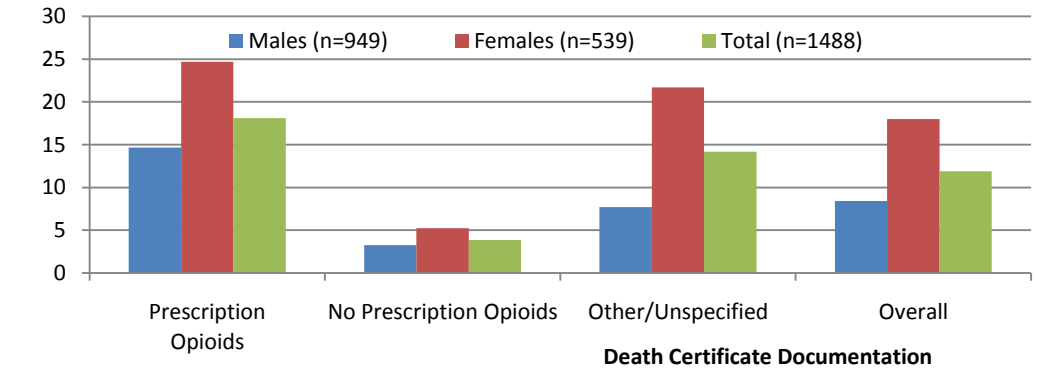
Over 40 percent of females in both the "other and unspecified drugs" and prescription opioid groups filled an average of at least one opioid prescription per month within the two-plus years preceding their death, compared to less than 20 percent of decedents with no prescription opioids documented on the death certificate *(Figure 4.14).* Similarly, over 20 percent of females in the prescription opioid and "other unspecified" groups filled an average of at least two opioid prescriptions per month, compared to less than six percent of decedents with no prescription opioids documented on the death certificate *(Figure 4.15).*

Figure 4.14. Percent of 2008 unintentional poisoning decedents[1] with at least one opioid prescription filled[2] per month between 2006-2008 by death certificate category and gender[3]



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).*
3. *Prescriptions filled outside of Ohio not included.*

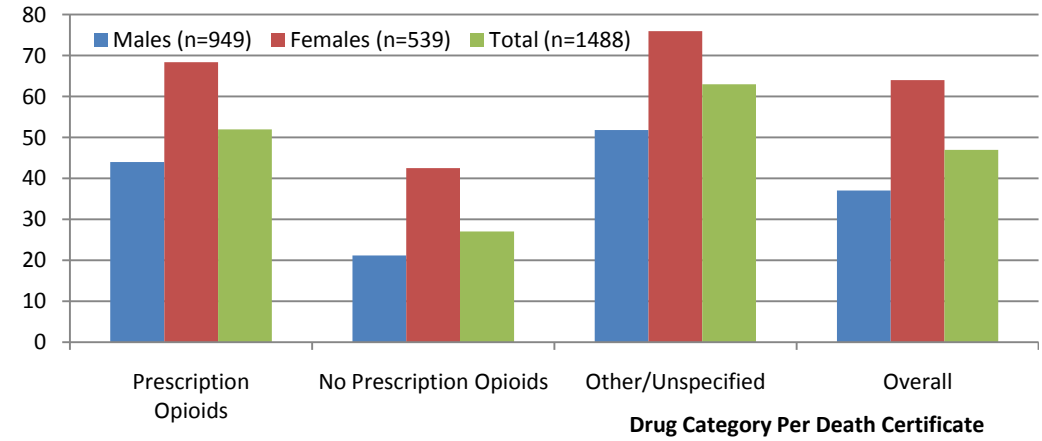
Figure 4.15. Percent of 2008 unintentional poisoning decedents[1] with an average of at least two opioid prescriptions filled[2] per month between 2006-2008, by death certificate category and gender [3]



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).*
3. *Prescriptions filled outside of Ohio not included.*

Figure 4.16 presents the prescription fill history of the drug combination of an opioid and benzodiazepine among 2008 unintentional poisoning decedents. "Other/unspecified" decedents had the largest percent of decedents with a history of filling at least one benzodiazepine and one opioid prescription within two-plus years of death. A larger percent of females than males had a history of this medication combination.

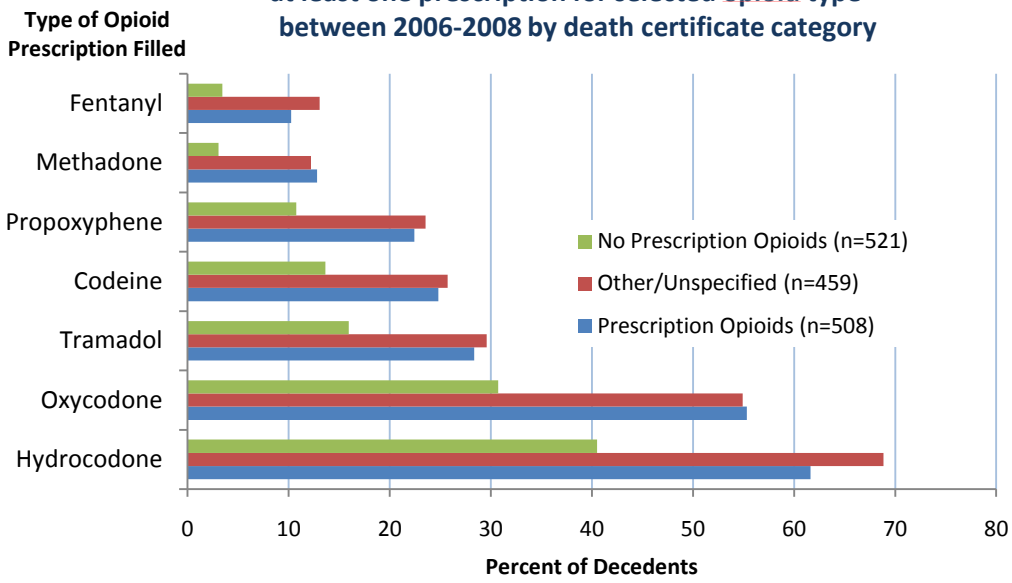
Figure 4.16. Percent of 2008 unintentional poisoning decedents[1] with at least one opioid and one benzodiazepine filled[2,3] between 2006-2008, by death certificate category and gender



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).*
3. *Prescriptions filled outside of Ohio not included.*

Overall, the opioid prescription history of those with prescription opioids documented on the death certificate and those with "other/unspecified" were similar across opioid types *(Figure 4.17).* Hydrocodone and oxycodone were prescribed to the largest percentage of patients across all causes of drug poisoning death.

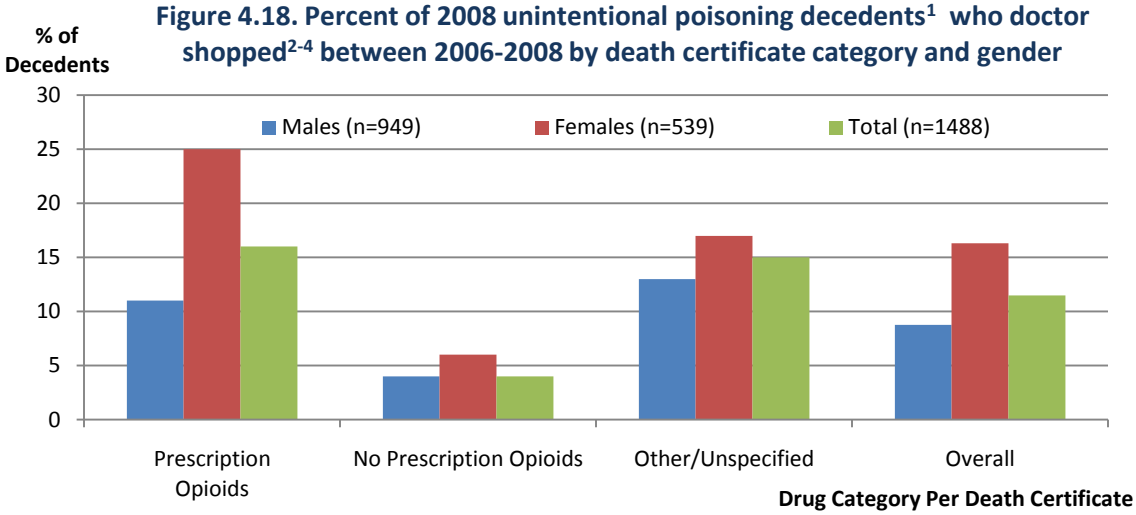
Figure 4.17. Percent of 2008 unintentional poisoning decedents[1] with at least one prescription for selected opioid type[2,3] between 2006-2008 by death certificate category



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).*
3. *Prescriptions filled outside of Ohio not included.*

Doctor shopping behavior among "other/unspecified" resembled those with "prescription opioid" on their death certificate more than those with no prescription opioid documented at time of death. Less than 10 percent of females with no prescription opioid documented on their death certificate obtained their medications through doctor shopping, compared to more than 15 percent of "other/unspecified" and more than 20 percent of those with a prescription opioid listed on their death certificate *(Figure 4.18).*

Figure 4.18. Percent of 2008 unintentional poisoning decedents[1] who doctor shopped[2-4] between 2006-2008 by death certificate category and gender



1. *Source: ODH Office of Vital Statistics*
2. *Source: Ohio Automated Rx Reporting System database, Ohio State Board of Pharmacy, Columbus, Ohio (August 12, 2009).*
3. *Doctor shopping = average 5 or more prescribers per year from 01/01/06-12/31/08*
4. *Prescriptions filled outside of Ohio not included.*

SECTION 5: PREVENTION RESOURCES FOR POISONINGS

OHIO RESOURCES

Alarming Rise in Fatal Unintentional Drug Overdoses in Ohio (presentation) **- Ohio Department of Health, Violence and Injury Prevention Program.**

Epidemic of Prescription Drug Overdose in Ohio factsheet **- Ohio Department of Health, Violence and Injury Prevention Program.**

Prescription for Prevention: Stop the Epidemic **Campaign Materials - Ohio Department of Health, Violence and Injury Prevention Program.**

Ohio Prescription Drug Abuse Task Force **Website and Final Report – Ohio Department of Health**

Generation RX Initiative – Ohio State University College of Pharmacy
http://pharmacy.osu.edu/outreach/generation-rx/

Healthy Ohio Program: Drug Poisoning – Ohio Department of Health
http://www.healthyohioprogram.org/diseaseprevention/dpoison/drugdata.aspx

Ohio Automated Rx Reporting System (OARRS) Ohio's Prescription Drug Monitoring Program http://www.ohiopmp.gov/Default/Default.aspx

Ohio Department of Alcohol and Drug Addiction Services
http://www.odadas.ohio.gov/public/

Ohio Substance Abuse Monitoring Program (OSAM)
http://www.med.wright.edu/citar/osam.html

NATIONAL RESOURCES

Drug Abuse in America: Prescription Drug Diversion. Trend Alert: Critical Information for State Decision-makers. http://www.csg.org/pubs/Documents/TA0404DrugDiversion.pdf

FDA – Food and Drug Administration- Misuse of Prescription Pain Relievers
http://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/MisuseofPrescriptionPainRelievers/default.htm

Join Together: Advancing Effective Alcohol and Drug Policy, Prevention and Treatment
http://www.jointogether.org/

NSC - National Safety Council – Unintentional Poisoning from Overdoses
http://www.nsc.org/SAFETY_HOME/RESOURCES/Pages/Poisoning.aspx

Office of National Drug Control Policy, Proper Disposal of Medications Factsheet:
http://www.whitehousedrugpolicy.gov/publications/pdf/prescrip_disposal.pdf

Prescription Drug Overdoses: State Health Agencies Respond
http://www.astho.org/Display/AssetDisplay.aspx?id=867

SAMHSA Center for Substance Abuse Prevention (CSAP) http://prevention.samhsa.gov/

PUBLIC AWARENESS CAMPAIGNS

For Providers and Pain Patients:

Prescription for Prevention: Stop the Epidemic **Campaign Materials - Ohio Department of Health, Violence and Injury Prevention Program.**

Follow Directions: How to Use Methadone Safely
http://www.dpt.samhsa.gov/methadonesafety/print_materials.aspx

Use as Directed Campaign
http://www.useonlyasdirected.org/index.php?p_resource=education_facts

Zero Unintentional Deaths http://www.zerodeaths.org/

For Youth:

Generation RX Initiative - Ohio State University College of Pharmacy
http://pharmacy.osu.edu/outreach/generation-rx/

Painfully Obvious http://www.painfullyobvious.com/

Parents – the Anti-Drug
http://www.theantidrug.com/drug_info/prescription_dangers.asp

OTHER STATE-LEVEL RESOURCES

Massachusetts – Opioid Overdose Prevention & Reversal
http://www.mass.gov/Eeohhs2/docs/dph/substance_abuse/naloxone_info.pdf

New Jersey – Partnership for a Drug Free New Jersey
http://www.drugfreenj.org/drugs_overview/

North Carolina http://www.injuryfreenc.ncdhhs.gov/About/DrugDeath.htm

Pennsylvania – Allegheny County www.pharmacy.pitt.edu/dept/conference/materials/dr %20karl %20williams.ppt

Use as Directed Campaign
http://www.useonlyasdirected.org/index.php?p_resource=education_facts

Washington State Fact Sheet
http://www.doh.wa.gov/hsqa/emstrauma/injury/pubs/icpg/DOH530090Poison.pdf

Wilkes County, NC – Project Lazarus Briefing Document
http://www.harmreduction.org/downloads/North %20Carolina %20Naloxone %2007.pdf

Zero Unintentional Deaths http://www.zerodeaths.org/

Drug-Specific Information and Public Health Advisories

FDA Public Health Advisory, Fentanyl Transdermal System (marketed as Duragesic) Information. Bethesda, MD: Center for Drug Evaluation and Research; 2007 December 21
http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm114961.htm

FDA Public Health Advisory on Methadone
http://www.fda.gov/Drugs/DrugSafety/PublicHealthAdvisories/ucm124346.htm

Nonpharmaceutical Fentanyl-Related Death, April 2005-March2007. MMWR 2008: 57(29): 793-6. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5729a1.htm

Pain Treatment Topics – Methadone Patient Safety
http://pain-topics.org/opioid_rx/methadone.php

Additional Poisoning Resources

American Association of PCC http://www.aapcc.org/DNN/

CDC Poisoning Information http://www.cdc.gov/health/poisoning.html

National Poison Help http://poisonhelp.hrsa.gov/

Central Ohio Poison Center
Nationwide Children's Hospital
700 Children's Drive
Columbus, Ohio 43205
Poison Emergency Hotline: 1-800-222-1222

Cincinnati Drug and Poison Information Center
Cincinnati Children's Hospital
3333 Burnet Avenue, VP-3
Cincinnati, OH 45229
Poison Emergency Hotline: 1-800-222-1222

The Greater Cleveland Poison Control Center
Rainbow Babies and Children's Hospital
11100 Euclid Avenue
Cleveland, OH 44106
Poison Emergency Hotline: 1-800-222-1222

SECTION 6: APPENDICES

Appendix A

Categorization of Types of Fatal Poisonings, Based on ICD-10 Cause of Death Codes

ICD-10 poison codes	Description
T40.0	opium
T40.1	heroin
T40.2	other opioids
T40.3	methadone
T40.4	other synthetic narcotics
T40.5	cocaine
T40.6	other narcotics
T40.0-T40.4, T40.6	opioids
T40.7-T40.9	hallucinogens (marijuana, LSD, mescaline, etc.)
T42.3	barbiturates
T42.4	benzodiazepines
T51.0, T51.1, T51.9	ethanol, methanol, unspecified alcohol
T50.9	other and unspecified drugs
T40.2-T40.4, T40.6	prescription opioids
X40-X44	unintentional drugs/medicants

Appendix B

First E-code and Corresponding Number of Poisoning Cases, Ohio Hospital Association Inpatient Database, 2003-07

Unintentional

First E-code	Description	No.	Percent
E850	analgesics, antipyretics, and antirheumatics	45	0.08%
E8500	Heroin, Diacetylmorphine	387	0.71%
E8501	Methadone	443	0.82%
E8502	Other opioids and related narcotics: Codeine , Meperidine, Morphine, Opium	1910	3.53%
E8503	Salicylates, Acetylsalicylic acid [aspirin],Amino derivatives of salicylic acid, Salicylic acid salts	233	0.43%
E8504	Aromatic analgesics, not elsewhere classified, Acetanilid, Paracetamol [acetaminophen], Phenacetin [acetophenetidin	838	1.55%
E8506	Antirheumatics [antiphlogistics, Gold salts, Indomethacin	99	0.18%
E8507	Other non-narcotic analgesics, Pyramidal	7	0.01%
E8508	Other specified analgesics and antipyretics, Pentazocine	327	0.60%
E8509	Unspecified analgesic or antipyretic	59	0.11%
E851	barbiturates	113	0.21%
E852	other sedatives and hypnotics	58	0.11%
E8520	Chloral hydrate group	2	0.00%
E8522	Bromine compounds, Bromides, Carbromal (derivatives)	2	0.00%
E8523	Methaqualone compounds	2	0.00%
E8528	Other specified sedatives and hypnotics	351	0.65%
E8529	Unspecified sedative or hypnotic, sleeping: drug, pill, tablet	264	0.49%
E853	tranquilizers	35	0.06%
E8530	Phenothiazine-based tranquilizers	22	0.04%
E8531	Butyrophenone-based tranquilizers	32	0.06%
E8532	Benzodiazepine-based tranquilizers	1520	2.81%
E8538	Other specified tranquilizers	390	0.72%
E8539	Unspecified tranquilizer	13	0.02%
E854	other psychotropic agents	21	0.04%
E8540	Antidepressants	661	1.22%
E8541	Psychodysleptics [hallucinogens]	86	0.16%

Unintentional

Appendix B: Unintentional

First E-code	Description	No.	Percent
E8542	Psychostimulants	168	0.31%
E8543	Central nervous system stimulants	1684	3.11%
E8548	Other psychotropic agents	149	0.28%
E855	other drugs acting on central and autonomic nervous system	7	0.01%
E8550	Anticonvulsant and anti-Parkinsonism drugs	692	1.28%
E8551	Other central nervous system depressants	230	0.42%
E8552	Local anesthetics, Cocaine, Lidocaine [lignocaine] Procaine, Tetracaine	59	0.11%
E8553	Parasympathomimetics [cholinergics]	12	0.02%
E8554	Parasympatholytics [anticholinergics and antimuscarinics] and spasmolytics	57	0.11%
E8555	Sympathomimetics [adrenergics	64	0.12%
E8556	Sympatholytics [antiadrenergics	56	0.10%
E8558	Other specified drugs acting on central and autonomic nervous systems	17	0.03%
E8559	Unspecified drug acting on central and autonomic nervous systems	12	0.02%
E856	antibiotics	92	0.17%
E857	other anti-infectives	43	0.08%
E858	other drugs	35	0.06%
E8580	Hormones and synthetic substitutes	916	1.69%
E8581	Primarily systemic agents	208	0.38%
E8582	Agents primarily affecting blood constituents	505	0.93%
E8583	Agents primarily affecting cardiovascular system	863	1.59%
E8584	Agents primarily affecting gastrointestinal system	41	0.08%
E8585	Water, mineral, and uric acid metabolism drugs	188	0.35%
E8586	Agents primarily acting on the smooth and skeletal muscles and respiratory system	259	0.48%
E8587	Agents primarily affecting skin and mucous membrane, ophthalmological, otorhinolaryngological, and dental drugs	46	0.08%
E8588	Other specified drugs	357	0.66%
E8589	Unspecified drug	342	0.63%
E860	alcohol, not elsewhere classified	7	0.01%
E8600	Alcoholic beverages	330	0.61%
E8601	Other and unspecified ethyl alcohol and its products	15	0.03%

Unintentional

Appendix B: Unintentional

First E-code	Description	No.	Percent	
E8602	Methyl alcohol	11	0.02%	Unintentional
E8603	Isopropyl alcohol	33	0.06%	
E8604	Fusel oil	1	0.00%	
E8608	Other specified alcohols	10	0.02%	
E8609	Unspecified alcohol	50	0.09%	
E8610	Synthetic detergents and shampoos	9	0.02%	
E8611	Soap products	5	0.01%	
E8612	Polishes	1	0.00%	
E8613	Other cleansing and polishing agents	38	0.07%	
E8614	Disinfectants	20	0.04%	
E8615	Lead paints	84	0.16%	
E8616	Other paints and varnishes; lacquers; oil colors; paints other than lead; white washes	5	0.01%	
E862	petroleum products, other solvents and their vapors, nec	1	0.00%	
E8620	Petroleum solvents: ether; benzine; naphtha	1	0.00%	
E8621	Petroleum fuels and cleaners	47	0.09%	
E8622	Lubricating oils	1	0.00%	
E8624	Other specified solvents, benzene	50	0.09%	
E8629	Unspecified solvent	7	0.01%	
E863	agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers	2	0.00%	
E8630	Insecticides of organochlorine compounds	16	0.03%	
E8631	Insecticides of organophosphorus compounds	4	0.01%	
E8634	Other and unspecified insecticides, Kerosene insecticides	27	0.05%	
E8635	Herbicides	2	0.00%	
E8636	Fungicides	12	0.02%	
E8637	Rodenticides	6	0.01%	
E864	corrosives and caustics, nec	8	0.01%	
E8640	Corrosive aromatics: carbolic acid or phenol	2	0.00%	
E8641	Acids	22	0.04%	
E8642	Caustic alkalis	56	0.10%	
E8643	Other specified corrosives and caustics	93	0.17%	
E8644	Unspecified corrosives and caustics	5	0.01%	
E8650	Meat	5	0.01%	

Appendix B: Unintentional

First E-code	Description	No.	Percent	
E8651	Shellfish	5	0.01%	Unintentional
E8652	Other fish	2	0.00%	
E8653	Berries and seeds	29	0.05%	
E8654	Other specified plants	173	0.32%	
E8655	Mushrooms and other fungi	24	0.04%	
E8658	Other specified foods	7	0.01%	
E8659	Unspecified foodstuff or poisonous plant	31	0.06%	
E866	other and unspecified solid and liquid substances	1	0.00%	
E8660	Lead and its compounds and fumes	33	0.06%	
E8661	Mercury and its compounds and fumes	4	0.01%	
E8663	Arsenic and its compounds and fumes	1	0.00%	
E8664	Other metals and their compounds and fu	44	0.08%	
E8665	Plant foods and fertilizers	5	0.01%	
E8666	Glues and adhesives	13	0.02%	
E8667	Cosmetics	4	0.01%	
E8668	Other specified solid or liquid substances	70	0.13%	
E8669	Unspecified solid or liquid substance	56	0.10%	
E867	gas distributed by pipeline	13	0.02%	
E868	other utility gas and other carbon monox	4	0.01%	
E8680	Liquefied petroleum gas distributed in mobile containers	61	0.11%	
E8681	Other and unspecified utility gas	22	0.04%	
E8682	Motor vehicle exhaust gas	56	0.10%	
E8683	Carbon monoxide from incomplete combustion of other domestic fuels	27	0.05%	
E8688	Carbon monoxide from other sources	72	0.13%	
E8689	Unspecified carbon monoxide	67	0.12%	
E869	other gases and vapors	3	0.01%	
E8692	Freon	4	0.01%	
E8693	Lacrimogenic gas [tear gas]	2	0.00%	
E8698	Other specified gases and vapors, Chlorine, Hydrocyanic acid gas	175	0.32%	
E8699	Unspecified gases and vapors	77	0.14%	

Appendix B: Self-Harm				
First E-code	**Description**	**No.**	**Percent**	**Self-Harm**
E950	poisoning by solid or liquid substances	178	0.33%	
E9500	Analgesics, antipyretics, and antirheumatics	7901	14.59%	
E9501	Barbiturates	227	0.42%	
E9502	Other sedatives and hypnotics	1061	1.96%	
E9503	Tranquilizers and other psychotropic agents	12672	23.40%	
E9504	Other specified drugs and medicinal substances	6567	12.13%	
E9505	Unspecified drug or medicinal substance	658	1.22%	
E9506	Agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers	70	0.13%	
E9507	Corrosive and caustic substances	219	0.40%	
E9508	Arsenic and its compounds	2	0.00%	
E9509	Other and unspecified solid and liquid substance	921	1.70%	
E951	poisoning by gases in domestic use	6	0.01%	
E9510	Gas distributed by pipeline	7	0.01%	
E9511	Liquefied petroleum gas distributed in mobile containers	7	0.01%	
E9518	Other utility gas	5	0.01%	
E952	other gases and vapors	14	0.03%	
E9520	Motor vehicle exhaust gas	214	0.40%	
E9521	Other carbon monoxide	32	0.06%	
E9528	Other specified gases and vapors	38	0.07%	
E9529	Unspecified gases and vapors	5	0.01%	

Appendix B: Assault				
First E-code	**Description**	**No.**	**Percent**	**Assault**
E962	Assault by poisoning	7	0.01%	
E9620	Drugs and medicinal substances	41	0.08%	
E9621	Other solid and liquid substances	6	0.01%	
E9622	Other gases and vapors	5	0.01%	
E980	solid or liquid substances	21	0.04%	

Appendix B: Undetermined				
First E-code	Description	No.	Percent	Undetermined
E9800	Analgesics, antipyretics, and antirheumatics	1515	2.80%	
E9801	Barbiturates	70	0.13%	
E9802	Other sedatives and hypnotics	197	0.36%	
E9803	Tranquilizers and other psychotropic agents	1584	2.93%	
E9804	Other specified drugs and medicinal substances	2059	3.80%	
E9805	Unspecified drug or medicinal substance	209	0.39%	
E9806	Corrosive and caustic substances	19	0.04%	
E9807	Agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers	26	0.05%	
E9808	Arsenic and its compounds	1	0.00%	
E9809	Other and unspecified solid and liquid substances	417	0.77%	
E9811	Liquefied petroleum gas distributed in mobile containers	4	0.01%	
E982	other gases	1	0.00%	
E9820	Motor vehicle exhaust gas	9	0.02%	
E9821	Other carbon monoxide	26	0.05%	
E9828	Other specified gases and vapors	21	0.04%	
E9829	Unspecified gases and vapors	10	0.02%	

APPENDIX C

Categorized Insurance Status

Payer Description	Insurance Status
Self Pay	uninsured
Workers Compensation	public
Medicare	public
Medicaid	public
Other Government	public
Commercial Insurance	private
Blue Cross Crossover	private
Champus	private
Other	private
Blue Cross Primary	private
HMO	private
PPO	private
Medicaid HMO	public
Blue Cross HMO	private
Medicare HMO	public
Bad Debt Uncompensated	uninsured
Charity Uncompensated	uninsured
HCAP	public

Appendix D

URBANALITY CLASSIFICATION FOR OHIO COUNTIES

METROPOLITAN	SUBURBAN	RURAL	APPALACHIAN
ALLEN	AUGLAIZE	ASHLAND	ADAMS
BUTLER	CLARK	ASHTABULA	ATHENS
CUYAHOGA	DELAWARE	CHAMPAIGN	BELMONT
FRANKLIN	FAIRFIELD	CLINTON	BROWN
HAMILTON	FULTON	CRAWFORD	CARROLL
LORAIN	GEAUGA	DARKE	CLERMONT
LUCAS	GREENE	DEFIANCE	COLUMBIANA
MAHONING	LAKE	ERIE	COSHOCTON
MONTGOMERY	LICKING	FAYETTE	GALLIA
RICHLAND	MADISON	HANCOCK	GUERNSEY
STARK	MEDINA	HARDIN	HARRISON
SUMMIT	MIAMI	HENRY	HIGHLAND
	PICKAWAY	HURON	HOCKING
	PORTAGE	KNOX	HOLMES
	TRUMBULL	LOGAN	JACKSON
	UNION	MARION	JEFFERSON
	WOOD	MERCER	LAWRENCE
		MORROW	MEIGS
		OTTAWA	MONROE
		PAULDING	MORGAN
		PREBLE	MUSKINGUM
		PUTNAM	NOBLE
		SANDUSKY	PERRY
		SENECA	PIKE
		SHELBY	ROSS
		VAN WERT	SCIOTO
		WARREN	TUSCARAWAS
		WAYNE	VINTON
		WILLIAMS	WASHINGTON
		WYANDOT	

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings				
Tranquilizers Among Inpatient Poisonings, 2003-07, Ohio				
ICD-9-CM	**Literal**	**Description**	**Number**	**Percent**
967	poisoning by sedatives/hypnotics		0	0.0%
9671	chloral hydrate group		14	0.0%
9672	paraldehyde		0	0.0%
9673	bromine compounds		0	0.0%
9674	methaqualone compounds		2	0.0%
9675	glutethimide group		0	0.0%
9676	mixed sedatives NEC		0	0.0%
9678	other sedatives/hypnotics		1,930	3.6%
9679	unspecified sedatives		784	1.4%
9691	phenothiazine-based tranquilizers		166	0.3%
9692	butyrophenone-based tranquilizers		128	0.2%
9693	other antipsychotics, neuroleptics, & major tranquilizers		3,665	6.8%
9695	other tranquilizers		515	1.0%
E852	acc other sedatives, hypnotics		68	0.1%
E8520	chloral hydrate group		2	0.0%
E8521	paraldehyde		0	0.0%
E8522	bromide compounds		2	0.0%
E8523	methaqualone compounds		2	0.0%
E8524	glutethimide group		0	0.0%
E8525	mixed sedatives, nec		0	0.0%
E8528	other specified sedatives & hypnotics		430	0.8%
E8529	unspecified sedative or hypnotic		309	0.6%
E853	unintentional poisoning by tranquilizers		38	0.1%
E8530	phenothiazine based tranquilizers		30	0.1%
E8531	butyrophenone-based tranquilizers		38	0.1%
E8538	other specified tranquilizers		495	0.9%
E8539	unspecified tranquilizers		0	0.0%
E937	therapeutic use sedatives/hypnotics		0	0.0%
E9371	chloral hydrate group		0	0.0%
E9372	bromide compounds		0	0.0%
E9374	methaqualone compounds		0	0.0%
E9375	glutethimide group		0	0.0%
E9376	mixed sedatives, NEC		0	0.0%
E9378	other treatment use sedatives/hypnotics		13	0.0%
E9379	unspecified treatment use sedatives/hypnotics		6	0.0%
E9391	phenothiazine-based tranquilizers		2	0.0%
E9392	butyrophenone-based tranquilizers		10	0.0%
E9393	other antipsychotics, neuroleptics, & major tranquilizers		17	0.0%
E9395	other tranquilizers		1	0.0%
E9502	oath sedatives/hypnotics	self-harm	1,671	3.1%
E9503	tranquilizers/other psychotropic agents	self-harm	15,264	28.2%
E9802	other sedatives/hypnotics		261	0.5%
E9803	tranquilizers/other psychotropic agents		2,154	4.0%
Total			**20,268**	**37.4%**

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings

Barbiturates and Derivatives, Among Inpatient Poisonings, Ohio, 2003-07

ICD-9-CM	Literal	Description	Number
304.1	barbiturate type, dependence unspecified	chlordiazepoxide, diazepam, glutethimide, meprobamate	0
304.10	barbiturate type, dependence continuous		320
304.11	barbiturate type, dependence episodic		
305.4*	barbiturates/tranquilizers, non dependent		0
305.40*	barbiturates/tranquilizers, non dependent, unspecified		722
305.41*	barbiturates/tranquilizers, non dependent, continuous		54
305.42	barbiturates/tranquilizers, non dependent, episodic		12
967.0	barbiturates	amobarbital, barbital ,butobarbital, pentobarbital, phenobarb, secobarb	650
E851	acc barbiturates	amobarbital, barbital, pheno-, seco-barbital	182
E937.0	therapeutic use of barbiturates	amobarbital (-tone), barbital (-tone), butobarbital (-tone), pentobarbital (-tone), phenobarbital (-tone), secobarbital (-tone)	2
E950.1	self-inflicted barbiturates		372
E980.1	undetermined intent barbiturates		103
		Total	**1,754 3.2%**

excludes thiobarbiturates, pyrabital;
*doesn't include any code for assault; 305.4, 305.40, 305.41 not exclusive to barbiturates

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings

Methadone Among Inpatient Poisonings, Ohio, 2003-07

ICD-9-CM	Literal	Number
965.02	methadone	1,032
E850.1	methadone	529
E935.1	methadone	4
	Total	**1,038** **1.9%**

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings

Benzodiazepines Among Inpatient Poisonings, 2003-07

ICD-9-CM	Literal	Description	Number
969.4	benzodiazepine-based tranquilizers	chlordiazepoxide, diazepam, flurazepam, lorazepam, medazepam, nitrazepam	11,120
E853.2	benzodiazepine-based tranquilizers	chlordiazepoxide, diazepam, flurazepam, lorazepam, medazepam, nitrazepam	2187
E939.4	benzodiazepine-based tranquilizers	chlordiazepoxide, diazepam, flurazepam, lorazepam, medazepam, nitrazepam	23
		Total	11,166 20.6%

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings

Alcohol Among Inpatient Poisonings, Ohio, 2003-07

ICD-9-CM	Literal	Description	Number
291.81	alcohol withdrawal	actually an alcoholic related mental disease	680
303	alcohol dependence syndrome		0
303.0	acute alcoholic intoxication		0
303.00	acute alcoholic intoxication, unspecified		757
303.01	acute alcoholic intoxication, continuous		626
303.02	acute alcoholic intoxication, episodic		42
303.9	other/unspecified alcohol dependence		0
303.90	other/unspecified alcohol dependence, unspecified		2,023
303.91	other/unspecified alcohol dependence, continuous		841
303.92	other/unspecified alcohol dependence, episodic		56
303.93	other/unspecified alcohol dependence, remission		306
305.0	alcohol abuse	drunkenness NOS, hangover, excessive drinking of alcohol, inebriety NOS	0
305.00	alcohol abuse, unspecified		6,565
305.01	alcohol abuse, continuous		827
305.02	alcohol abuse, episodic		195
790.3	excessive blood level of alcohol	(only pertinent code in series)	6
980	toxic effect of alcohol		0
980.0	ethyl alcohol		2,886
980.9	unspecified alcohol		540
E860	unintentional poisoning from alcohol		15
E860.0	alcoholic beverages		669
E860.1	ethyl alcohol		20
E860.9	unspecified alcohol		91
V79.1	special screening for alcoholism		0
		Total Alcohol	**13,202 24.4%**

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings			
Cocaine Among Inpatient Poisonings, Ohio, 2003-07			
ICD-9-CM	**Literal**	**Description**	**Number**
304.2	cocaine dependence		0
304.20	cocaine dependence, unspecified		1007
304.21	cocaine dependence, continuous		390
304.22	cocaine dependence, episodic		41
304.23*	cocaine dependence, in remission		0
305.6	cocaine nondependence		0
305.60	cocaine nondependence, unspecified		4804
305.61	cocaine nondependence, continuous		530
305.62	cocaine nondependence, episodic		135
305.63*	cocaine nondependence, in remission		146
968.5	surface/infiltration anesthetics	cocaine, lignocaine, procaine, tetracaine	122
E855.2	local anesthetics	cocaine, lidocaine, procaine, tetracaine	65
E938.5	surface/infiltration anesthetics	cocaine, lidocaine, procaine, tetracaine	0
		Total	**6,917 12.8%**
***304.23 & 305.63 (in remission) not included in cocaine total**			

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings

Prescription Opioids Among Inpatient Poisonings, 2003-07

ICD-9-CM	Literal	Description	Number
965.02	methadone		1,032
965.09	other opioids/related narcotics	codeine, meperdine, morphine	3,966
965.8	pentazocine	synthetic opioid analgesic	1,305
E850.1	methadone		529
E850.8	other specified analgesics, antipyretics	pentazocine	411
E935.0	therapeutic use of heroin	diacetylmorphine	1
E935.1	methadone		4
E935.2	other opioids/related narcotics	codeine (methylmorphine, meperdine (pethidine), morphine, opium (alkaloids)	33
E935.8	other specified analgesics/antipyretics	pentazocine (*narcotic opioid analgesic*)	33

Appendix E: ICD-9-CM Codes Used to Identify Drug/Medication-Related Poisonings

Opioids Among Inpatient Poisonings, Ohio, 2003-07

ICD-9-CM	Literal	Description	Number
304.0	morphine type dependence	heroin, methadone, opium, opium alkaloids & derivatives, synthetics	0
304.00	morphine type dependence, unspecified		904
304.01	morphine type dependence, continuous		486
304.02	morphine type dependence, episodic		9
304.7	morphine + any other		0
304.70	morphine + any other		444
304.71	morphine + any other		225
304.72	morphine + any other		8
305.5	morphine type, nondependence		0
305.50	opioid abuse, unspecified		1,220
965.0	opioids & related narcotics		0
965.00	opium		1,845
965.01	heroin	diacetylmorphine	994
965.02	methadone		1,032
965.09	other opioids/related narcotics	codeine, meperdine, morphine	3,966
965.8	pentazocine	synthetic opioid analgesic	1,305
E850.0	heroin	diacetylmorphine	463
E850.1	methadone		529
E850.2	other opioids/related narcotics	codeine (methylmorphine, meperdine (pethidine), morphine, opium (alkaloids)	2,382
E850.8	other specified analgesics, antipyretics	pentazocine	411
E935.0	therapeutic use of heroin	diacetylmorphine	1
E935.1	methadone		4
E935.2	other opioids/related narcotics	codeine (methylmorphine, meperdine (pethidine), morphine, opium (alkaloids)	33
E935.8	other/unspecified analgesics/antipyretics	pentazocine (*narcotic opioid analgesic*)	6
Total w/965.8, E850.8 & E935.8=10,325, 19.1%; w/o 9,198, 17.0%			

APPENDIX F

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APPENDIX H

ABBREVIATIONS

ARCOS	**The Automation of Reports and Consolidated Orders System**
CDC	**Centers for Disease Control and Prevention**
CPI	**Consumer Price Index**
DEA	**Drug Enforcement Agency**
DMR	**Drug/Medication-related**
E-Code	**External cause of injury code**
ICD	**International Classification of Diseases**
IPP	**Violence and Injury Prevention Program**
LOS	**Length of stay**
NEDTW	**New and Emerging Drug Trends Workgroup**
NPDS	**National Poison Death System**
OAR$_x$RS	**Ohio Automated Rx System**
ODADAS	**Ohio Department of Alcohol and Drug Addiction Services**
ODH	**Ohio Department of Health**
OHA	**Ohio Hospital Association**
OIPP	**Ohio Injury Prevention Partnership**
OPDATF	**Ohio Prescription Drug Abuse Task Force**
OVDRS	**Ohio Violent Death Reporting System**
PAG	**Poison Action Group**
PMP	**Prescription Monitoring Program**
SAMHSA	**Substance Abuse and Mental Health Services Administration**
WISQARS™	**Web-based Injury Statistics Query and Reporting System**
WONDER	**Wide-ranging Online Data for Epidemiologic Research**
YPLL	**Years of Potential Life Lost**

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