Drug poisonings in Southern Nevada, 2001-2012

By Jing Feng, Ph.Dc, MS | Nancy Williams, MD, MPH | Cassius Lockett, Ph.D | Joseph P. Iser, MD, DrPH, MSc

Abstract

Objective
This report presents recent trends relating to fatal drug poisonings in Southern Nevada for available data years from 2001 through 2012.

Data and methods
Data from the death (preliminary from 2012 onwards) registry and hospital inpatient discharge as well as emergency department visit databases were evaluated to provide empirically-based information on the mortality and morbidity burden associated with drug overdoses. Statistical methods are primarily descriptive and consist of calculations of frequencies and rates.

Main results
The number of drug-induced deaths, including both drug poisonings and those attributed to drug dependence or addiction, nearly doubled over the past decade. Since 2005-06, drug overdose has become the leading injury mortality cause in the county, and relative to the nation, drug overdose rates were about 70% higher for residents. The vast majority of drug overdoses were unintentional. Close to two-thirds of drug overdoses involved opioid analgesics. Ages 45-54 had higher overdose rates involving opioid analgesics than other age groups. Opioids-induced hospitalizations and ED visits are a significant area of health expenditure, accounting for over $40 million in total billed amount for hospitalizations and over $7 million for associated ED visits in 2012 respectively.

Abbreviations
DP: drug poisoning
NHB: non-Hispanic black
NHW: non-Hispanic white
CI: confidence interval

Poisoning is a leading cause of mortality in the United States that requires serious public health attention. Poisoning prevention was made one of the priority areas from the outset of the Healthy People (HP) 2010 initiative, and was retained as a HP 2020 objective. The National Centers for Disease and Prevention (CDC) have extensively documented the dramatic rise in fatal poisonings and the role of pharmaceutical drug overdoses as a major cause of this epidemic. There were nearly 100 drug overdoses every day in the United States,[1] the majority of which attributed to prescription opioids, namely opioid pain relievers. Drug poisoning and dependence also contribute significantly to psychosocial deterioration, emergency department visits, hospitalization, and health system costs.

The misuse and abuse of psychotropic pharmaceuticals and illicit drugs pose a serious public health challenge in Clark County. The number of drug-induced deaths, including both drug poisonings (i.e. overdoses) and those attributed to drug dependence or addiction, nearly doubled over the past decade from 710 in 2001-03 to 1,255 in 2010-2012. Moreover, drug overdose rates were about 70% higher for residents (at an age-standardized rate [see Definitions] of 20.7 deaths per 100,000 person-years) than comparable national rates (12.3 per 100,000) in 2010-2011.[2] The relative excess of drug overdoses occurred among both male and female residents, with rates of 24.1 and 17.2 per 100,000 males and females (versus national rates of 15 and 9.6) respectively.

Drug overdose is the leading injury mortality cause and a large source of premature deaths

Since 2005-06, drug poisonings (DP) have surpassed firearm injuries as the leading cause of injury deaths in the county. Fatal drug poisonings accounted for around 35% of all injury deaths in 2010-12, exceeding deaths from firearm (21%) and motor vehicle traffic (13%) causes combined (Figure 1). Most fatal DPs (>80%) were unintentional, and in contrast to a declining slope noted for fatal motor vehicle traffic accidents, unintentional overdoses resulting from drug misuse or abuse have increased steadily over the past decade, comprising nearly half of all deaths due to unintentional injury in 2010-12.

DP leads to much premature mortality. Ages 25-54 made up about two-thirds of drug overdoses in both males and females, but only 17% and 12% of all deaths respectively (Figure 1).

Definitions

Injury deaths: Violent or accidental deaths caused by forces external to the body. Examples of injury causes or mechanisms include cut or pierce, submersion, fall, fire/burn, firearm, motor vehicle, poisoning, and suffocation.

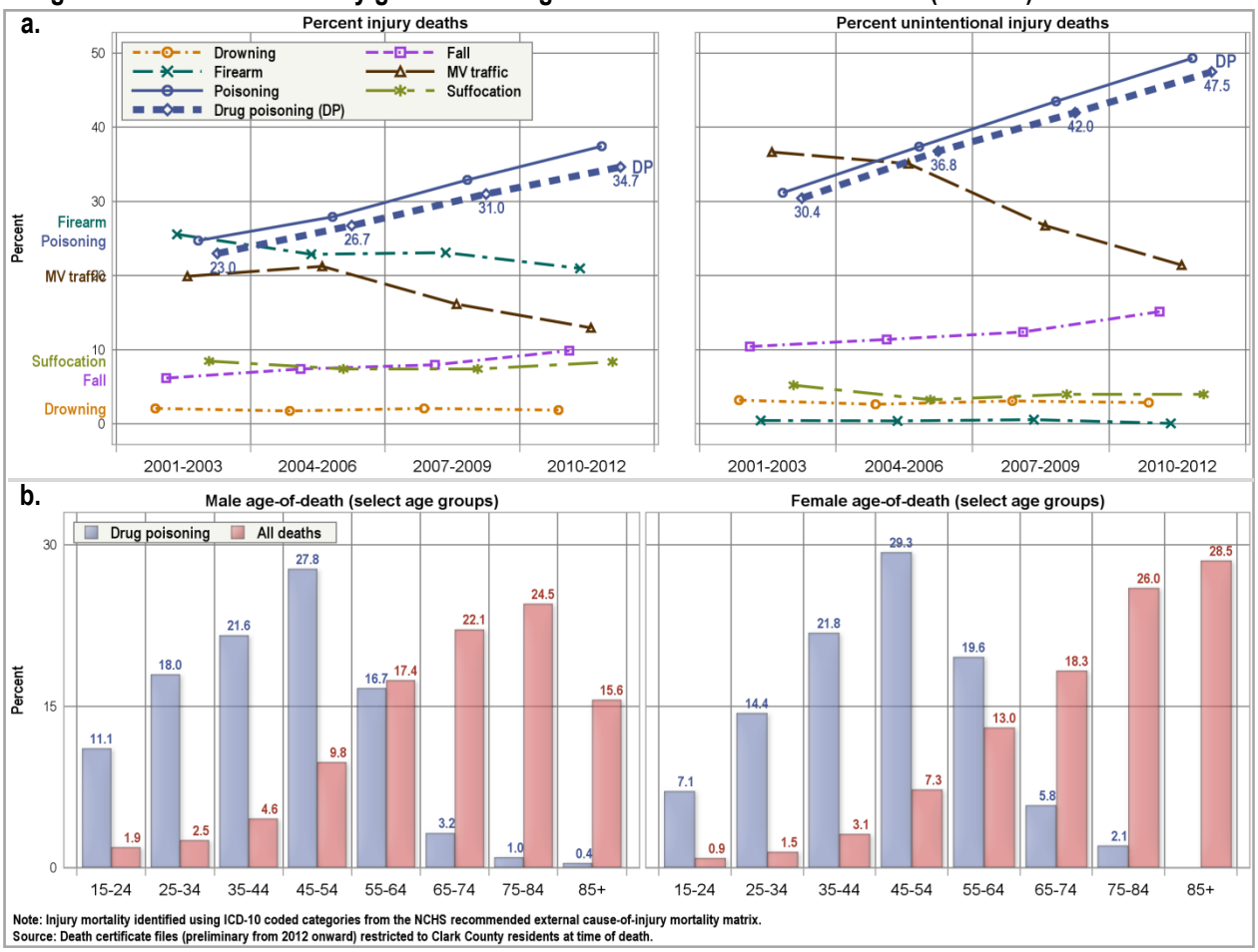
Poisoning deaths: Include deaths from exposure to natural or manmade substance(s). Most poisoning deaths result from unintentional or intentional (self-harm) drug overdoses. Non-drug poisoning deaths are those from exposure to other toxic substances (e.g. gases, vapors).

Drug-induced deaths: Include fatal drug poisonings (accounting for the overwhelming majority of drug-induced deaths as well as poisoning deaths) and deaths from medical conditions directly related to dependent and nondependent use of medically prescribed and other drugs (e.g. drug dependence or psychoses and other mental or behavioral disorder). The latter are not considered injury deaths according to the external causes of injury mortality framework recommend by the National Center for Health Statistics (NCHS).[3]

Age-specific mortality rate: Computed as the number of deaths among persons in a specific age group and time period divided by the population of all residents in that same age group and time period.

Age-standardized mortality rate: An artificial measurement computed as the weighted average of the age-specific death rates where the weights are the standard population proportions by age. This direct adjustment method removes the potential confounding of mortality risks due to age heterogeneity across groups and over time. The standard or reference population adopted in this analysis was the July 1, 2000 bridged-race intercensal national population estimates.

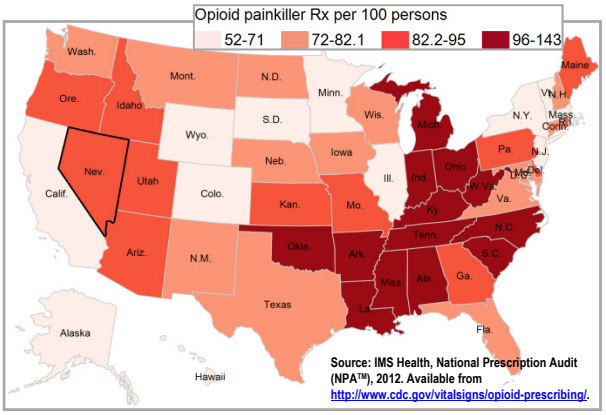
Figure 1. Injury and all-cause deaths, Clark County-NV, 2001-12: a. Injury mortality by select mechanism; b. Age-of-death distributions by gender for drug overdoses and all-cause deaths (2010-12).



Close to two-thirds of drug overdoses involved opioid analgesics

Research examining opioid analgesics prescribing practices indicated that prescribing rates correlated with overdose deaths.[4,5] According to a CDC analysis of the 2012 National Prescription Audit, the state of Nevada had the 15th highest rate in the country of prescribing opioid pain relievers (OPR), at 94.1 OPR prescriptions per 100 persons (versus a national rate of 82.5 per 100) (Figure 2), the 10th highest rate of prescribing long-acting/extended-release† OPRs (14.8 versus 10.3 per 100), and the 3rd highest rate of prescribing high-dose†† OPRs (8.2 versus 4.2 per 100).[6]

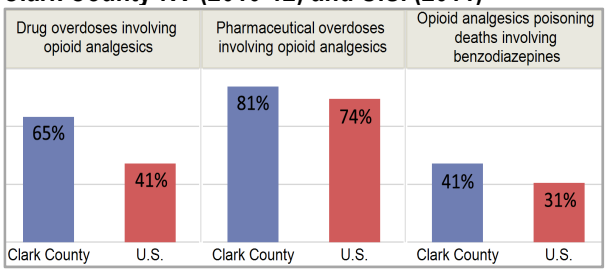
Figure 2. Opioid painkiller prescriptions by state



†Long-acting/extended-release OPR: those that should be taken only 2-3 times a day, e.g. methadone, oxycodone. ††High-dose OPR: the largest formulations available for each type of OPR that resulted in a total daily dosage of 100+ milligram morphine equivalents when taken at the usual frequency, e.g. every 4-6 hours.

As might be expected, opioid analgesics were involved in more DP deaths in the county than in the nation (Figure 3). Of the 1,249 DP deaths in

Figure 3. Deaths involving select substances (%), Clark County-NV (2010-12) and U.S. (2011)



Source: Death certificate files (preliminary from 2012 onward) restricted to Clark County residents at time of death.

2010-12, 65% (809) involved prescription opioids, including natural/semisynthetic (e.g. morphine, hydrocodone, oxycodone) and synthetic (e.g. fentanyl, tramadol, methadone) opioid analgesics. In comparison, 41% of DP deaths nationwide involved opioid analgesics.[7] As well, nearly three out of four pharmaceutical overdoses in the nation involved opioid analgesics,[8] whereas the comparable rate was 81% (809 of 1,004) in the county. Among residents in 2010-12, there were also twice as many drug overdoses involving opioid analgesics as those involving illicit drugs such as heroin, cocaine, and stimulants with abuse potential (347 deaths).

Deaths attributed to opioid analgesics often involve other drugs. The concomitant use of opioid analgesics with sedatives, such as those in the benzodiazepine family, greatly increases the risk for overdose. In 2010-12, 41% or 332 of the 809 of opioid analgesics poisoning deaths also involved benzodiazepines, compared to 22% (162 of 737) in 2007-09 and a national rate of 31%.[7]

Commonly abused drug types

Narcotics — opioid analgesics and related compounds including both licit pharmaceutical substances and illicit drugs (e.g. heroin, opium, cocaine), which in moderate doses dull the senses, induce drowsiness and relieve pain but may cause coma, hallucinations, convulsions or death if doses are excessive.

Opiates/opioids — compounds or drugs that bind to receptors in the brain involved in the control of pain and other functions, including opium-derived or semi-synthetic analgesics such as morphine, codeine, hydrocodone (Vicodin®), and oxycodone (OxyContin®, Percocet®); synthetic narcotics such as methadone (a legal substitute for heroin in opioid addiction treatment programs), fentanyl, propoxyphene, and meperidine; and related narcotics such as heroin. Serious health risks including overdose may result from opioid misuse. While opioids are typically abused due to their euphoria-producing property, misuse can also include taking opioid drugs concomitantly with substances that depress the central nervous system (CNS) (e.g. barbiturates, benzodiazepines, alcohol, antihistamines, or general anesthetics), which increases the risk of life-threatening respiratory depression.

Sedatives/hypnotics — CNS depressants that slow CNS function, suppress anxiety, and promote sleep, including benzodiazepines (e.g. diazepam [Valium®], alprazolam [Xanax®] , triazolam and estazolam), barbiturates, and other types of CNS depressants (e.g. non-benzodiazepine sedatives such as zolpidem [Ambien®], eszopiclone [Lunesta®] and zalepon [Sonata®]). Adverse effects associated with sedative use and abuse may include physical dependence and withdrawal, which can lead to life-threatening complications. Typically, depressants should not be combined with other substances that depress the CNS (e.g. opioid analgesics, alcohol, antihistamines, and certain OTC cough suppressants), given the potential health risks posed including suppression of brain activities and respiration as well as cardiovascular failure.

Stimulants — psychotropic drugs that facilitate the activity of the central or peripheral nervous systems (e.g. through enhancing the effects of key brain neurotransmitters such as monoamines), thereby increasing alertness, attention, and endurance, as well as elevating respiration, heart rate and blood pressure. When used appropriately in medical treatment, stimulants increase mental and/or physical functions. However, some stimulants with abuse potential (e.g. amphetamines) are known to cause elevated mood and euphoria, as well as rebound fatigue, anxiety and depression. Whereas dependence/addiction often leads to psychiatric and psychosocial deterioration, excessive doses can affect body temperature, heart rhythm, and cause cardiovascular complications such as heart failure or seizures.

Ages 45-54 had higher overdose rates involving opioid analgesics than other age groups

While men were more likely to die from opioid analgesics poisonings, the gender divide narrowed in recent years due to a notable rise in related overdose deaths among females (Figure 4). In 2010-12, there were 433 (at an age standardized rate of 14.1 per 100,000) male and 376 (12.4 per 100,000) female drug overdoses involving opioid analgesics, up 4% and 18% from equivalent numbers in 2007-09 (418 and 319) respectively. In female opioid analgesics overdoses, 44% (164 deaths) also involved benzodiazepines, compared to 39% (168) in males. For both genders, the highest rates of opioid analgesics poisoning were in the 45-54 age group. In ages 55 and above, the female rates were higher than the male rates. Whereas overdose rates involving illicit drugs also plateaued in ages 45-54, younger ages represented greater proportions of the associated mortality burden than in opioid analgesics overdoses.

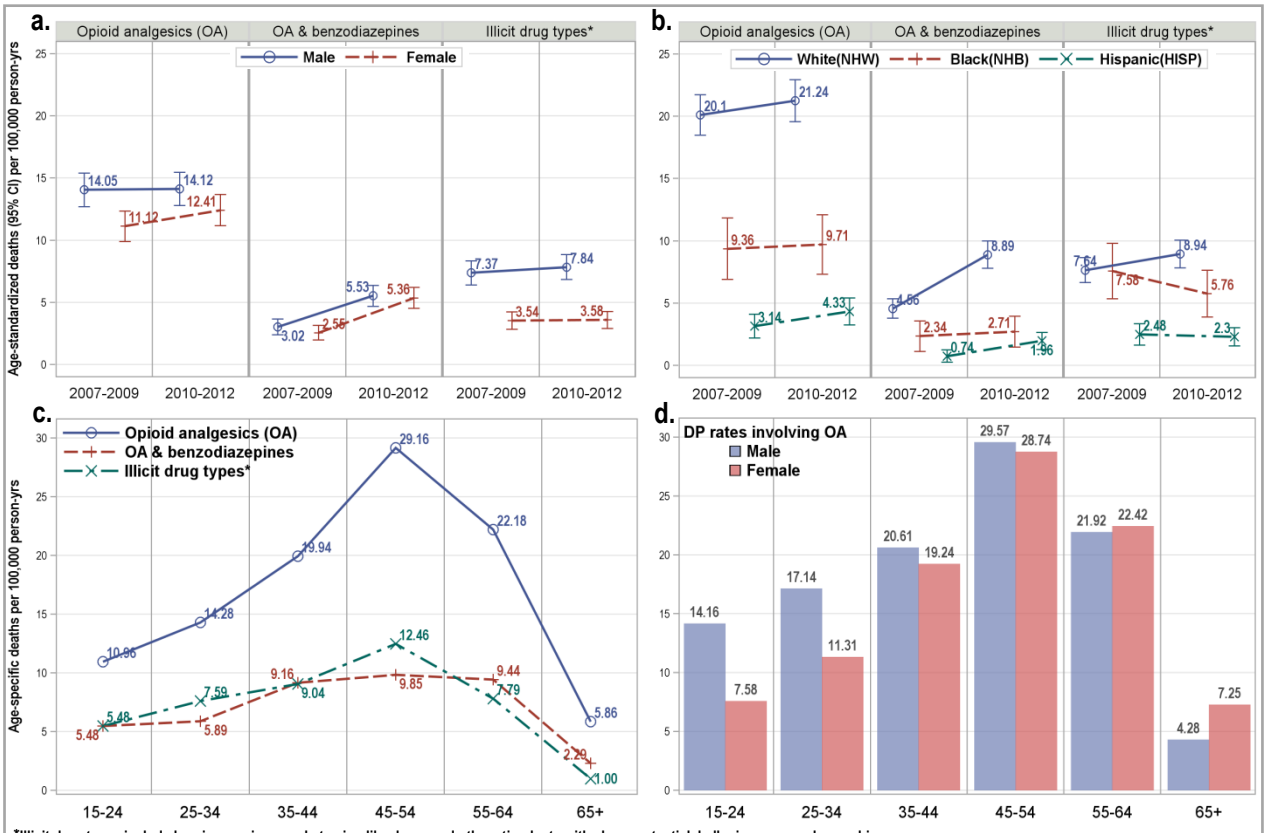
Non-Hispanic whites (NHW) were predominant in opioid analgesics overdoses

At 21.2 deaths per 100,000 in 2010-12, NHWs had the highest death rate from opioid analgesic poisonings, followed by American Indians/Alaska Natives (data not shown), and then non-Hispanic blacks (NHB) (Figure 4). Further, overdose rates involving both opioid analgesics and benzodiazepines nearly doubled among NHWs from 4.9 to 8.9 per 100,000 between 2007-09 and 2010-12, and showed moderate increases for NHBs and Hispanics as well.

Overdose deaths involving illicit drugs were more common among NHW and NHB men

As in previous years, males far exceeded females in illicit drug-related overdoses, at a rate of 7.8 per 100,000 in 2010-12, more than twice the rate of 3.6 per 100,000 in females. The racial disparity in illicit drug-related overdoses persisted, with rates substantially higher among NHWs and NHBs than other race/ethnicities.

Figure 4. Drug poisoning deaths by drug type involved, Clark County-NV, 2007-12: a. Age-adjusted rates (AjR) by gender; b. AjRs by race; c. Age-specific rates (2010-12); d. Age/gender-specific rates involving opioid analgesics.



*Illicit drug types include heroin, cocaine, amphetamine-like drugs and other stimulants with abuse potential, hallucinogens, and cannabis.
Source: Death certificate files (preliminary from 2012 onward) restricted to Clark County residents at time of death and bridged-race intercensal 2000-2009 series/vintage 2013 postcensal estimates.

Opioids-induced hospitalizations and ED visits are a significant area of health expenditure

In 2012, 2,585 hospitalizations and 5,630 ED visits had 'drug-induced' conditions as the principal discharge diagnosis (the dominant condition or main reason for the medical care encounter), defined as those due to drug poisoning, nondependent drug abuse, drug dependence or psychoses. Of these medical care encounters, 1,458 (56%) and 2,888 (51%) were attributed to poisoning by pharmaceutical drugs respectively.

Taking both principal and secondary diagnoses into consideration, misuse and abuse of opioid type drugs were involved in 1,340 (52%) drug-induced hospitalizations and 1,356 (24%) drug-induced ED visits in 2012, compared with 968 (41%) and 1,261 (24%) in 2010 respectively. Opioids-induced hospitalizations and ED visits are a significant area of health expenditure, accounting for over $40 million in total billed amount for hospitalizations and over $7 million for associated ED visits in 2012 respectively.

Preventive measures

To assist with public health efforts to monitor, minimize and prevent drug overdoses, the bulk of which involve opioid analgesics, mortality and medical care encounter data pertaining to opioid analgesics poisonings were examined across residential zip codes (Appendix A).

The markedly high drug overdose rates in Clark County when compared with the rest of the country are reflective of the higher-than-the-nation prescribing pattern for opioid analgesics in the state of Nevada. Evaluating and modifying prescribing patterns are therefore critical to reversing the fatal drug poisoning epidemic in Clark County. To reduce prescribing patterns that are risky to patient safety, the CDC recommends that states consider ways to increase use of information on local prescribing practices, such as those from the Prescription Drug Monitoring Programs (state-run electronic databases used to track the prescribing and dispensing of prescription drugs), including monitoring PDMP data for signs of inappropriate usage patterns, linking PDMPs to electronic health records systems, and sending alerts to prescribers when problems are identified.[9] Policy options (laws and regulations) to hold prescribers accountable for prescribing excesses can also help bring local prescribing rates more in line with best practices.[1,6] As well, public health entities and relevant stakeholders should work to improve the availability of substance abuse treatment programs.

Acknowledgements

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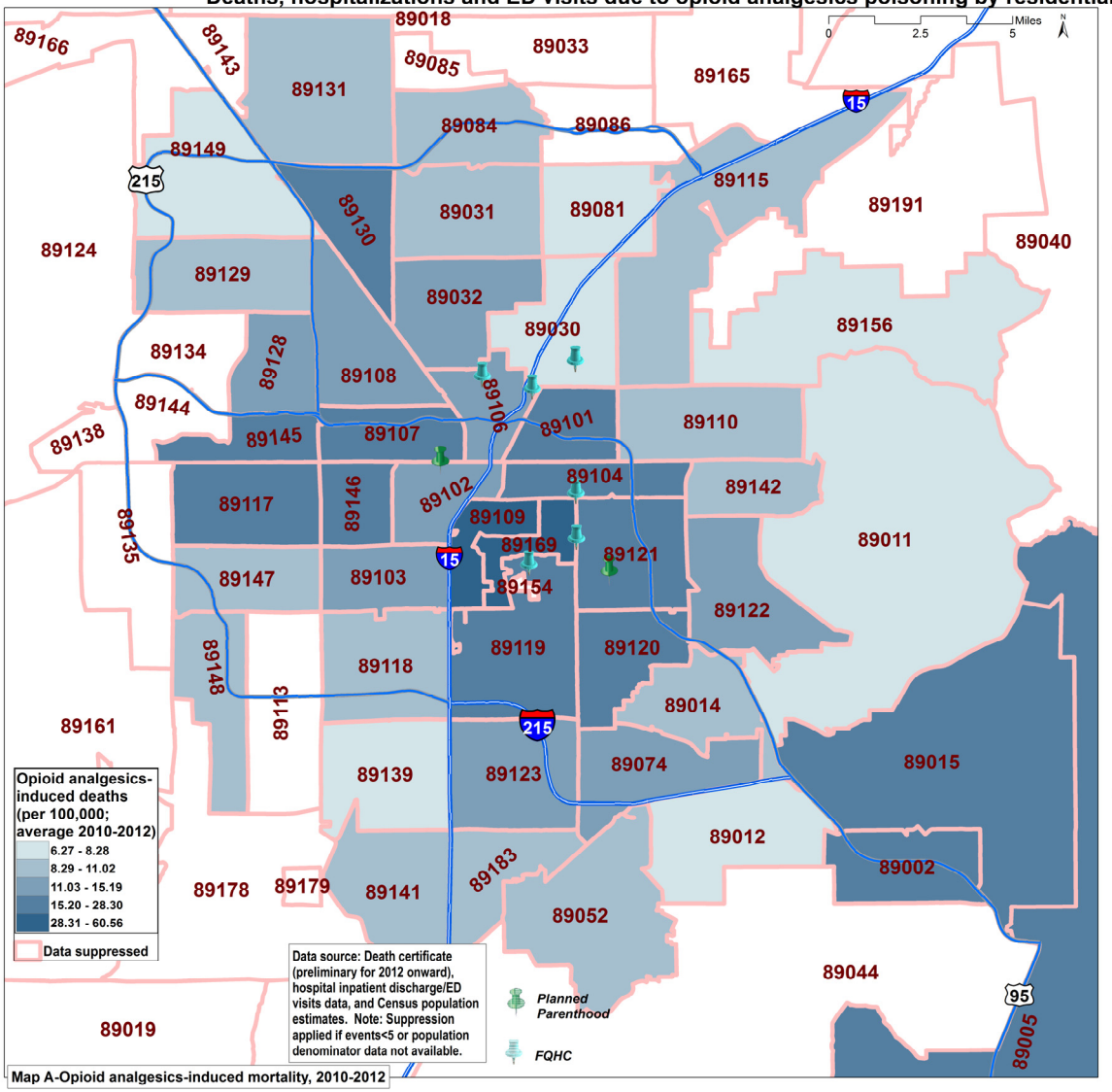
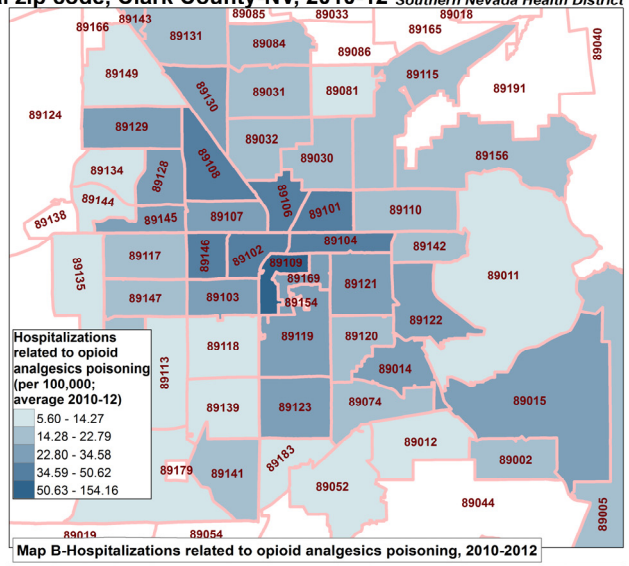
Appendix A.

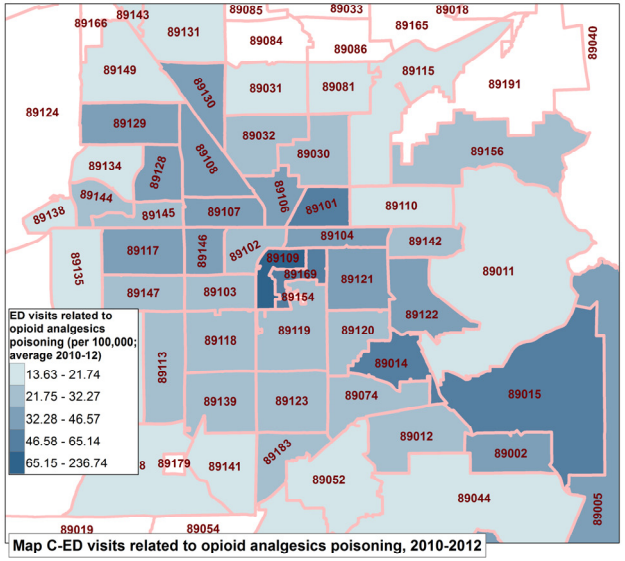
Deaths, hospitalizations and ED visits due to opioid analgesics poisoning by residential zip code, Clark County-NV, 2010-12 *Southern Nevada Health District*



Map A-Opioid analgesics-induced mortality, 2010-2012



Map B-Hospitalizations related to opioid analgesics poisoning, 2010-2012



Map C-ED visits related to opioid analgesics poisoning, 2010-2012