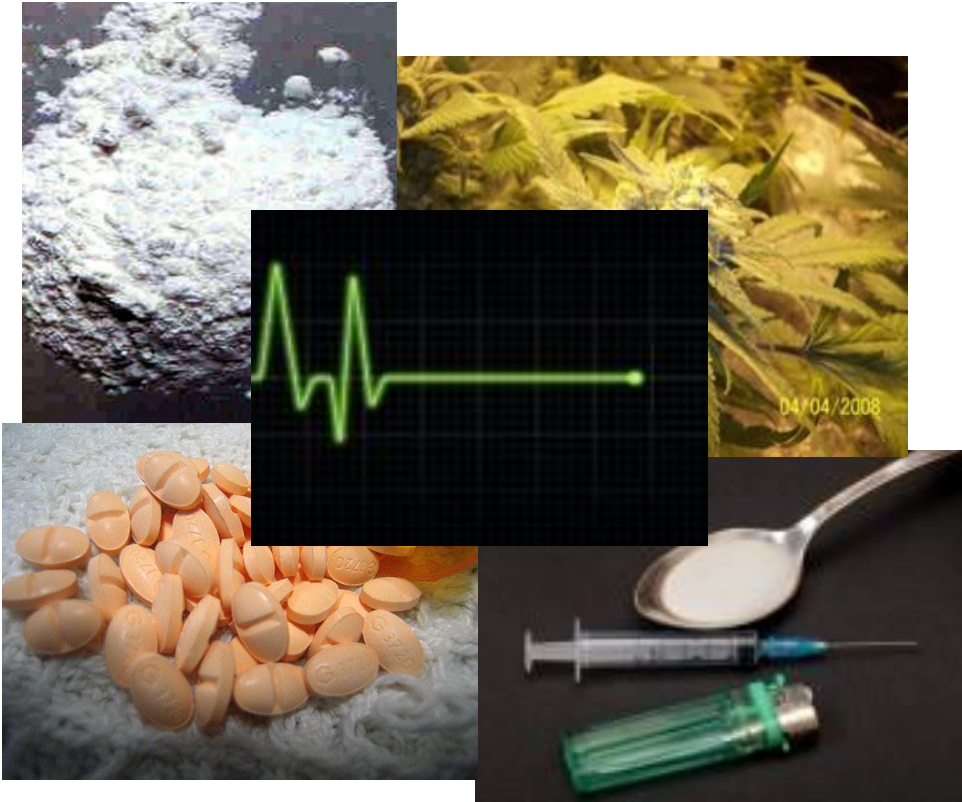


Drug Overdose Deaths in Lake County Indiana 2009 – 2012



**Lake County HIDTA
Investigative Support Center
October 2013**

Lake County HIDTA

Drug Overdose Deaths in Lake County, Indiana

EXECUTIVE SUMMARY

Drug-caused and drug-related deaths in Lake County are of major concern. Licit and illicit drug use and abuse continue to impact all regions throughout the county. The rapid growth and popularity of heroin among all age groups has caused an alarming increase in the number of drug-caused deaths. Nearly every age group from 20 – 60 is affected by heroin abuse. Evidence suggests that poly-drug use is common in drug-caused overdose victims. Decedents combined licit and illicit drugs, often in combination with alcohol to form a lethal cocktail. Marijuana use seems to be more prevalent than originally thought. Marijuana was present in 42 percent of drug-related autopsies and 19 percent of all autopsies from 2009 -2012. This study will focus on emerging drug abuse trends as they relate to overdose deaths in Lake County for the period 2009 – 2012.

Key findings of this study include:

- Opiate and heroin-related deaths in Lake County have increased over the last few years. In 2012 forensic pathologists from the LCCO found 19 deaths were directly caused by heroin. In the previous three years combined, there were only 11.
- Licit and illicit drugs are often used in combination with each other, causing adverse effects and in some instances, death. Based on toxicology reports, alprazolam (Xanax®) is one of the most widely abused benzodiazepines in Lake County deaths related to drugs. Benzodiazepines are often combined with opiates and opioids which often result in lethal overdoses.
- Of the 624 drug-related and drug-caused deaths from 2009 - 2012, tetrahydrocannabinol (THC) was found in 260 (42 percent) of decedents. In homicide cases in which autopsies/toxicology reports were ordered, 76 percent (117 of 153) of victims exhibited THC in their bodily fluids.
- Ninety percent of 248 drug-caused deaths involved the use of multiple drug combinations. Overall, 58 percent of all 624 toxicology reports showed the use of more than one drug.
- Of the 624 total deaths studied, 415 involved at least one illicit drug. This represents 66 percent of all drug-related and drug-caused deaths.

- Of the 248 drug-caused deaths, 141 (57 percent) involved at least one opiate; heroin, morphine, or codeine.
- Of the 71 drug-caused deaths in 2012, 48 (67 percent) involved at least one opiate.
- Benzodiazepines are defined as depressants that produce sedation, induce sleep, relieve anxiety and muscle spasms, and prevent seizures. Alprazolam is by far the most abused benzodiazepine as related to drug-related deaths. In fact, alprazolam was mentioned in 49 percent of drug-caused deaths, behind only morphine. It remains the most abused prescription drug in our area.

METHODOLOGY

The Lake County High Intensity Drug Trafficking Area (HIDTA) Investigative Support Center (ISC) conducted a study of drug-related deaths in Lake County Indiana from 2009 - 2012. Over 1,300 autopsy reports were examined to determine which licit and illicit drugs were present in death investigations conducted by the Lake County Coroner's Office (LCCO). After reviewing all available records, including toxicology reports, the LCCO forensic pathologist determined if a death was drug-caused or if drugs were merely present in the bodily fluids of a decedent.

Drug presence/levels were documented in toxicology reports generated by the LCCO contractor, AIT Laboratories of Indianapolis. Bodily fluids such as blood, urine, and/or vitreous eye fluid samples were used in the toxicology tests to determine drug presence and concentration levels. LCCO investigators also gathered evidence of drug usage at death scenes. Not every coroner case resulted in an autopsy or toxicology report being ordered. For example, in 2009 the LCCO office was notified of over 900 deaths, yet only 352 autopsies were conducted. Pathologists had to determine if autopsies were warranted based on evidence collected by investigators and their own observations. Other influences, such as budgetary restrictions, had an impact on the numbers of autopsies/toxicology reports ordered.

This report will concentrate on "drug-caused" deaths in Lake County Indiana from calendar years 2009 – 2012. Some highlights from the study are noted below:

VARIABLES OVERVIEW

Date Range: January 1, 2009 – December 31, 2012

Cause (Mode) of Death: Accident, Homicide, Natural, Suicide, Undetermined.

Gender of Decedent: Male, Female

Age of Decedent

Drugs Detected by Toxicology Reports

Causal Relationship: Drug-Related, Drug-Caused

Illicit Drugs Queried:

6-monoacetylmorphine (heroin)
marijuana/(cannabinoids/THC)
cocaine/benzoyllecgonine
methamphetamine
PCP (phencyclidine)
methylenedioxyamphetamine/methylenedioxyamphetamine
(MDMA/MDA, Ecstasy)

Licit Drugs Queried

Benzodiazepines

alprazolam (Xanax®)
diazepam (Valium®)
clonazepam/7-aminoclonazepam/aminoclonazepam (Klonopin®)
temazepam (Restoril®)
lorazepam (Ativan®)
chlordiazapoxide/demoxepam (Angirex®/Elenium®)

Opioids/Licit Opiates

morphine
codeine
hydrocodone (Vicodin®)
methadone
oxycodone (OxyContin®/Percocet®/Percodan®)
hydromorphone (Dilaudid®/Palladone®)
fentanyl (Actiq®/Duragesic®)
norpropoxyphene/dextropropoxyphene (Darvon®)
oxymorphone (Opana®)

Anti-Depressants

citalopram (Celexa®/Cipramil®)
amitriptyline/nortriptyline (Tryptomer®/Elavil®)

fluoxetine (Prozac®/Sarafem®)
duloxetine (Cymbalta®)
paroxetine (Paxil®/Seroxat®)
sertraline/norsertaline (Zoloft®/Lustral®)
bupropion (Wellbutrin®/Budeprion®)
trazodone (Desyrel®/Oleptro®)

Others

cyclobenzaprine (Flexeril®)
meprobamate (Miltown®/Equanil®)
tramadol (Conzip®/Ultram®)
Carisoprodol (Soma®)
amphetamine
phenobarbital

DEMOGRAPHICS

Lake County Indiana is located in Northwest Indiana and shares a border with Cook (Chicago) and Will Counties in Illinois and Porter, Newton, and Jasper Counties in Indiana. The 2010 United States Census documented Lake County's population as, 496,000. It is racially diverse and has large segments of Whites (55.4 percent), Blacks (25.9 percent) and Hispanics (17 percent).



Most of the heroin used in Lake County is purchased in Chicago or its southern suburbs. The increased availability of heroin is also reflected in the increase of drug-caused, heroin-related deaths over the last four years.

According to LCCO forensic pathologist findings, Lake County experienced 95 drug-caused, heroin-related deaths between 2009 and 2012, with notable increases in 2011 and 2012. Over 38 percent of drug-caused deaths in this study revealed the presence of heroin. Other opiates, such as morphine and codeine were also prevalent in both drug-caused and drug-related deaths.

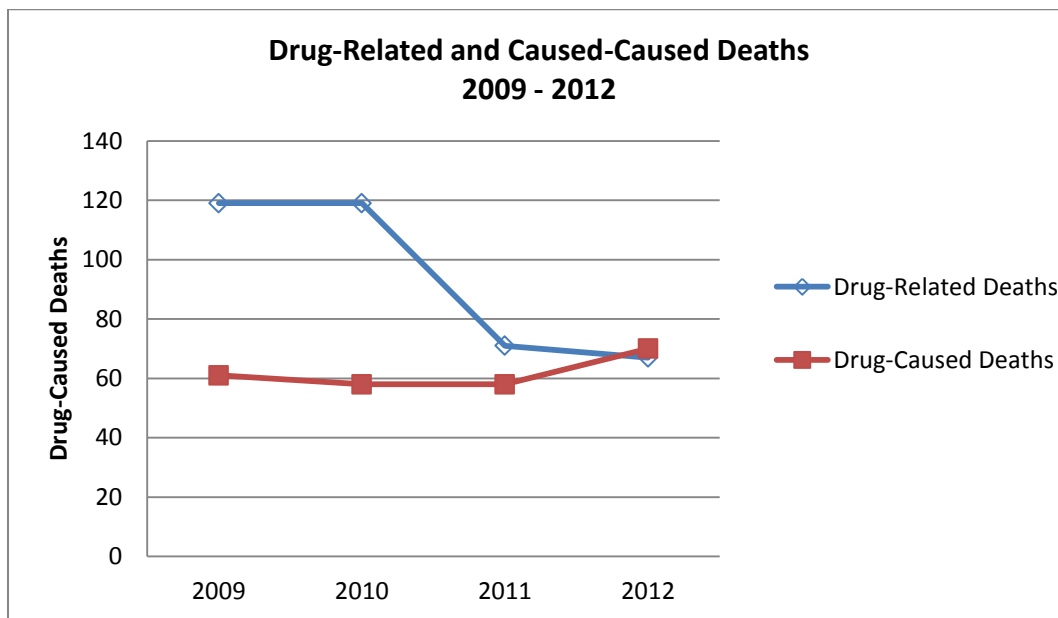
DRUG-CAUSED VERSUS DRUG-RELATED DEATHS

“Drug-caused” deaths were normally determined by the LCCO forensic pathologist, who ruled the cause of death was directly related to drug use/abuse. In some instances, LCCO investigators observed drug-related evidence at the death scene which helped prove the causal relationship between drugs and the decedent. A “drug-related” death would indicate that licit and/or illicit drugs were present in the decedent’s bodily fluids, but did not contribute directly to that person’s death as determined by the LCCO forensic pathologist.

Pathologists who perform autopsies review toxicology and investigative reports to make a determination if the death was drug-caused or drug-related. It should be noted that not all deaths result in autopsies and toxicology reports being submitted for analysis. Only questionable or suspicious causes of death warrant toxicological requests.

DRUG-RELATED DEATHS

Despite the rising number of “drug-caused” deaths from 2011 to 2012, the actual number of “drug-related” deaths decreased. According to LCCO personnel, budgetary cuts in 2011 dictated a decrease in autopsies/toxicology reports ordered. In 2011 and 2012 forensic pathologists definitively categorized a drug-caused death when the evidence warranted such.



Of total drug mentions in all 624 drug-related and drug-caused autopsies and toxicology reports THC (marijuana) was the most prominent. THC was mentioned in nearly 42 percent of all decedents’ toxicology reports. The table below displays all drug mentions of the 624 toxicology reports between the years 2009 – 2012.

Total Drug Mentions, 2009-2012

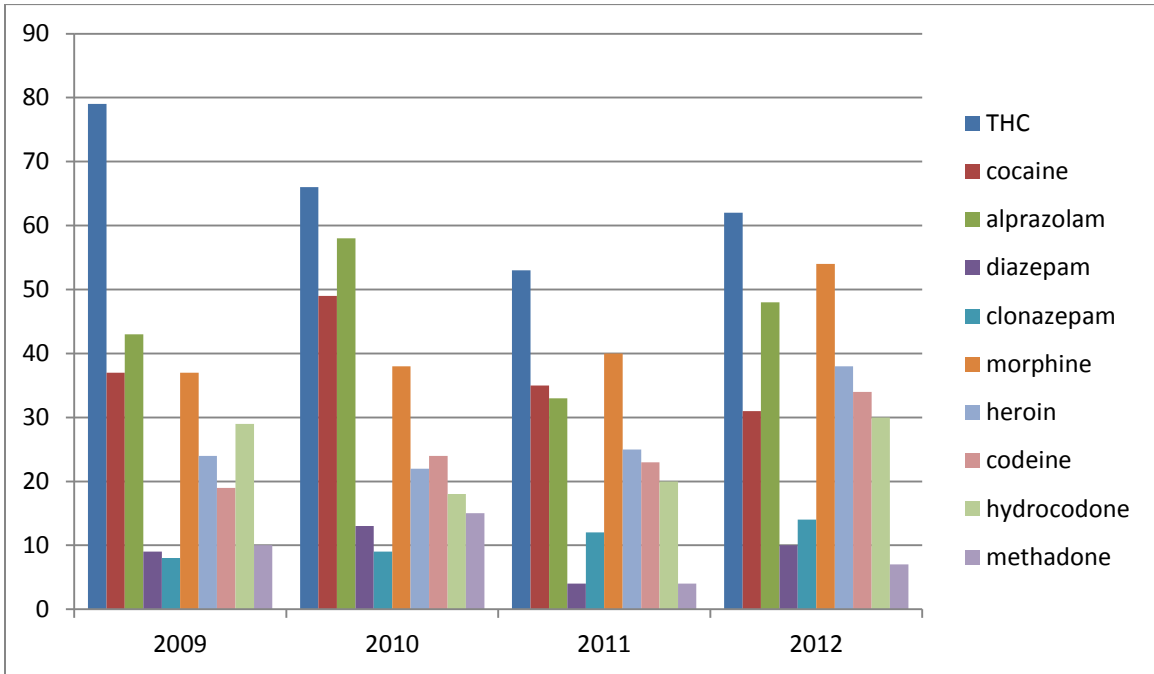
Drug	Total Number	Legality of Drug
THC	260	Illicit*
alprazolam (Xanax®)	182	Benzodiazepine
morphine	169	Opiate
cocaine	142	Illicit
6-monoacetylmorphine (heroin)	109	Illicit
codeine	100	Opiate
hydrocodone	97	Opioid (Vicodin®)
diazepam	40	Benzodiazepine
clonazepam	36	Benzodiazepine
methadone	36	Opioid
oxycodone	31	Opioid (OxyContin®)
hydromorphone	29	Opioid (Dilaudid®)
fentanyl	25	Opioid

**Illicit Drugs in Bold*

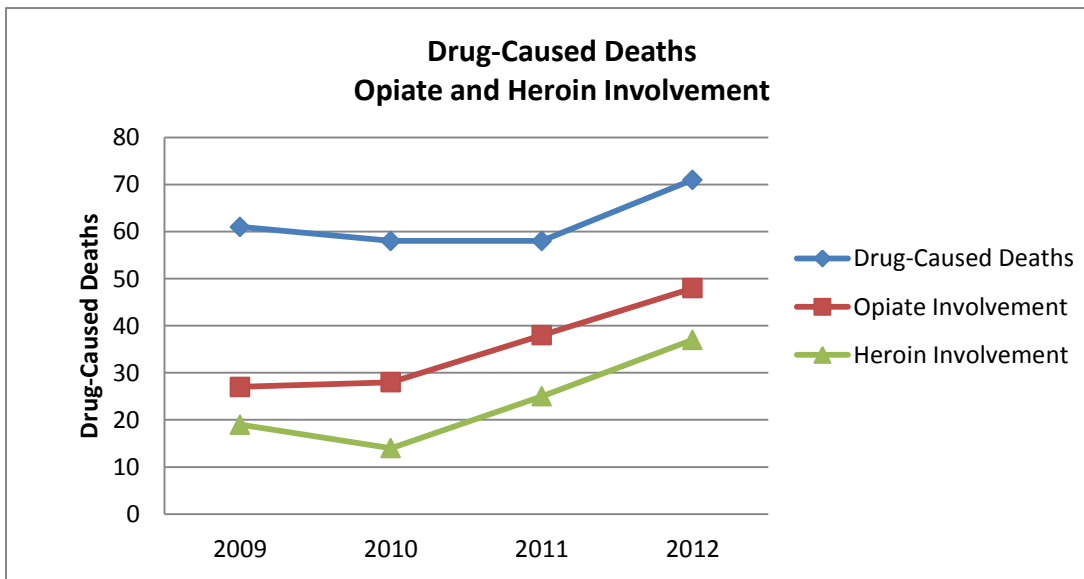
After THC, opiates continue to be the drug of choice in Lake County, exhibited by toxicology reports from autopsies. Despite the emergence of opiates as the primary threat in the area, cocaine still remains a dangerous drug of abuse. The presence of cocaine among overdoses waned a bit in 2009 – 2010, but in the last two years, according to toxicology reports, has become more prevalent.

The following chart displays the top mentioned drugs in toxicology reports from the 624 reports from of this study. The emergence of opiates as the primary drug of abuse is apparent in this chart.

Drug Mentions by Year – Drug Related and Drug-Caused Deaths



Another query studied the number of drug-caused deaths associated with opium-based drugs; morphine, heroin, and codeine. Of the 248 drug-caused deaths from 2009 - 2012, 141 deaths involved at least one opiate, which represents 57 percent of the total. In 2009, 42 percent of drug-caused deaths involved at least one opiate, compared to 68 percent in 2012, a marked increase. In 2009, 31 percent of drug-caused deaths showed the presence of heroin, as compared to 43 percent in 2012. The following graph depicts the growing influence of opiates, including heroin, since 2010 in Lake County drug-caused deaths.

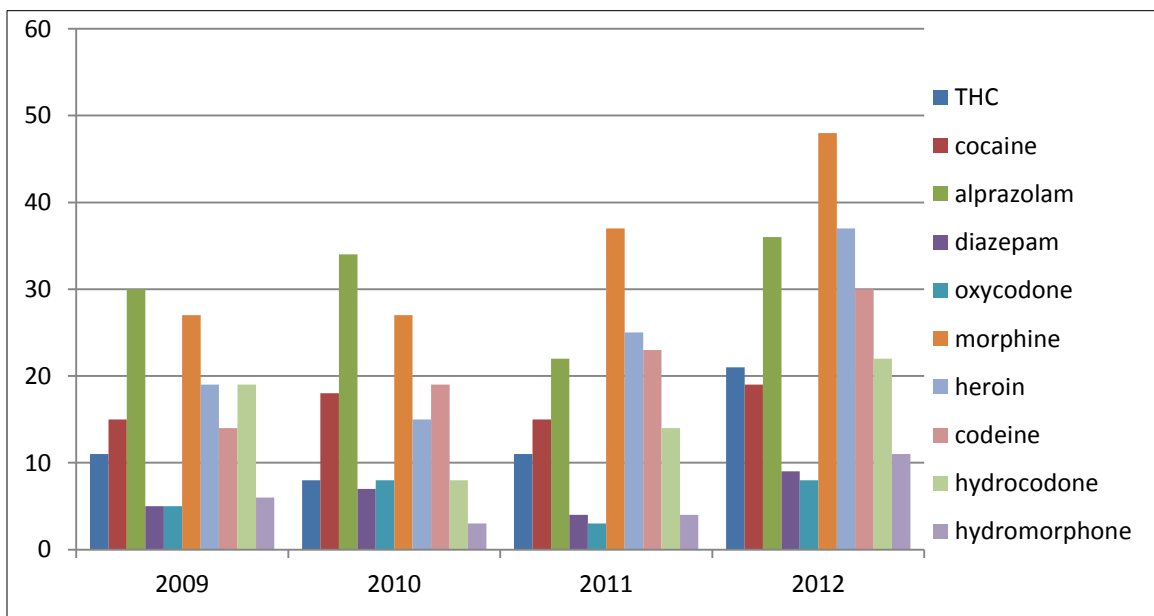


In drug-caused deaths opiates were mentioned more than other drug type. Morphine was the drug most mentioned, followed by the benzodiazepine, alprazolam (Xanax®). Heroin, codeine, and cocaine finished the top five most mentioned drugs in LCCO drug-related deaths.

It is important to note that both heroin and codeine metabolize into morphine the longer these drugs remain in the blood system. Some toxicological morphine readings may actually reveal the decedent had ingested heroin, codeine, or morphine itself. In 2009 there were 27 opiate-related, drug-caused deaths in Lake County as compared to 48 in 2012, an increase of 77 percent.

The chart below displays the number of drug mentions in drug-caused deaths from 2009 -2012. As expected, opiates and alprazolam are the most mentioned. However, cocaine’s influence, although a bit diminished in the last two years, is still a major contributor to drug-caused deaths. The chart shows that, according to toxicology reports, the total number of drug mentions increased notably in 2012.

Drug Mentions in Drug-Caused Deaths, 2009 -2012



POLY-DRUG USE

Of the 624 drug-related and drug-caused deaths, 367 involved more than one drug (licit and illicit), which represents over 58 percent of the drug deaths reported by the LCCO. More significantly, over 90 percent of drug-caused deaths involved more than one drug in comparison to 38 percent of drug-related deaths. The eleven most mentioned drugs in poly-drug, drug-caused deaths are shown below. As expected, opiates were the most prevalent in these deaths.

**Most Mentioned Drugs in
Poly-Drug, Drug-Caused Deaths
2009 – 2012**

morphine	136
alprazolam	119
6-monoacetylmorphine (heroin)	95
codeine	85
hydrocodone	62
cocaine	60
THC	50
hydromorphone	24
diazepam	22
oxycodone	22
clonazepam	22

In addition to opiates, benzodiazepines such as diazepam, clonazepam, and especially alprazolam were often mentioned in toxicology results. Many of the deaths were caused by a lethal combination of opiates, benzodiazepines, THC, and alcohol. When used in combination with other drugs, as is often the case, benzodiazepines prove to be as lethal as opiates. Sizable increases of drug mentions in every drug category were noted in 2012. It should be noted that 79 of the 248 drug-caused deaths involved the consumption of ethanol (alcohol) in combination with licit and illicit drugs. Marijuana was found in 21 percent of drug-caused deaths from 2009 – 2012. In 2012, marijuana drug mentions in drug-caused deaths nearly doubled from 2011. The table below notes the highest number of drug mentions in drug-caused deaths in Lake County from 2009 – 2012. In 2012 there were a total of 318 drug mentions in AIT toxicology reports. This number represents a 32 percent increase from 2011, when there were only 241. This would suggest that overdose victims were ingesting multiple drugs which ultimately led to their deaths.

**Highest Frequency Drug Mentions in Drug-Caused Deaths
Lake County, Indiana 2009 - 2012**

Drug	2009	2010	2011	2012	Total
Morphine	27	27	37	48	139
Alprazolam (<i>Xanax</i> ®)	30	34	22	36	122
6-monoacetylmorphine (heroin)	19	15	25	37	96
Codeine	14	19	23	30	86
Cocaine	15	18	15	19	67
Hydrocodone (<i>Vicodin</i> ®)	19	8	14	22	63
THC	11	8	11	21	51
Diazepam (<i>Valium</i> ®)	5	7	4	9	25
Hydromorphone (<i>Dilaudid</i> ®)	6	3	4	11	24
Oxycodone (<i>OxyContin</i> ®)	5	8	3	8	24
Clonazepam (<i>Klonopin</i> ®)	1	6	6	7	20
Methadone	6	6	3	4	19
Fentanyl	4	4	2	3	13
Total	162	163	169	255	749

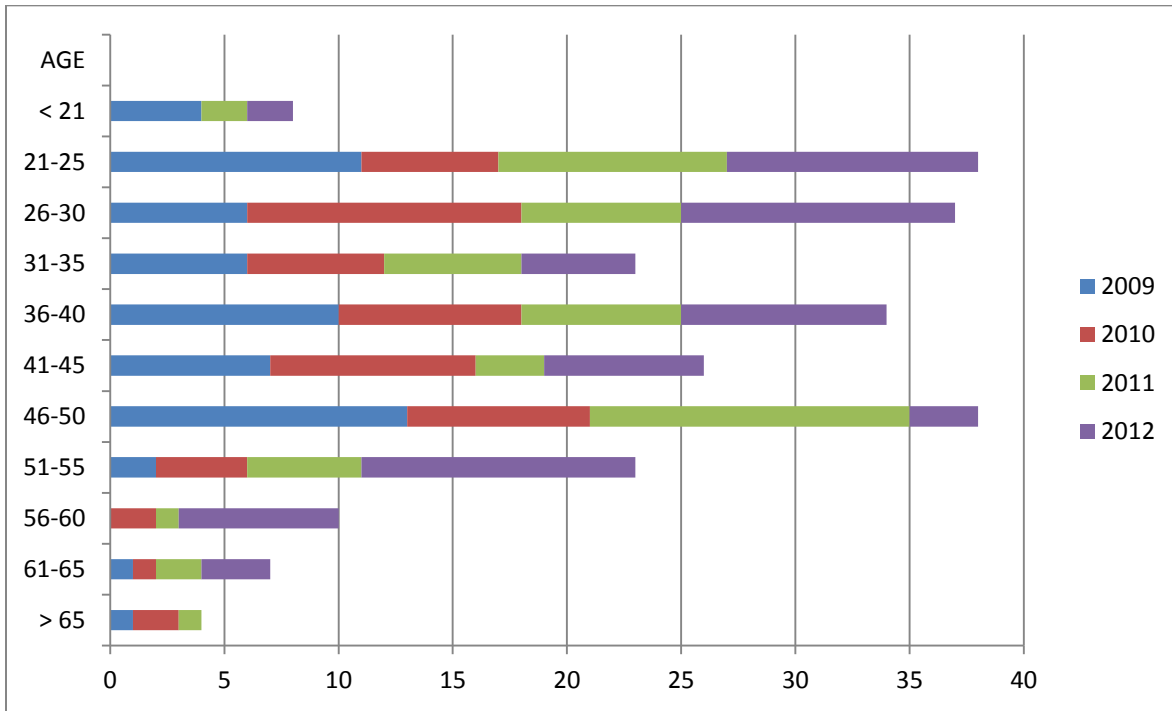
Source Lake County Coroner's Office

VARIABLES

Age and Ethnicity

Victims of drug-caused deaths ranged in age from 5 – 83. Persons between the ages of 21 – 30 accounted for 36 percent of all heroin-related, drug-caused deaths. Ages of drug-caused deaths were distributed relatively evenly over the four-year period, although the age bracket 46-50 equaled that of younger age brackets. The chart below demonstrates victims of drug-caused deaths by age group from 2009 -2012. It was surprising to find that a sizeable number (26) of heroin-related, drug-caused victims were between the ages of 41 – 55. The age group 51 – 55 alone had 10 heroin-related deaths in the last four years. The advanced age of an older group of drug-caused victims could indicate that chronic users were more susceptible to overdoses because of their prolonged usage of the drug. It could also indicate that older abusers were more inclined to have a lethal overdose episode due to their age and the body's inability to withstand and process repeated drug ingestion.

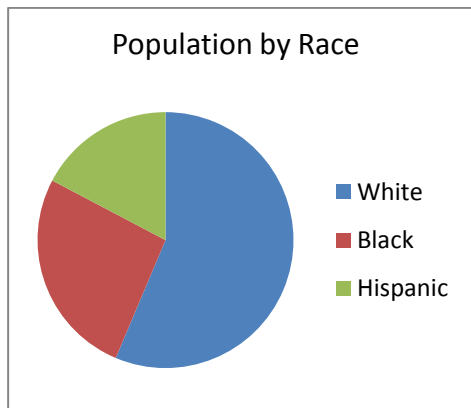
Ages of Drug-Caused Death Victims, Lake County, 2009 -2012



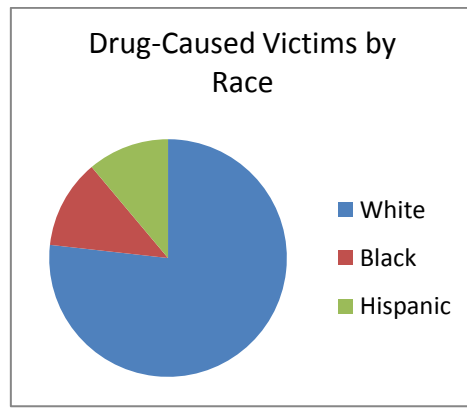
Source: Lake County Coroner's Office

Although whites make up 55 percent of Lake County's population, they represented 76 percent of drug-caused death victims, as compared to blacks (12 percent) and Hispanics (11 percent). Most victims were Caucasian (194), followed by African American (32), and Hispanic (20).

Drug-caused deaths involving heroin mirrored those of the overall study. Regarding heroin-related, drug-caused deaths, 77 percent of the victims were white, 13 percent were black, and 10 percent Hispanic.



2010 U.S. Census Data



2009 - 2012, Source: LCCO

Gender

Of the 248 drug-caused deaths in Lake County deaths 162 (65 percent) were male and 86 (35 percent) were female. The death rates for heroin victims were significantly higher among men. Of the 95 heroin-related, drug-caused deaths 83 percent of the victims were male and only 17 percent were female. This rate is 18 percent higher than all drug-caused deaths in the study.

MODES OF DEATH

Natural

Of the 248 drug-caused deaths, 159 were categorized as “natural”, as determined by a LCCO forensic pathologist. Natural deaths can be described as a developed medical condition or that the manner of death could not be determined. Of the total natural deaths, the most drug mentions in toxicology reports were opiates and alprazolam. Morphine was mentioned in over half of all drug-caused natural deaths. Opioids, cocaine, other benzodiazepines, and THC made up the most mentioned drugs in natural deaths as exhibited by toxicology reports.

“Drug-Caused” Natural Deaths Total Drug Mentions

morphine	89
alprazolam	82
6-monoacetylmorphine (heroin)	63
codeine	56
cocaine	48
hydrocodone	37
THC	37
methadone	16
diazepam	15
oxycodone	15
clonazepam	11
hydromorphone	10

2008 – 2012 LCCO Statistics

Accident

Of the 248 drug-caused deaths considered in this study, 47 were categorized as “accidental”, as determined by a LCCO forensic pathologist. Of that total, the most drug mentions in toxicology

reports were opiates, followed by alprazolam. Morphine was mentioned in over 80 percent of all drug-caused “accidental” deaths. Opioids, cocaine, other benzodiazepines, and THC made up the most mentioned drugs in natural deaths as determined by toxicology reports.

The term “accidental” often referred to victims who had died as a result of a traffic accident or other mishap. In other instances the term was used when someone accidentally ingested an excessive amount of drugs or medications.

**“Drug-Caused” Accidental Deaths
Total Drug Mentions**

morphine	38
6-monoacetylmorphine (heroin)	30
codeine	22
alprazolam	21
cocaine	13
hydrocodone	11
THC	9
hydromorphone	6
clonazepam	6
diazepam	4

Suicide

Of the 248 drug-caused deaths considered in this study, 26 were categorized as “suicide” by LCCO forensic pathologists. Of that total, the drugs most mentioned in suicide toxicology reports were alprazolam, hydrocodone, and hydromorphone. Morphine and codeine rounded out the top five most mentioned. In broader terms most drugs found in suicide victims were licit prescription drugs.

“Drug-Caused” Suicide Deaths, Total Drug Mentions

alprazolam	10
hydrocodone	9
hydromorphone	6
morphine	6
codeine	4
oxycodone	4
temazepam	4
clonazepam	3
demoxepam	2
diazepam	2
fluoxetine	2
paroxetine	2

Undetermined

Undetermined mode of death was the category used when the forensic pathologist could not determine a specific cause of death. There were only 14 undetermined drug-caused deaths for the four-year period. Of that total, alprazolam was the drug most mentioned.

alprazolam	9
hydrocodone	6
cocaine	5
morphine	5
diazepam	4
THC	4
codeine	3
fentanyl	3
Oxycodone	3
dextromethorphan	2
hydromorphone	2

OUTLOOK

The influence and abuse of opiates, especially heroin, will continue to grow, and contribute to overdose deaths throughout Northwest Indiana. Prescription drugs will continue to be diverted and sold at the street level. Abuse of prescription drugs is a serious problem. They do not have the social stigma of heroin or cocaine, for example. The combination of opiates and prescription drugs, especially benzodiazepines, and pain killers will contribute to overdose episodes and deaths. The numbers of different drugs found in 2012 toxicology reports is rather alarming. The raw numbers of drugs found in decedents' toxicology reports indicates that victims are ingesting numerous drugs which were significant factors in their deaths.

There is some evidence to suggest that cocaine is becoming more available in the area. Any increase in the presence of that drug can influence overdose rates. "Ice" methamphetamine is not presently a threat in Lake County. However, investigative intelligence shows that drug trafficking organizations are attempting to establish a methamphetamine market in Northwest Indiana.

THC and alcohol also contribute to drug-caused and drug-related deaths in Lake County. When combined with licit and illicit drugs, marijuana and ethanol influence the mix of substances, which often result in overdoses. It will be interesting to see if recent legislation which legalized "medical" marijuana in neighboring Illinois will have any impact on Lake County. Marijuana presence in drug-caused deaths increased significantly in 2012. Any increase in availability could expand the use of this drug, resulting in it becoming more prevalent in toxicology reports.

THANKS

A special thank you goes out to the Lake County Coroner and personnel from the Lake County Coroner's Office for allowing unlimited access to their investigative reports. Without their help, this project would not have been possible.

CREDITS

Significant contributions to this report were made by the Indiana National Guard Counterdrug Program, Lake County HIDTA civilian analysts, and the Drug Enforcement Administration Merrillville Resident Office and DEA Intelligence Program personnel.