*ACCIDENTAL DEATH*

*BY*

*DRUG OVERDOSE*

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CIS 5270 – Business Intelligence

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**Abstract**

The dataset which I have chosen to work on R is “Accidental Death by Drug Overdose”. The link for the above dataset is provided in the section “Dataset link”.

This is a dynamic dataset as there are minimum of 10 deaths in 2 hours hence the up to date information is not available.

Let’s understand the nature of the dataset why is this dataset maintained by the Federal Government is very interesting as we all know that once a person dies his or her mortal remains will be taken to the coroner office to determine the cause of the death and every victim’s details are recorded in the coroner office’s file system to keep track of death be it natural or unnatural, there are many a times when the nature of the death is very vague and mysterious the reason is some of the medicines ingredient’s when taken regularly can cause various illness.

I would like to dwell deep in this dataset to gain more knowledge about the death rate.

**Dataset Link**

<https://catalog.data.gov/dataset/accidental-drug-related-deaths-january-2012-sept-2015>

A listing of each accidental death associated with drug overdose in Connecticut from 2012 to June 2017. A "Y" value under the different substance columns indicates that particular substance was detected. This dataset consists of 32 columns and 61019 rows of information.

Data are derived from an investigation by the Office of the Chief Medical Examiner which includes the toxicity report, death certificate, as well as a scene investigation.

The “Morphine (Not Heroin)” values are related to the differences between how Morphine and Heroin are metabolized and therefor detected in the toxicity results. Heroin metabolizes to 6-MAM which then metabolizes to morphine. 6-MAM is unique to heroin and has a short half-life (as does heroin itself). Thus, in some heroin deaths, the toxicity results will not indicate whether the morphine is from heroin or prescription morphine. In these cases, the Medical Examiner may be able to determine the cause based on the scene investigation (such as finding heroin needles). If they find prescription morphine at the scene it is certified as “Morphine (not heroin).” Therefore, the Cause of Death may indicate Morphine, but the Heroin or Morphine (Not Heroin) may not be indicated.

“Any Opioid” – If the Medical Examiner cannot conclude whether it’s RX Morphine or heroin based morphine in the toxicity results, that column may be checked

**Objective**

The objective of this study is to find out the reason for the accidental death caused due to drugs.

As we say “drugs “the most popular drugs which comes to our mind is Heroin, Cocaine and Opium but there are other drugs which can cause death though they are prescribed by doctors for various illness. This is a dynamic list and may never be able to satisfy particular standards for completeness. You can help by expanding it with reliably sourced entries.

Drug overdose and intoxication are significant causes of accidental death, and can also be used as a form of suicide. Death can occur from overdosing on a single or multiple drug, or from combined drug intoxication (CDI) due to poly drug use. Poly drug use often carries more risk than use of a single drug, due to an increase in side effects, and drug synergy. For example, the chance of death from overdosing on opiates is greatly increased when they are consumed in conjunction with alcohol. While they are two distinct phenomena, deaths from CDI are often misreported as overdoses. Drug overdoses and intoxication can also cause indirect deaths. For example, while marijuana does not cause fatal overdoses, being intoxicated by it can increase the chance of fatal traffic collisions.

The dataset here has many cases of death under mysterious circumstances like a person is dead at his /her residence and after the body is sent to coroner’s office for autopsy its revealed that the death has occurred due to the high intake of a drug called Opioid.

The dataset which I have considered for working in R is accidental death caused in the city of Connecticut from the year 2012 to 2017.

**Data Cleaning**

|  |  |
| --- | --- |
| **Problem** | **Un-Cleaned and Cleaned Data** |
| **Splitting Columns** |  |
| **Deleting Rows/Columns with Duplicate values** |  |
| **Deleting Columns/ Rows with empty values & updating it** | There are no such values or columns that needs to be deleted |

**Questions**

1. ***How many Death has occurred every year?***



***Library used: ggplot2, Chart type: Bar chart***

In the above visualization we can notice that the death rate per year is increasing gradually and the maximum number of death has occurred in the year ***2013*** as there are more that 15 death each week for the month of October which is ***Red*** color. The death has occurred due to the overuse of drugs called ***EtOH and Hydrocodone***. The reason was due to excessive depression and the season of October is usually coldest month in the city of ***Connecticut.***

The weather at Connecticut is very cold during October and heavy snowfall & rainfall will hamper the daily activities of a person for weeks hence the person tends to get bored and involve in drugs, Long-term effects of hydrocodone use can include a broad range of physical problems—from **acetaminophen toxicity and liver damage** to**sensorineural hearing loss**. Some of the most damaging results of being addicted to hydrocodone, however, may be the adverse effects on your personal life.

1. ***How age and year matters when death occurs?***



***Library used: ploty, chart type: Scatter Plot***

In the above visualization we can notice that the scatter plot has come in a vertical manner that is because a person who is dead has very less age gap from the other person who has been dead previously. This is a shocking observation at such a young age the death occurs not because they are involved in excessive drugs it is because due to an illness short time ago and the medication is prescribed for a long time and been taken regularly the minimum age is 17 and maximum age is 70 and between the age interval of ***17 – 30*** there are maximum death which has occurred, what is even more shocking is that the cause of death is “***Acute Intoxication From the Combined Effects of Heroin, Hydromorphone, Methadone, and Alprazolam***”

1. ***Total number of deaths occurred in the year 2012 to 2015?***

******

***Library used: ggplot2 , MASS, Chart type: Histogram with a Normal Curve***

The above visualization tells us that there is a normal distribution of the death but its evidently seen that the normal curve is not ended as I had mentioned previously this dataset is dynamic and the list is never complete hence the normal curve too has the same dynamic nature. According to the Curve we can say the ***minimum death rate =30 , Mean= 80.*** The combination of histogram and normal curve gives us a proper insight of the data. The major proportion of death has occurred due to over use of “***Opioid is an illegal drug and excessive use can cause Intoxication due to the Combined Effects of Paroxetine, Mirtazapine, Buspirone, Cyclobenzaprine, Hydrocodone, and Oxycodone and lead to heart attacks.”***

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**R CODES**

***R codes for Data cleaning***

getwd("/users/shwethaseetharam")

library(tidyr)

library(dplyr)

daccident<-read.csv(“Rdata.csv",header=T,sep=",")

daccident\_clean1<- deperate(daccident,Date,c(“Month”, “Day”, “Year”), sep= “/”)

daccident\_clean2<-distinct(daccident)

***R codes for visualizations***

1. ***Bar plot codes***

library(ggplot2)

barplot(deathrate,col=colors,ylab='frequency of death rate',main='Death Rate per Year')

colors<-c('blue','green','red','orange')

1. ***Scatter Plot Codes***  
   agetable<-table(daccident$Age)  
   yeartable<-table(daccident$Year)  
   plot(yeartable,agetable,main='Age & Year Comparison')
2. ***Histogram with Normal Curve***

***Codes for histogram***

h<-hist(x, breaks=10, col="red", xlab="Death Rate every Year",main = "Histogram")

***Codes for Normal Curve***

xfit<-seq(min(x),max(x),length=40)

yfit<-dnorm(xfit,mean=mean(x),sd=sd(x))

yfit <- yfit\*diff(h$mids[1:2])\*length(x)

lines(xfit, yfit, col="blue", lwd=2)

1. ***Statistical Analysis Codes***summary(daccident$Age)  
   ******
2. ***User Defined Function code***

***Filename: gender2.R  
“To find the Individual Sex count of death”***sexcount<-function(dataset)

{

case1<-0

case2<-0

for (i in dataset$Sex)

{

if(i=="Male")

{

case1 = case1 + 1

}

else if(i=="Female")

{

case2 = case2 + 1

}

}

print(paste('Count for Male Death:' ,case1))

print(paste('Count for Female Death: ',case2))

}

***Output:***



1. ***Library used*** 1. ggplot2  
    2. ploty  
    3.tidyr  
    4. dplyr  
    5. MASS

**References**

1. ***Dataset from the year 2012 - 2017***

*“Accidental Drug Related Deaths 2012-2017.” Accidental Drug Related Deaths 2012-2017 - Data.gov, Publisher Data.ct.gov, 11 Apr. 2018, catalog.data.gov/dataset/accidental-drug-related-deaths-january-2012-sept-2015.*

1. ***Combined Drug Intoxication (CDI)***

*“Combined Drug Intoxication.” Wikipedia, Wikimedia Foundation, 10 Apr. 2018, en.wikipedia.org/wiki/Combined\_drug\_intoxication.*

1. ***Opioid Crisis Blamed For Sharp Increase In Accidental Deaths In U.S.***

*Neuman, Scott. “Opioid Crisis Blamed for Sharp Increase in Accidental Deaths in U.S.” NPR, NPR, 17 Jan. 2018, www.npr.org/sections/thetwo-way/2018/01/17/578518297/opioid-crisis-blamed-for-sharp-increase-in-accidental-deaths-in-u-s.*

1. ***Opioid Description***

*National Institute on Drug Abuse. “Opioids.” NIDA, www.drugabuse.gov/drugs-abuse/opioids.*

1. ***Scatter plot***

*“Scatter Plot.” An R Introduction to Statistics | R Tutorial, www.r-tutor.com/elementary-statistics/quantitative-data/scatter-plot.*

1. ***Hydrocodone****“The Effects of Hydrocodone Use.” DrugAbuse.com, 25 May 2017, drugabuse.com/library/the-effects-of-hydrocodone-use/#long-term-effects-of-hydrocodone.*