

R Notebook

3 ways to label points: 1. `geom_label()` 2. `geom_text()` 3. `annotate()`

```
library(tidyverse)
```

```
## Loading tidyverse: ggplot2
## Loading tidyverse: tibble
## Loading tidyverse: tidyr
## Loading tidyverse: readr
## Loading tidyverse: purrr
## Loading tidyverse: dplyr
```

```
## Conflicts with tidy packages -----
```

```
## filter(): dplyr, stats
## lag():      dplyr, stats
```

```
CTaccidentaldrugdeaths <- read.csv('Accidental_Drug_Related_Deaths__2012-June_2017.csv')
head(CTaccidentaldrugdeaths)
```

```
##   CaseNumber      Date    Sex  Race Age Residence.City Residence.State
```

```
## 1   13-16336 11/09/2013 Female White  53          GROTON
```

```
## 2   12-18447 12/29/2012  Male White  30          WOLCOTT
```

```
## 3    14-2758 02/18/2014  Male White  43          ENFIELD
```

```
## 4   14-13497 09/07/2014 Female White  24    WALLINGFORD
```

```
## 5   13-14421 10/04/2013 Female White  26      WEST HAVEN
```

```
## 6   13-18018 12/10/2013 Female White  45    RIDGEFIELD
```

```
##   Residence.County Death.City Death.State Death.County Location
```

```
## 1      NEW LONDON      GROTON          NEW LONDON Residence
```

```
## 2      NEW HAVEN    WATERBURY          NEW HAVEN Hospital
```

```
## 3                      ENFIELD                      Residence
```

```
## 4                      WALLINGFORD          NEW HAVEN Residence
```

```
## 5      NEW HAVEN    WEST HAVEN          NEW HAVEN    Other
```

```
## 6      FAIRFIELD      DANBURY          FAIRFIELD Hospital
```

```
##   DescriptionofInjury      InjuryPlace
```

```
## 1
```

```
## 2                      Residence
```

```
## 3                      Residence
```

```
## 4                      Residence
```

```
## 5                      Residential Building
```

```
## 6                      Residence
```

```
##
```

```
## 1 Acute Combined Oxycodone, Oxymorphone, Carisoprodol,, Meprobamate, Diazepam, Nordiazepam and Trazodolone
```

```
## 2                      Cocaine and Oxycodone
```

```
## 3                      Acute Intoxication due to the Combined Effects of Alcohol, Lorazepam, and Fentanyl
```

```
## 4                      Heroin and Fentanyl
```

```
## 5                      Acute Intoxication due to the Combined Effects of Alcohol, Lorazepam, and Fentanyl
```

```
## 6                      Acute Intoxication due to the Combined Effects of Ethanol, Clonazepam, Alprazolam, and Fentanyl
```

```
##   Heroin Cocaine Fentanyl Oxycodone Oxymorphone EtOH Hydrocodone
```

```
## 1                      Y          Y
```

```
## 2                      Y          Y
```

```
## 3                      Y          Y
```

```
## 4                      Y          Y
```

```
## 5                      Y          Y
```

```
## 6                                     Y
## Benzodiazepine Methadone Amphet Tramad Morphine..not.heroin. Other
## 1                                     Y
## 2
## 3                                     Y
## 4
## 5
## 6                                     Y
## Any.Opioid MannerofDeath AmendedMannerofDeath
## 1                                     Accident
## 2                                     Accident
## 3                                     Accident
## 4                                     Accident
## 5                                     Accident
## 6                                     Accident
##                                     DeathLoc
## 1 GROTON, CT\n(41.343693, -72.07877)
## 2 WATERBURY, CT\n(41.554261, -73.043069)
## 3 ENFIELD, CT\n(41.976501, -72.591985)
## 4 WALLINGFORD, CT\n(41.454408, -72.818414)
## 5 WEST HAVEN, CT\n(41.272336, -72.949817)
## 6 DANBURY, CT\n(41.393666, -73.451539)
```

```
library(ggthemes) # loading themes to make plot pretty
```

```
CTaccidentaldrugdeathssex <- CTaccidentaldrugdeaths[CTaccidentaldrugdeaths$Sex == "Male" | CTaccidental
CTaccidentaldrugdeathssexfemale <- CTaccidentaldrugdeathssex[CTaccidentaldrugdeaths$Sex == 'Female',]
summary(CTaccidentaldrugdeathssexfemale$Age)
```

```
## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 14.00 32.00 44.00 42.91 53.00 81.00
```

```
CTaccidentaldrugdeathsmale <- CTaccidentaldrugdeathssex[CTaccidentaldrugdeathssex$Sex == 'Male',]
print("male")
```

```
## [1] "male"
```

```
summary(CTaccidentaldrugdeathsmale)
```

```
## CaseNumber Date Sex Race
## 12-10000: 1 05/29/2017: 8 : 0 White :2047
## 12-10041: 1 06/02/2017: 7 Female: 0 Hispanic, White: 311
## 12-10101: 1 06/18/2017: 7 Male :2610 Black : 206
## 12-10309: 1 11/18/2016: 7 Unknown : 12
## 12-1035 : 1 01/05/2017: 6 Hispanic, Black: 9
## 12-10391: 1 01/31/2014: 6 Asian, Other : 8
## (Other) :2604 (Other) :2569 (Other) : 17
## Age Residence.City Residence.State Residence.County
## Min. :16.00 HARTFORD : 161 :1386 HARTFORD :595
## 1st Qu.:31.00 WATERBURY : 127 CT :1168 NEW HAVEN :548
## Median :42.00 NEW HAVEN : 113 UNKNOWN: 19 :499
## Mean :41.66 BRIDGEPORT : 111 NY : 12 FAIRFIELD :324
## 3rd Qu.:51.00 NEW BRITAIN: 95 MA : 11 NEW LONDON:213
## Max. :87.00 : 73 FL : 4 LITCHFIELD:119
## (Other) :1930 (Other): 10 (Other) :312
## Death.City Death.State Death.County
```

```

## HARTFORD : 278 :1351 :860
## NEW HAVEN : 186 CT : 867 HARTFORD :507
## WATERBURY : 181 CTCCTTCT : 360 NEW HAVEN :506
## BRIDGEPORT : 163 CTUCTnCTkCTnCToCTwCTnCT: 19 FAIRFIELD :276
## NEW BRITAIN: 108 CTMCTACT : 5 NEW LONDON:177
## NORWICH : 86 CTNCTYCT : 4 LITCHFIELD:100
## (Other) :1608 (Other) : 4 (Other) :184
## Location DescriptionofInjury
## : 16 :1874
## Convalescent Home: 3 Substance Abuse: 380
## Hospice : 1 Drug Use : 93
## Hospital : 825 substance abuse: 70
## Other : 415 Substance abuse: 49
## Residence :1350 SUBSTANCE ABUSE: 48
## (Other) : 96
## InjuryPlace ImmediateCauseA Heroin
## Residence :1787 Substance Abuse : 209 :1094
## Other : 181 Heroin Intoxication : 104 : 3
## Residential Building: 120 Multiple Drug Toxicity : 89 y: 19
## Hotel or Motel : 116 Acute Heroin Toxicity : 75 Y:1494
## Unknown : 83 Acute Heroin Intoxication: 71
## : 47 Heroin Toxicity : 67
## (Other) : 276 (Other) :1995
## Cocaine Fentanyl Oxycodone Oxymorphone EtOH Hydrocodone
## :1859 :1732 :2287 :2546 :2011 :2558
## y: 5 y : 8 y: 3 Y: 64 y: 9 y: 0
## Y: 746 Y : 868 Y: 320 Y: 590 Y: 52
## Y (PTCH): 0
## Y POPS : 1
## Y-A : 1
##
## Benzodiazepine Methadone Amphet Tramad Morphine..not.heroin.
## :2036 :2396 :2559 :2557 :2577
## y: 9 y: 1 Y: 51 Y: 53 : 15
## Y: 565 Y: 213 Y : 15
## NO RX BUT STRAWS: 1
## STOLE MEDS : 1
## y : 1
## (Other) : 0
## Other Any.Opioid MannerofDeath
## :2410 :2074 : 7
## MORPHINE : 30 : 15 accident: 7
## PCP : 23 N: 3 Accident:2584
## HYDROMORPH : 22 y: 1 ACCIDENT: 1
## BUPRENORPHONE: 16 Y: 517 Natural : 1
## OPIATE : 11 Pending : 10
## (Other) : 98
## AmendedMannerofDeath
## :2216
## Acute Fentanyl Intoxication : 20
## Acute Cocaine Intoxication : 9
## Acute Intoxication due to the Combined Effects of Fentanyl and Heroin: 7
## Acute Heroin Intoxication : 5
## Acute Intoxication From the Combined Effects of Cocaine and Heroin : 5

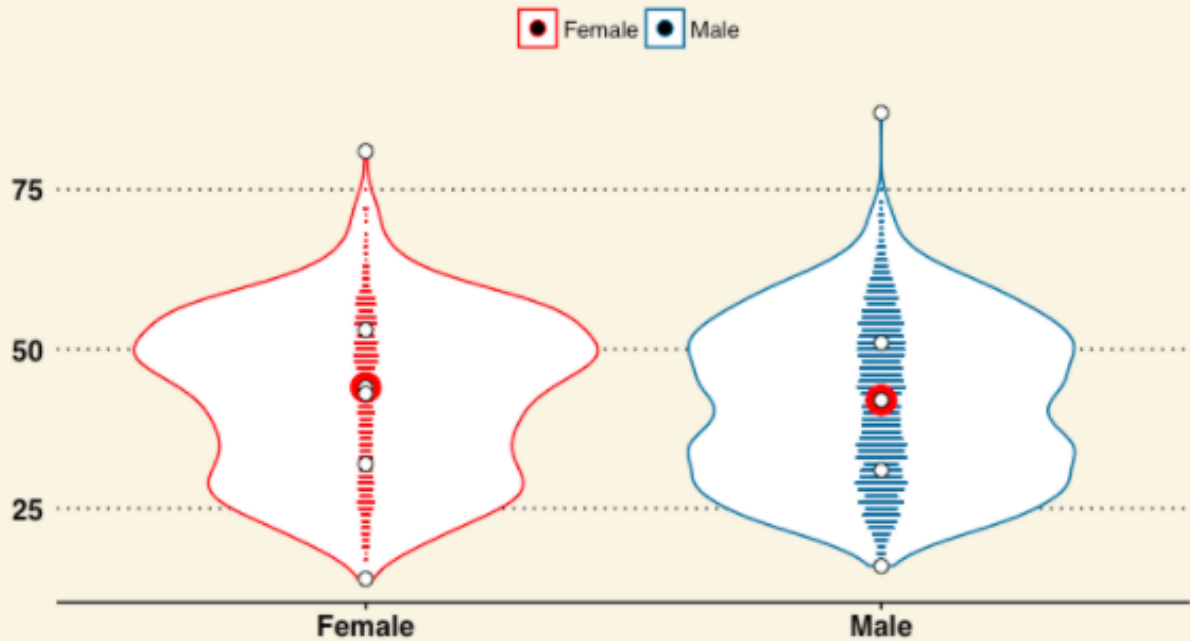
```

: 348

```
# creating a dataframe wi
```

```
drugdeathssex$Sex, y = CTab
```

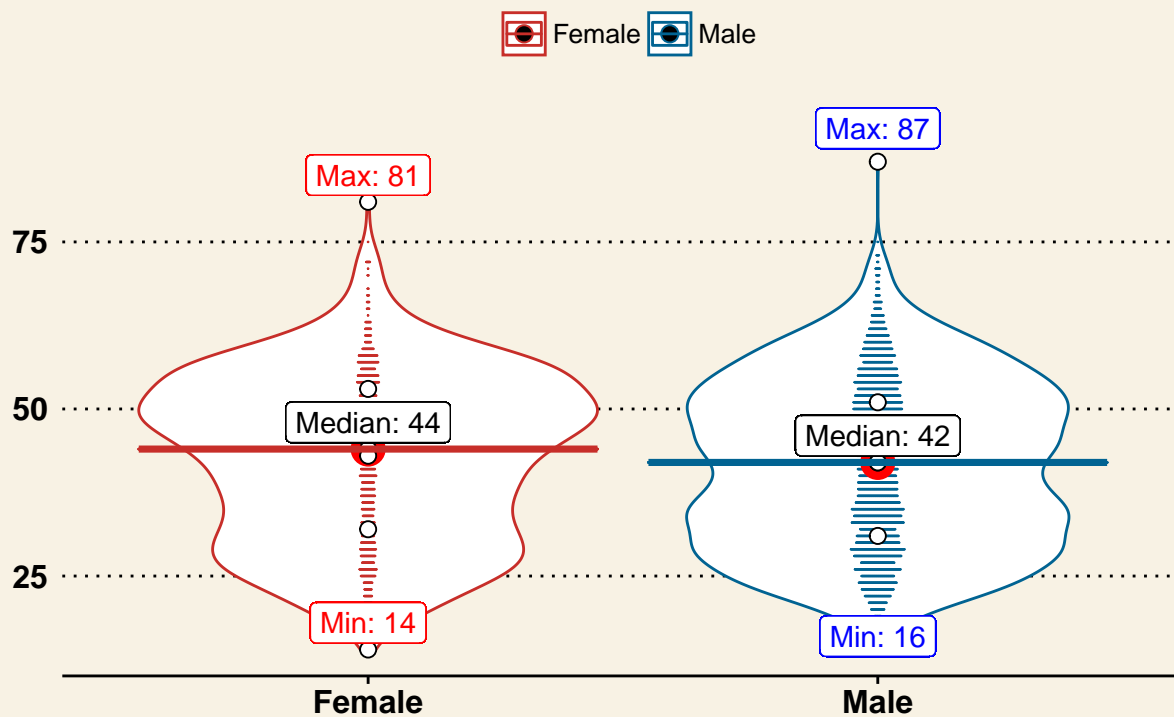
Age of Death



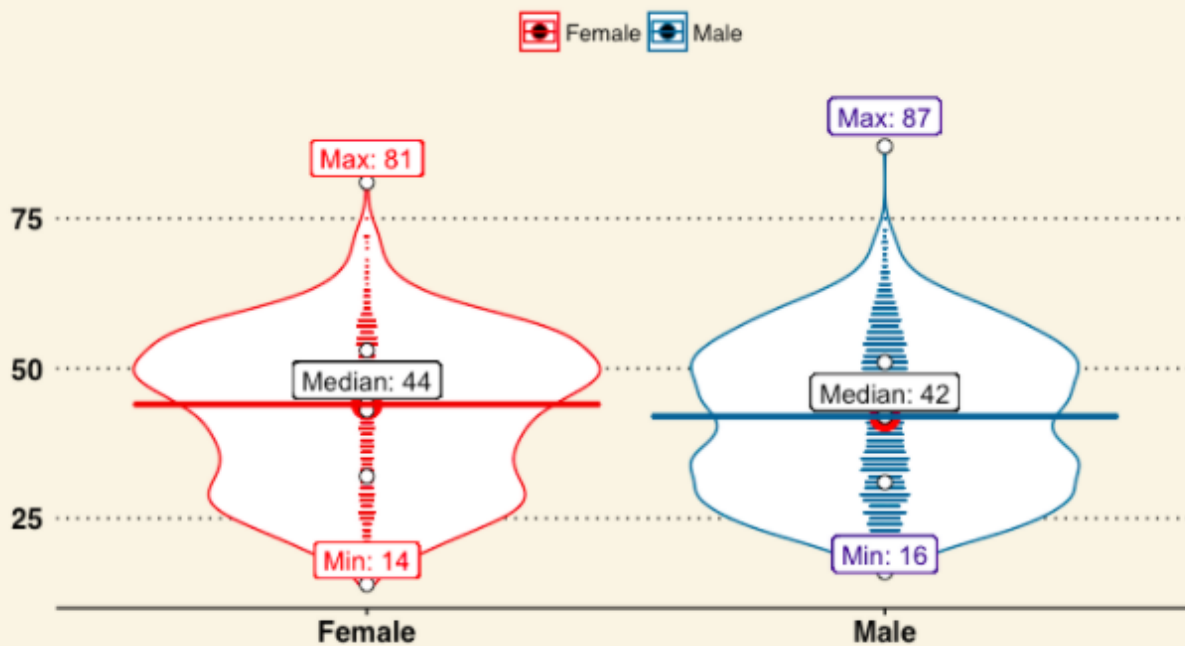
```
plotsummaryGenderAge_withlabels <- ggplot(data=CTaccidentaldrugdeathssex, mapping=aes(x=CTaccidentaldrugdeathssex$sex, y=CTaccidentaldrugdeathssex$age)) +
  binaxis = "y",          # which axis to bin along
  binwidth = 0.1,        # Minimal difference considered different
  stackdir = "center"    # Centered
) + geom_point(sex_age_summary_median, mapping=aes(x=Sex, y=Age), size=5.5, color='red')

plotsummaryGenderAge_withlabels
```

Age of Death



Age of Death



geom_label is used here, but you have to specify each of the label positions yourself, for example where on the x and y axis

```
CTaccidentaldrugdeaths <- na.omit(CTaccidentaldrugdeaths) # omitting rows of NA
year <- format(as.Date(CTaccidentaldrugdeaths$Date, format="%m/%d/%Y"),"%Y") #extracting year from data
CTaccidentaldrugdeaths$Year <- as.numeric(year)
multi.fun <- function(x) {cbind(freq = table(x), percentage = prop.table(table(x))*100)} # function to
CTaccidentaldrugdeathsNO2017 <- CTaccidentaldrugdeaths[CTaccidentaldrugdeaths$Year != '2017',] #subsetting
CTaccidentaldrugdeathsNO2017$months <- format(as.Date(CTaccidentaldrugdeathsNO2017$Date, format="%m/%d/%Y"),"%m/%d/%Y")
head(CTaccidentaldrugdeathsNO2017) # first 6 rows
```

```
## CaseNumber      Date      Sex Race Age Residence.City Residence.State
## 1    13-16336 11/09/2013 Female White 53      GROTON
## 2    12-18447 12/29/2012 Male White 30      WOLCOTT
## 3     14-2758 02/18/2014 Male White 43      ENFIELD
## 4    14-13497 09/07/2014 Female White 24    WALLINGFORD
## 5    13-14421 10/04/2013 Female White 26      WEST HAVEN
## 6    13-18018 12/10/2013 Female White 45    RIDGEFIELD
## Residence.County Death.City Death.State Death.County Location
## 1      NEW LONDON      GROTON      NEW LONDON Residence
## 2      NEW HAVEN    WATERBURY      NEW HAVEN Hospital
## 3                      ENFIELD                      Residence
## 4                      WALLINGFORD      NEW HAVEN Residence
## 5      NEW HAVEN    WEST HAVEN      NEW HAVEN Other
## 6      FAIRFIELD    DANBURY      FAIRFIELD Hospital
## DescriptionofInjury      InjuryPlace
## 1
## 2                      Residence
## 3                      Residence
## 4                      Residence
## 5      Residential Building
## 6                      Residence
##
## 1 Acute Combined Oxycodone, Oxymorphone, Carisoprodol,, Meprobamate, Diazepam, Nordiazepam and Trazodone
## 2                      Cocaine and Oxycodone
## 3      Acute Intoxication due to the Combined Effects of Alcohol, Lorazepam, and Fentanyl
## 4                      Heroin and Fentanyl
## 5                      Acute Intoxication due to the Combined Effects of Alcohol, Lorazepam, and Fentanyl
## 6      Acute Intoxication due to the Combined Effects of Ethanol, Clonazepam, Alprazolam, and Fentanyl
## Heroin Cocaine Fentanyl Oxycodone Oxymorphone EtOH Hydrocodone
## 1                      Y      Y
## 2      Y      Y
## 3                      Y
## 4      Y      Y
## 5      Y
## 6                      Y
## Benzodiazepine Methadone Amphet Tramadol Morphine..not.heroin. Other
## 1      Y
## 2
## 3      Y
## 4
## 5
## 6      Y
## Any.Opioid MannerofDeath AmendedMannerofDeath
## 1      Accident
## 2      Accident
## 3      Accident
```

```
## 4          Accident
## 5          Accident
## 6          Accident
##
##              DeathLoc Year months
## 1      GROTON, CT\n(41.343693, -72.07877) 2013    11
## 2  WATERBURY, CT\n(41.554261, -73.043069) 2012    12
## 3    ENFIELD, CT\n(41.976501, -72.591985) 2014    02
## 4 WALLINGFORD, CT\n(41.454408, -72.818414) 2014    09
## 5  WEST HAVEN, CT\n(41.272336, -72.949817) 2013    10
## 6    DANBURY, CT\n(41.393666, -73.451539) 2013    12
```

```
monthsNO2017<- as.data.frame(multi.fun(CTaccidentaldrugdeathsNO2017$months))
head(monthsNO2017) # head of dataframe of months and freq
```

```
##      freq percentage
## 01  234    7.692308
## 02  237    7.790927
## 03  232    7.626561
## 04  237    7.790927
## 05  228    7.495069
## 06  258    8.481262
```

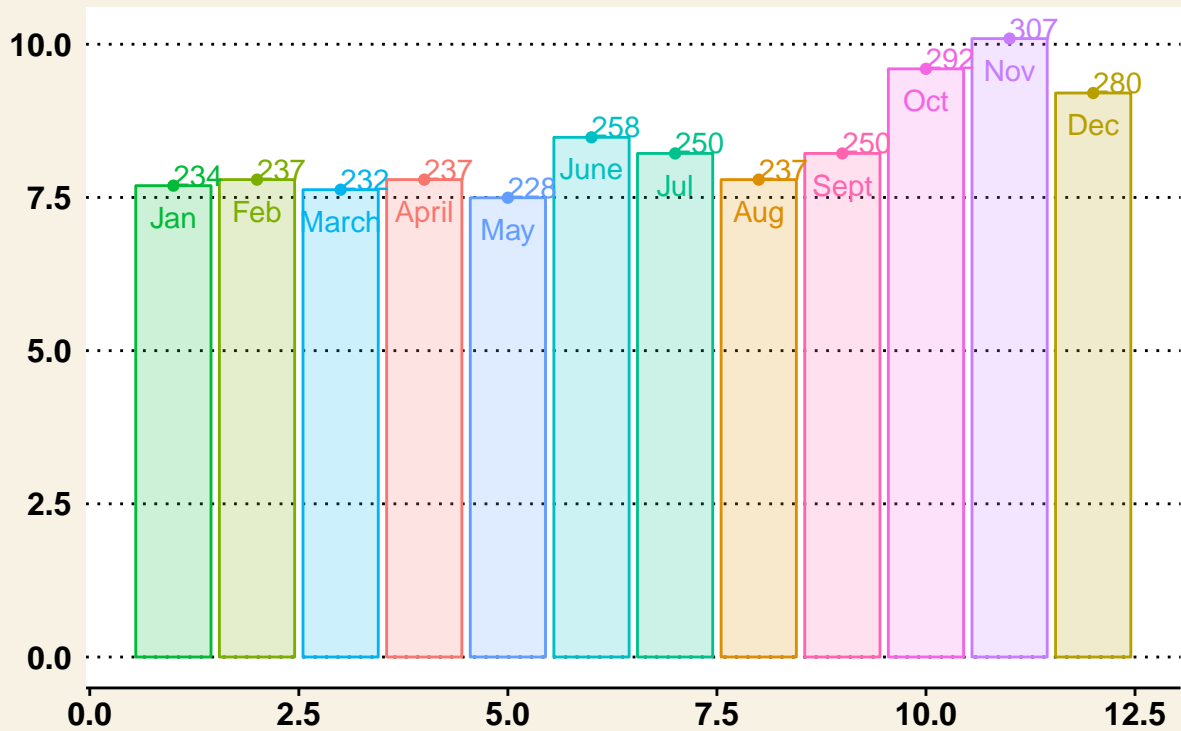
```
monthsdeaths2012to2016 <- data.frame(c(1,2,3,4,5,6,7,8,9,10,11,12),c("Jan", "Feb", "March", "April", "May", "June", "July", "Aug", "Sept", "Oct", "Nov", "Dec"),
colnames(monthsdeaths2012to2016) <- c("Months","sh", "DrugDeathCounts", "Percentage")
head(monthsdeaths2012to2016)
```

```
##   Months   sh DrugDeathCounts Percentage
## 1     1   Jan             234    7.692308
## 2     2   Feb             237    7.790927
## 3     3 March             232    7.626561
## 4     4 April             237    7.790927
## 5     5   May             228    7.495069
## 6     6   June            258    8.481262
```

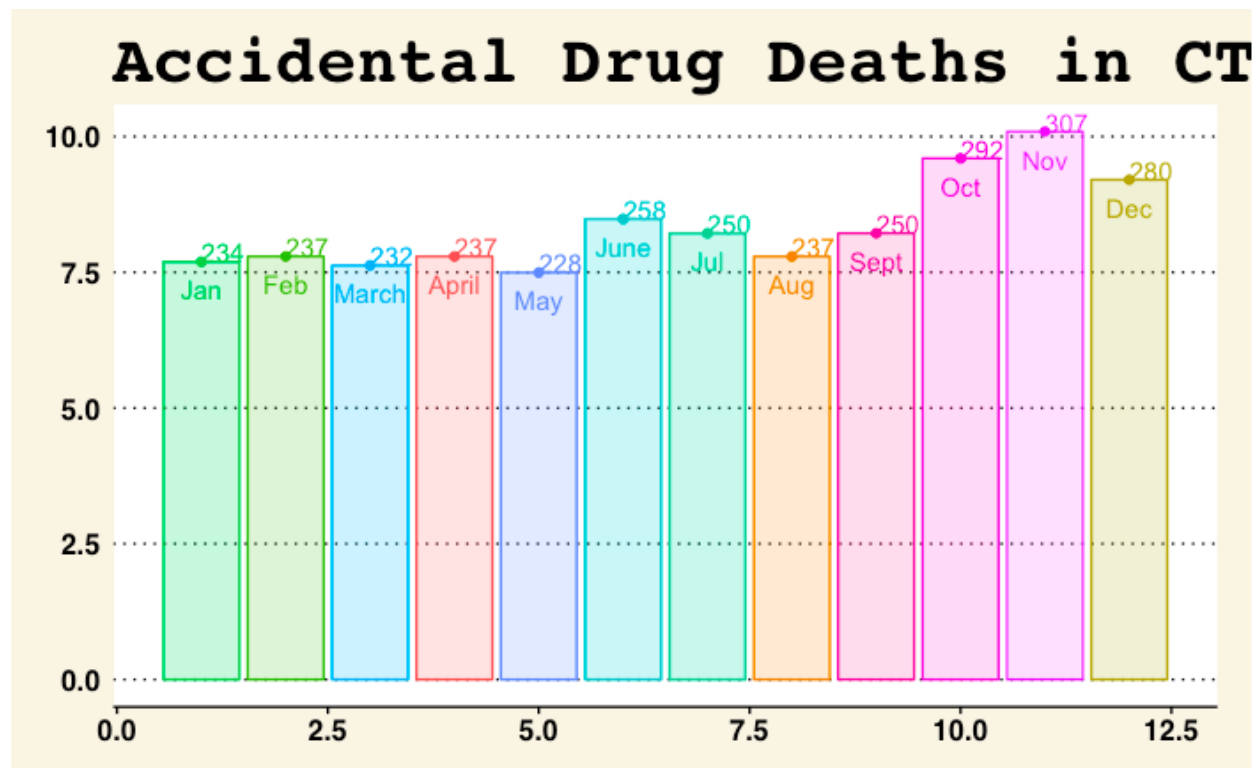
```
monthssummaryplotpercentages<- ggplot(monthsdeaths2012to2016, mapping=aes(x=monthsdeaths2012to2016$Months, y=DrugDeathCounts))
```

```
monthssummaryplotpercentages
```


Accidental Drug Deaths in



geom_text function is used here to label the points of, the geom_point must be used beforehand, then the hjust and vjust can be if you want to slightly adjust the position of the label of the points. I labeled each point with the DrugDeathCounts which is also in the same dataframe. I also used geom_text to label the sh column which is just the months written as characters instead of numeric.

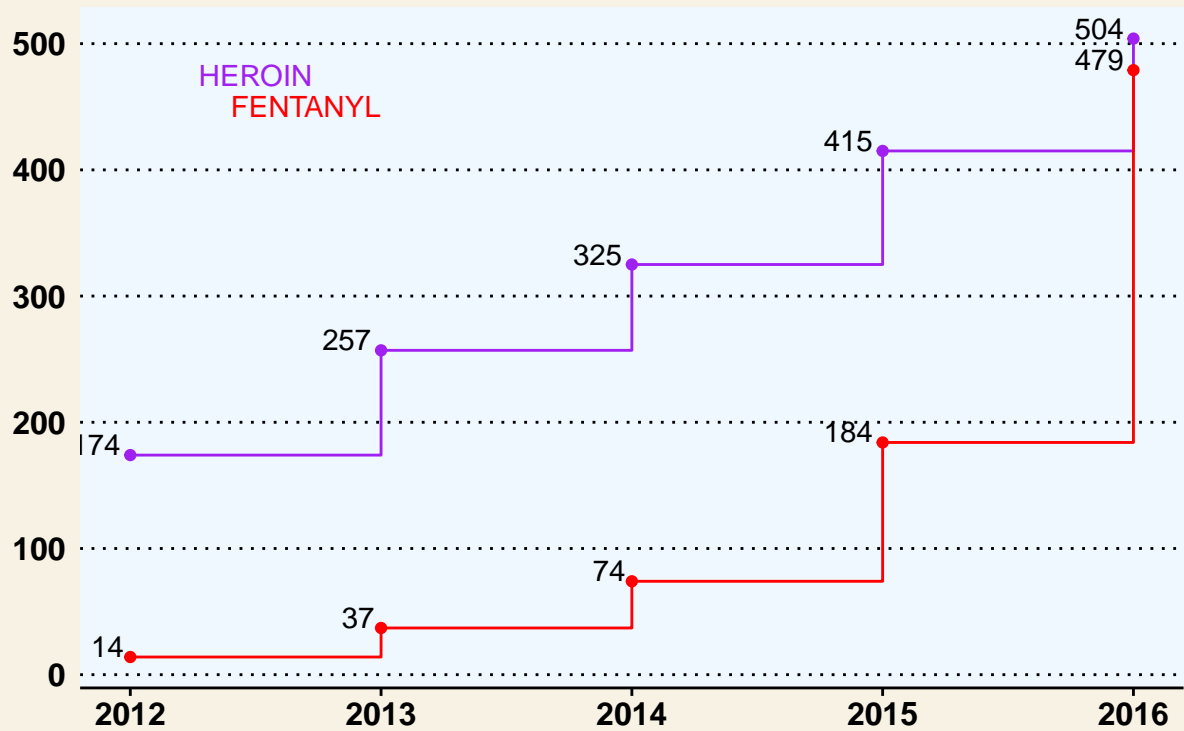


```
Topdrugsyr <- data.frame(Year=c(2012,2013,2014,2015,2016), Fentanyl=c(14, 37, 74, 184, 479), Tramadol=c(8, 7, 15, 16, 16),
  Heroin=c(174, 257, 325, 415, 504), Oxymorphone=c(30, 16, 29, 6, 7), Cocaine=c(105, 147, 127, 174, 273), Oxycodone=c(70, 74, 101, 95, 110), Methadone=c(33, 47, 51, 71, 84),
  Hydrocodone=c(15, 19, 14, 20, 20), Amphetamine=c(7, 4, 13, 20, 19), Benzodiazepine=c(49, 78, 156, 220, 242), Alcohol=c(61, 83, 126, 173, 254))
head(Topdrugsyr)
```

```
##   Year Fentanyl Tramadol Heroin Oxymorphone Cocaine Oxycodone Methadone
## 1 2012         14         8   174          30    105         70         33
## 2 2013         37         7   257          16    147         74         47
## 3 2014         74        15   325          29    127        101         51
## 4 2015        184        16   415           6    174         95         71
## 5 2016        479        16   504           7    273        110         84
##   Hydrocodone Amphetamine Benzodiazepine Alcohol
## 1          15           7              49      61
## 2          19           4              78      83
## 3          14          13             156     126
## 4          20          20             220     173
## 5          20          19             242     254
```

```
heroinsummaryplottime <- ggplot(Topdrugsyr, mapping=aes(x=Year)) +geom_step(aes(y=Topdrugsyr$Heroin), color='red')
heroinsummaryplottime
```

Accidental Drug Deaths in



This plot has each points in the Heroin and Fentanyl columns of the dataframe on the graph using `annotate()` function

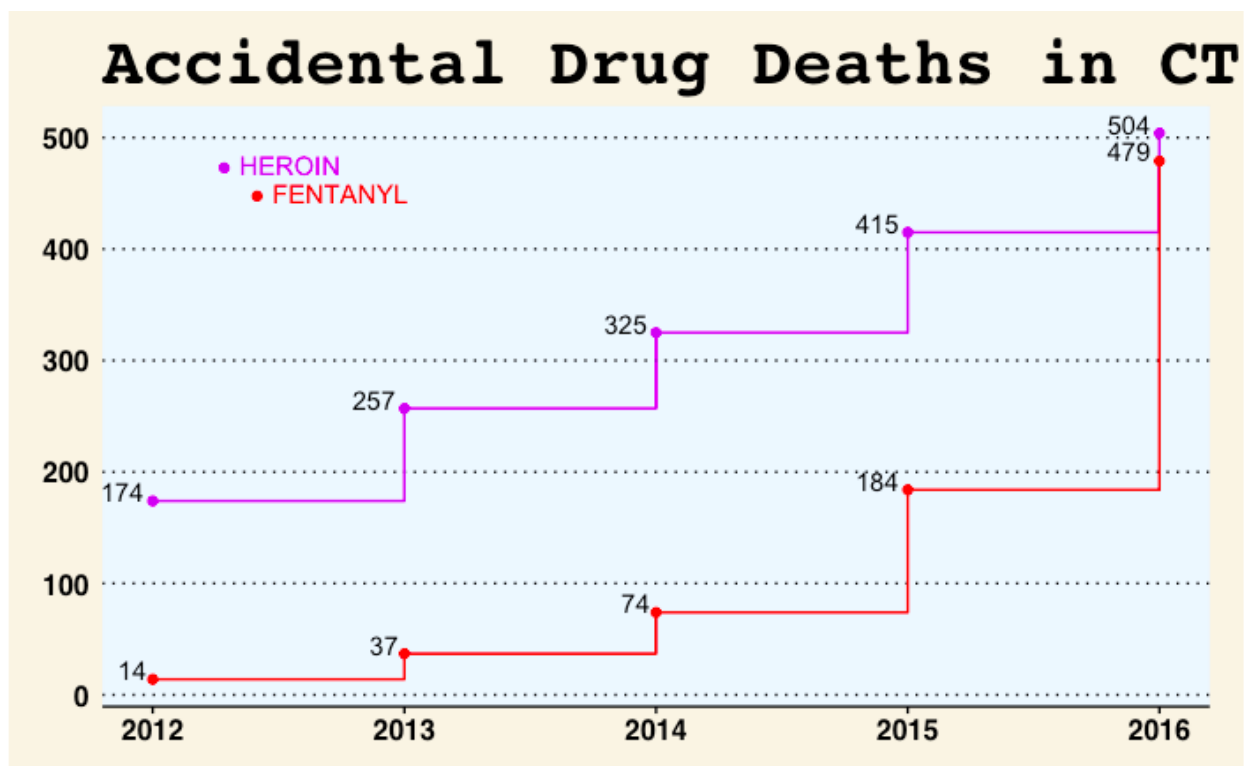


Figure 1: annotate example