Cumulative-Killed Graphic for 2014

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```
library(readr)
library(lubridate)
library(ggplot2)

gva_2014 <- read_csv("~/Desktop/gun_violence_research/001_data/001A_ORIGINAL/gva-2014.csv",
        col_types = cols(`Incident ID` = col_skip(),
        `Incident Date` = col_date(format = "%B %d, %Y"),
        State = col_skip(), `City Or County` = col_skip(),
        Address = col_skip(), Operations = col_skip()))

names(gva_2014) <- c("ID", "Killed", "Injured")

# Order dataframe by 'ID' (incident date)
gva_2014 <- gva_2014[order(gva_2014$`ID`), ]

# View(gva_2014)
```

Detemination of Slope, Intercept & R^2 Functions

** Two methods**

```
# linear_model <- lm(gva_2014$Cum_Killed ~ gva_2014$Days)
# cf <- coef(linear_model)
# print(cf[1]); print(cf[2])

slope <- function(x, y) {
  cov(x, y) / var(x)
}
intercept <- function(x, y) {
  mean(y) - slope(x, y) * mean(x)
}

R_Squared = function(x, y) {
  cor(x, y)^2
}
```

Convert ID & Killed/Injured/Grand Total to cumulative numbers

```
date <- ymd(gva_2014$`ID`)
gva_2014$Days <- yday(date) - 1 # so Jan 1 = day 0

gva_2014$Cum_Killed <- cumsum(gva_2014$Killed)
```

```
gva_2014$Cum_Injured <- cumsum(gva_2014$Injured)
gva_2014$Grand_Total <- gva_2014$Cum_Killed + gva_2014$Cum_Injured

tail(gva_2014)
```

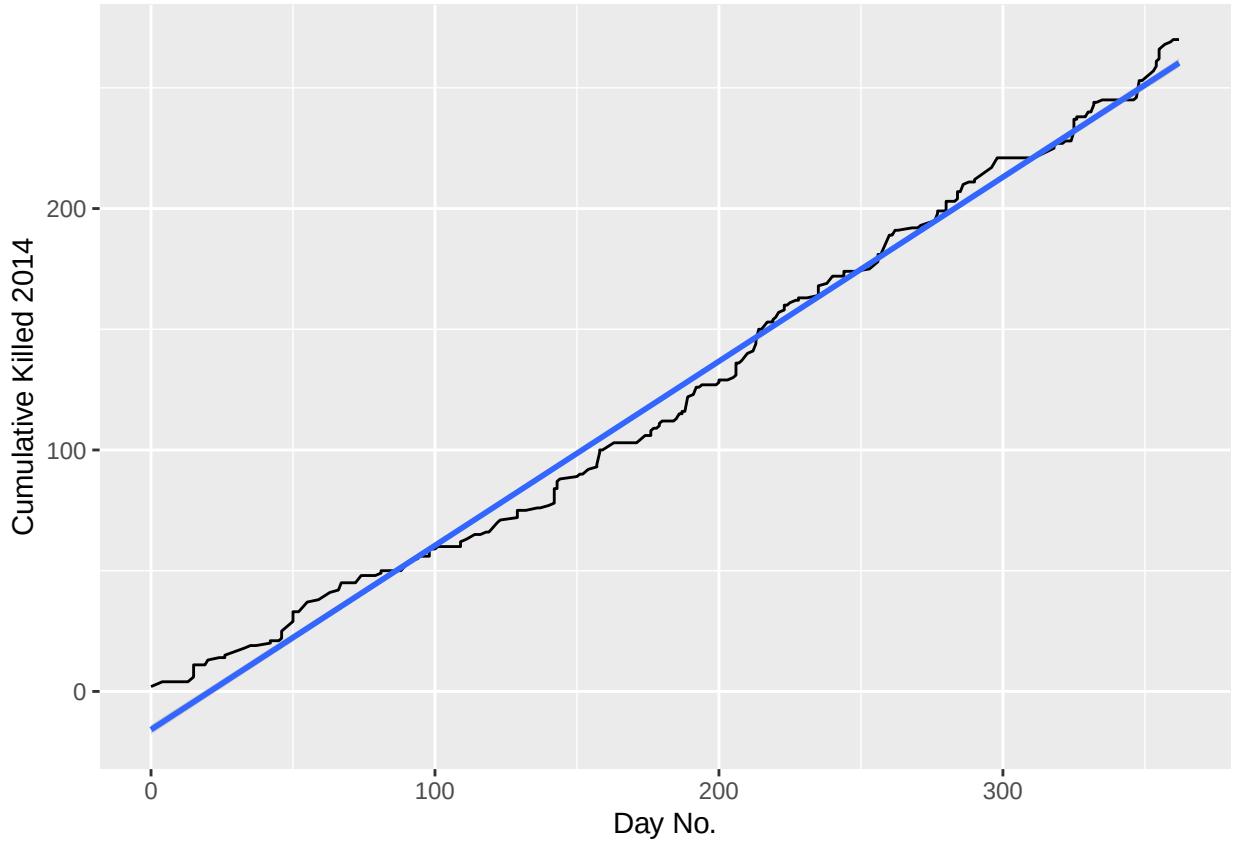
```
## # A tibble: 6 x 7
##   ID         Killed Injured  Days Cum_Killed Cum_Injured Grand_Total
##   <date>      <dbl>   <dbl> <dbl>      <dbl>       <dbl>       <dbl>
## 1 2014-12-23      1       3   356        267        1068        1335
## 2 2014-12-24      1       3   357        268        1071        1339
## 3 2014-12-26      1       3   359        269        1074        1343
## 4 2014-12-27      1       3   360        270        1077        1347
## 5 2014-12-27      0       4   360        270        1081        1351
## 6 2014-12-29      0       4   362        270        1085        1355
```

```
names(gva_2014)
```

```
## [1] "ID"          "Killed"      "Injured"     "Days"        "Cum_Killed"
## [6] "Cum_Injured" "Grand_Total"
```

Cumulative Deaths vs Days for 2014

```
ggplot(gva_2014, aes(x=gva_2014$Days, y=gva_2014$Cum_Killed)) +
  geom_line() +
  labs(x='Day No.', y='Cumulative Killed 2014') +
  geom_smooth(method = "lm")
```




```
graphic_s  <- slope(gva_2014$Days, gva_2014$Cum_Killed)
graphic_i  <- intercept(gva_2014$Days, gva_2014$Cum_Killed)
graphic_r2 <- R_Squared(gva_2014$Days, gva_2014$Cum_Killed)

print(paste('Slope = ', graphic_s))
```

```
## [1] "Slope =  0.762825665907124"
```

```
print(paste('Intercept = ', graphic_i))
```

```
## [1] "Intercept =  -15.8279273787283"
```

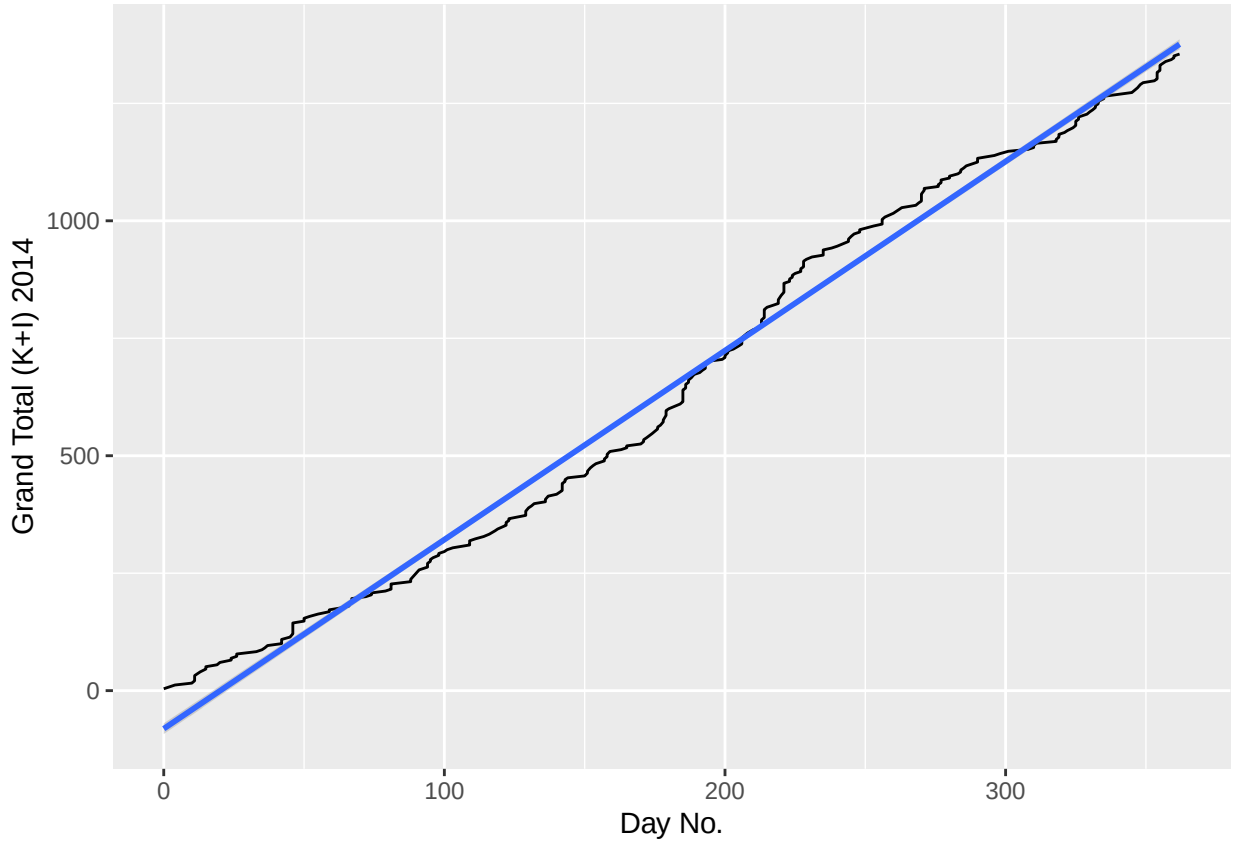
```
print(paste('R_Squared = ', graphic_r2))
```

```
## [1] "R_Squared =  0.990127922945717"
```

Cumulative Total Shot vs Days for 2014

```
ggplot(gva_2014, aes(x=Days, y=Grand_Total)) +
  geom_line() +
  labs(x='Day No.', y='Grand Total (K+I) 2014') +
  geom_smooth(method = "lm")
```

```
## `geom_smooth()` using formula 'y ~ x'
```




```
graphic_s <- slope(gva_2014$Days, gva_2014$Grand_Total)
graphic_i <- intercept(gva_2014$Days, gva_2014$Grand_Total)
graphic_r2 <- R_Squared(gva_2014$Days, gva_2014$Grand_Total)

print(paste('Slope = ', graphic_s))
```

```
## [1] "Slope =  4.02442202295235"
```

```
print(paste('Intercept = ', graphic_i))
```

```
## [1] "Intercept =  -81.0156428756411"
```

```
print(paste('R_Squared = ', graphic_r2))
```

```
## [1] "R_Squared =  0.987876362040067"
```