Worldwide Motorcycle deaths (per 100,000)

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Load the data

Let's start off with loading the dataset which was downloaded from the Gapminder website. This dataset is from GIMD/WHO on 2-wheeler, motorized, mortality per 100,000 around the world from 1997-2008.

```
setwd('C:/Users/user/version-control/Leada-R-Project-4-Motorcycle-Deaths')
suppressMessages(require(xlsx))
df <- read.xlsx('mc RTI age adjusted indicator file 20100906.xlsx',  sheetName = "Data")
names(df)[1]<-"Country"
```

Why this data?

I chose this dataset as it's almost spring here in Beautiful British Columbia. I'm ready to renew my motorcycle insurance for my Royal Enfield Bullet for another season. I decided to see if the anecdotes I hear about how dangerous motorcycling is are supported by the data and I was also interested to see how Canada compares with other countries around the world.

Clean the data

```
# Let's ensure all countries are accounted for - assumption we are using the latest year for which ther
library(data.table)
```

```
##
## Attaching package: 'data.table'
##
```

```
## The following object is masked _by_ '.GlobalEnv':
##
##     .N
```

```
library(reshape2)
mc <- na.omit(melt(as.data.table(df, keep.rownames = TRUE),
             id.vars = "rn"))[, value[.N], by = rn]
#merge with countries column
mc <- cbind(mc,df$Country)
mc <- subset(mc, select=c(3,2))
colnames(mc) <- c("Country","Latest_Mortality_Rate")
#Delete a few countries with no data #edit(mc) - easier to copy and paste country names
nodata <- c("Azerbaijan", "Bahrain", "Fiji", "Grenada", "Guyana", "Mauritius", "Qatar")
for (country in nodata){
  mc <- mc[grep(country, mc$Latest_Mortality_Rate, invert = TRUE) , ]
}
```

Safest Country

```
minimum <- min(mc$Latest_Mortality_Rate)
safest_country <- as.character(mc[mc$Latest_Mortality_Rate==minimum, Country])
```

Peru is the safest country in terms of motorycyle deaths at 0.028 deaths/100,000 in a year.

Largest Improvement in Safety

```
#We will only consider columns that are NOT NA in both year (1998 & 2008)
#split up into two dfs
df1998 <- df[,1:15]
df2008 <- df[,c(1,16:25)]
#if NA in 1998 we will choose the latest year of data, same with 2008 dataframe
library(data.table)
library(reshape2)
df1998 <- na.omit(melt(as.data.table(df1998, keep.rownames = TRUE),
             id.vars = "rn"))[, value[.N], by = rn]
df2008 <- na.omit(melt(as.data.table(df2008, keep.rownames = TRUE),
             id.vars = "rn"))[, value[.N], by = rn]
#let's merge into one dataframe
dfchange <- cbind(df1998,df2008,df$Country)
#Keep only applicable columns and rename them
colnames(dfchange) <- c("rn","X1998","rn","X2008","Country")
dfchange <- subset(dfchange, select= c(5,2,4))
#Some countries still have no data in either 2008 or 1998
#Convert text to NAs
dfchange$X1998<- as.numeric(dfchange$X1998)
dfchange$X2008<- as.numeric(dfchange$X2008)
dfchange <- dfchange[complete.cases(dfchange),]
#Now we have all countries with data in each year so we can compare
dfchange <- transform(dfchange, improvement = X1998-X2008)
maximum <- max(dfchange$improvement)
```

```
largest_improvement <- as.character(dfchange[dfchange$improvement==maximum,Country])
improvement1998 <- dfchange[dfchange$improvement==maximum,X1998]
improvement2008 <- dfchange[dfchange$improvement==maximum,X2008]
```

The country with the largest improvement in the ten year period from 1998 to 2008 is **Portugal** which improved from 13.338 to 3.164

Where does Canada rank in terms of motorcyclist safety? What is the most dangerous country?

Canada is considered the 27th safest country out of these 81 countries that we have data for.The mortality rate per 100,000 people is 1.018/100,000 compared with the highest mortality rate for 2-wheelers which is 7.864 per 100,000 people. This unfortunate honour goes to the South American country of **Venezuela**.

On average, how much safer are the 10 safest countries vs the most dangerous?

```
safest_mc <- mc[1:10,]
dangerous_mc <- mc[(nrow(mc)-10):nrow(mc),]
```

Prepare data for visualization

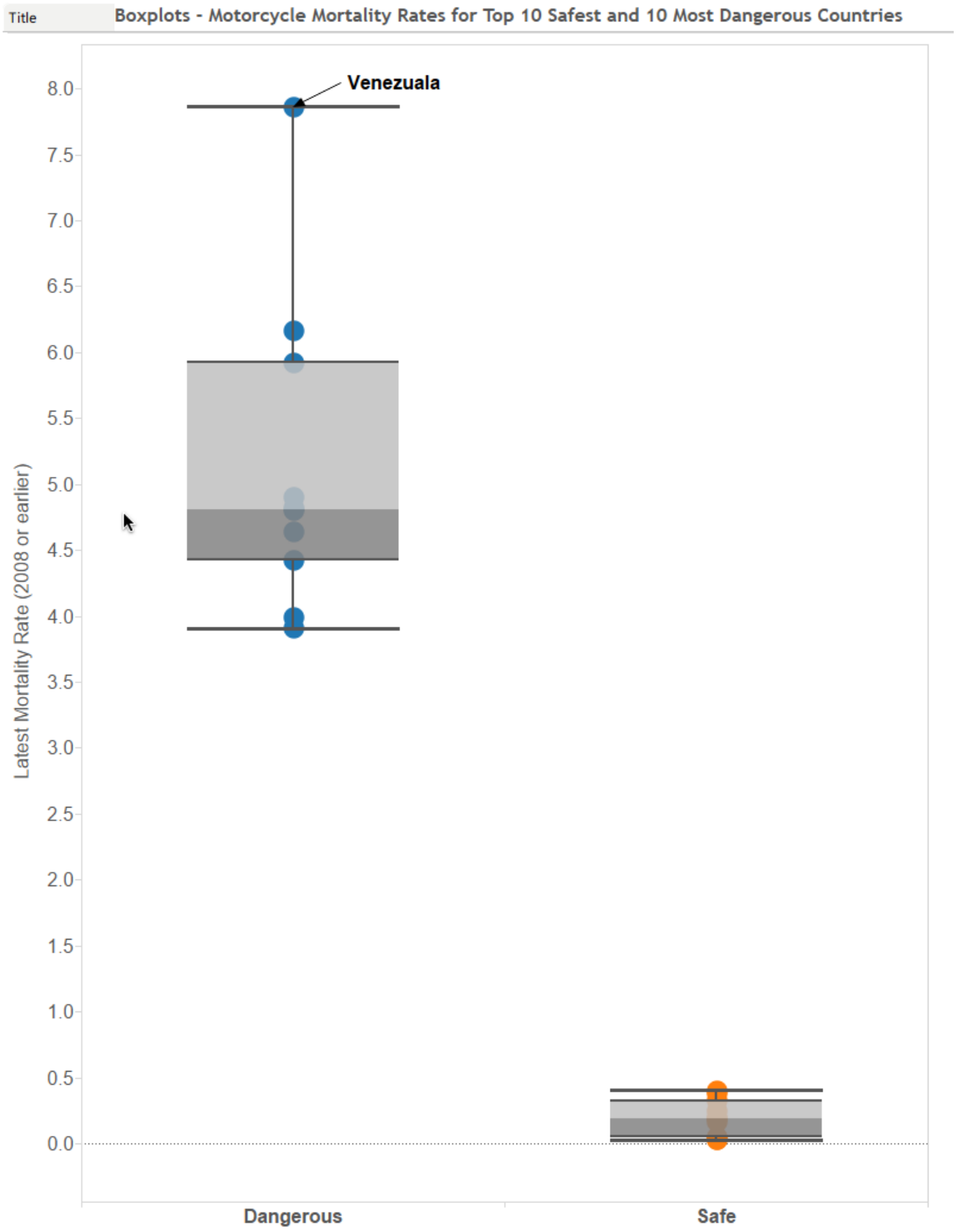
```
safest_mc <- mc[1:10,]
dangerous_mc <- mc[(nrow(mc)-9):nrow(mc),]
safest_mc$safety_level <- factor("Safe")
dangerous_mc$safety_level <- factor("Dangerous")
#Combine top10 safest and most dangerous
top10 <- rbind(safest_mc,dangerous_mc)
#Export to csv, for use in Tableau
#write.csv(top10, "top10_motorcycle_safety.csv")
#Sort by Mortality Rates, and safety level
top10 <- top10[order(top10$Latest_Mortality_Rate,top10$safety_level)]
#The top 10 most dangerous are not sorted from highest to lowest as I'd like
dangerous_mc$Latest_Mortality_Rate <- as.numeric(dangerous_mc$Latest_Mortality_Rate)
dangerous_mc <- dangerous_mc[order(-dangerous_mc$Latest_Mortality_Rate)]
#now I'll just append it to a subset of the first dataframe
top10 <- rbind(top10[1:10,],dangerous_mc)
```

Top 10 Safest & Dangerous Countries for Motorcyclists

Country	Latest_Mortality_Rate	safety_level
Peru	0.028	Safe
Georgia	0.029	Safe
Uzbekistan	0.051	Safe
Trinidad and Tobago	0.168	Safe
Hong Kong SAR	0.192	Safe
Kyrgyzstan	0.194	Safe
Chile	0.249	Safe
Egypt	0.326	Safe

Country	Latest_Mortality_Rate	safety_level
Iceland	0.382	Safe
Guatemala	0.402	Safe
Venezuela	7.864	Dangerous
Uruguay	6.166	Dangerous
Reunion	5.923	Dangerous
Malaysia	4.901	Dangerous
Paraguay	4.823	Dangerous
Colombia	4.8	Dangerous
Brazil	4.637	Dangerous
Greece	4.425	Dangerous
Bahamas	3.988	Dangerous
French Guiana	3.906	Dangerous

The top safest 10 countries are at least 10 times safer than the 10 most dangerous countries on average as shown by the box plot below.



Finally, an interesting fact. Réunion is an actual country (in fact a French island) with a population of 840,974 inhabitants located in the Indian Ocean, east of Madagascar, about 200 kilometres (120 mi) southwest

of Mauritius, the nearest island.