MATH22707 Assignment 1

Turning Tables

Student Details

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Data Source

- Safe Work Australia (19 April 2018) *Number and incidence rate of work-related traumatic injury fatalities by Occupation – 2012-2016*. Retrieved from https://www.safeworkaustralia.gov.au/doc/number-and-incidence-rate-work-related-traumatic-injury-fatalities-occupation-2012-2016

Code and Visualisation

```
library(readxl)
library(openxlsx)
library(tidyr)
library(dplyr)
library(ggplot2)
library(reshape2)
library(RColorBrewer)
library(cowplot)
library(formatR)
library(knitr)
opts_chunk$set(tidy.opts=list(width.cutoff=60),tidy=TRUE)
```

```
# load table
injuries <- read_excel("traumatic_injuries.xlsx", range = "A5:K57")
total_fatalities <- injuries[, 1:6]
colnames(total_fatalities) <- c("Occupation", total_fatalities[1,
    2:6])
total_fatalities <- total_fatalities[-1, ]

# Take only last three years statistics and only the
# occupation groups
total_subset <- total_fatalities %>% select(Occupation, `2014`,
    `2015`, `2016`)
total_groups <- total_subset %>% filter(Occupation %in% c("Machinery Operators and Drivers",
    "Labourers", "Technicians and Trades Workers", "Managers",
    "Professionals", "Community and Personal Service Workers",
    "Sales Workers", "Clerical and Administrative Workers"))

# Convert from wide to long format data
total_groups <- reshape2::melt(total_groups, id.vars = "Occupation",
    variable.name = "Year", value.name = "Total fatalities")
```

```
# take last 3 years of incidence statistics
incidence <- injuries[, c(1, 9:11)]
colnames(incidence) <- c("Occupation", "2014", "2015", "2016")
incidence <- incidence[-1, ]
```

```r
# Take only the occupation groups
incidence <- incidence %>% filter(Occupation %in% c("Machinery Operators and Drivers",
    "Labourers", "Technicians and Trades Workers", "Managers",
    "Professionals", "Community and Personal Service Workers",
    "Sales Workers", "Clerical and Administrative Workers"))

# Convert from wide to long format data
incidence_groups <- reshape2::melt(incidence, id.vars = "Occupation",
    variable.name = "Year", value.name = "Incidence rate")
```

```r
# merging incidence and total
merged_injuries <- cbind(total_groups, incidence = round(incidence_groups[,
    3], digits = 2))
merged_injuries$Occupation <- as.factor(merged_injuries$Occupation)
merged_injuries$Occupation <- factor(merged_injuries$Occupation,
    labels = c("Clerical", "Community worker", "Labourers", "Machinery Operator",
        "Managers", "Professionals", "Sales", "Technician/trade"))
```

```r
# Section 1: fatalities
Fatalities <- ggplot(data = merged_injuries, aes(x = Occupation,
    y = `Total fatalities`), fill = Year)

Fatalities2 <- Fatalities + geom_col(position = "dodge2", aes(fill = Year)) +
    theme(axis.text.x = element_text(angle = 60, vjust = 0.5)) +
    scale_fill_manual(values = colorRampPalette(brewer.pal(3,
        "Reds"))(3))

Fatalities3 <- Fatalities2 + scale_y_continuous(breaks = 1:7 *
    10)

Fatalities4 <- Fatalities3 + labs(title = "Total Fatalities",
    x = "Occupation", y = "Total fatalities") + annotate("text",
    x = c(1, 1.3), y = c(4, 4), label = "1", size = 4) + annotate("text",
    x = 4, y = 74, label = "71") + theme(plot.title = element_text(size = 16,
    face = "bold"), axis.text = element_text(size = 14), axis.title = element_text(size = 14,
    face = "bold"))
```

```r
# Section 2: incidence

Incidence <- ggplot(data = merged_injuries, aes(x = Occupation,
    y = incidence), fill = Year)

Incidence2 <- Incidence + geom_col(position = "dodge2", aes(fill = Year)) +
    theme(axis.text.x = element_text(angle = 60, vjust = 0.5)) +
    scale_fill_manual(values = colorRampPalette(brewer.pal(3,
        "Blues"))(3))

Incidence3 <- Incidence2 + scale_y_continuous(breaks = 2 * 1:5)

Incidence4 <- Incidence3 + labs(title = "Incidence rate of Fatalities",
    x = "Occupation", y = "Incidence (per 100,000 workers)") +
    annotate("text", x = c(1, 1.3), y = c(0.75, 0.75), label = c(".06",
        ".06"), size = 4) + annotate("text", x = 4, y = 10, label = "9.53",
    size = 3.8) + theme(plot.title = element_text(size = 16,
    face = "bold"), axis.text = element_text(size = 14), axis.title = element_text(size = 14,
```

```
    face = "bold"))
```

```
# Unify the plot sections together

title_theme <- ggdraw() + draw_label("What occupation type experienced the highest and
             lowest injury-related fatalities in Australia (2014-2016)?",
    fontface = "bold", size = 18)

p <- plot_grid(Fatalities4, Incidence4, labels = c("A", "B"),
    nrow = 2)

plot_grid(title_theme, p, ncol = 1, rel_heights = c(0.1, 1))
```

What occupation type experienced the highest and lowest injury−related fatalities in Australia (2014−2016)?