

Utah Health Index

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Introduction

The following analysis uses data from <http://www.countyhealthrankings.org/app/utah/2016/overview>, the focus was on few health outcomes for Utah by county, (Excessive drinking, adult smoking, adult obesity, healthcare costs, uninsured adults and children).

The analysis focuses on the use of choropleth maps in R, namely thru the use of (choroplethr, choroplethrMaps) libraries.

This document was rendered using rmarkdown.

```
##  
## Attaching package: 'dplyr'  
  
## The following objects are masked from 'package:stats':  
##  
##     filter, lag  
  
## The following objects are masked from 'package:base':  
##  
##     intersect, setdiff, setequal, union  
  
## Warning: package 'choroplethr' was built under R version 3.4.1  
  
## Loading required package: acs  
  
## Warning: package 'acs' was built under R version 3.4.1  
  
## Loading required package: stringr  
  
## Loading required package: XML  
  
##  
## Attaching package: 'acs'  
  
## The following object is masked from 'package:dplyr':  
##  
##     combine  
  
## The following object is masked from 'package:base':  
##  
##     apply  
  
## Warning: package 'choroplethrMaps' was built under R version 3.4.1  
  
## Warning: package 'gridExtra' was built under R version 3.4.1  
  
##  
## Attaching package: 'gridExtra'  
  
## The following object is masked from 'package:acs':  
##  
##     combine
```

```

## The following object is masked from 'package:dplyr':
##
##     combine

## Google Maps API Terms of Service: http://developers.google.com/maps/terms.

## Please cite ggmap if you use it: see citation("ggmap") for details.

```

Load dataset

```

#load the dataset
dh <- read.csv("C:/Users/Dell/Documents/2016_CHR_Analytic_Data.csv")
#choose a subset
collist <- c('STATECODE', 'COUNTYCODE', 'State', 'County',
            'Adult.smoking.Value', 'Adult.obesity.Value',
            'Uninsured.adults.Value', 'Uninsured.children.Value',
            'Median.household.income.Value')
dhSmall <- dh[, c(1, 2, 3, 4, 31, 36, 249, 254, 270)]
#fucus on Utah
dhUtah <- subset(dhSmall, State == 'UT')
head(dhUtah, 5)

##           STATECODE COUNTYCODE State      County Adult.smoking.Value
## 622          49        55    UT  Wayne County          0.096
## 2778         49        9    UT Daggett County          0.085
## 2821         49       33    UT   Rich County          0.097
## 2822         49        0    UT      Utah          0.097
## 2823         49        1    UT Beaver County          0.097
##           Adult.obesity.Value Uninsured.adults.Value Uninsured.children.Value
## 622             0.233                  0.217              0.168
## 2778             0.261                  0.184              0.124
## 2821             0.268                  0.196              0.150
## 2822             0.249                  0.185              0.096
## 2823             0.276                  0.221              0.129
##           Median.household.income.Value
## 622                 42366
## 2778                 53006
## 2821                 56772
## 2822                 60943
## 2823                 50818

```

Data munging

```

# remove state rows from dataset
dhUtah <- subset(dhUtah, COUNTYCODE != 0)

dhUtah$STATECODE <- as.integer(dhUtah$STATECODE)
dhUtah$COUNTYCODE <- as.integer(dhUtah$COUNTYCODE)

# pad county digits
dhUtah$COUNTYCODE <- sprintf("%03d", dhUtah$COUNTYCODE)

# concatenate and create FIPS

```

```

dhUtah$FIPSCODE <- as.numeric(paste0(dhUtah$STATECODE, dhUtah$COUNTYCODE))

#handle NA
NAResplace <- NULL
if (!is.null(NAResplace)) {
  dhUtah[["value"]][is.na(dhUtah[["value"]])] <- NAResplace
}

```

Smoking (Top 5 counties)

```

top_smoke_cty <- dhUtah %>%
  arrange(desc(Adult.smoking.Value)) %>%
  select(County, Adult.smoking.Value)

kable(head(top_smoke_cty, 5))

```

County	Adult.smoking.Value
San Juan County	0.170
Carbon County	0.129
Weber County	0.126
Grand County	0.119
Uintah County	0.114

Smoking map

```

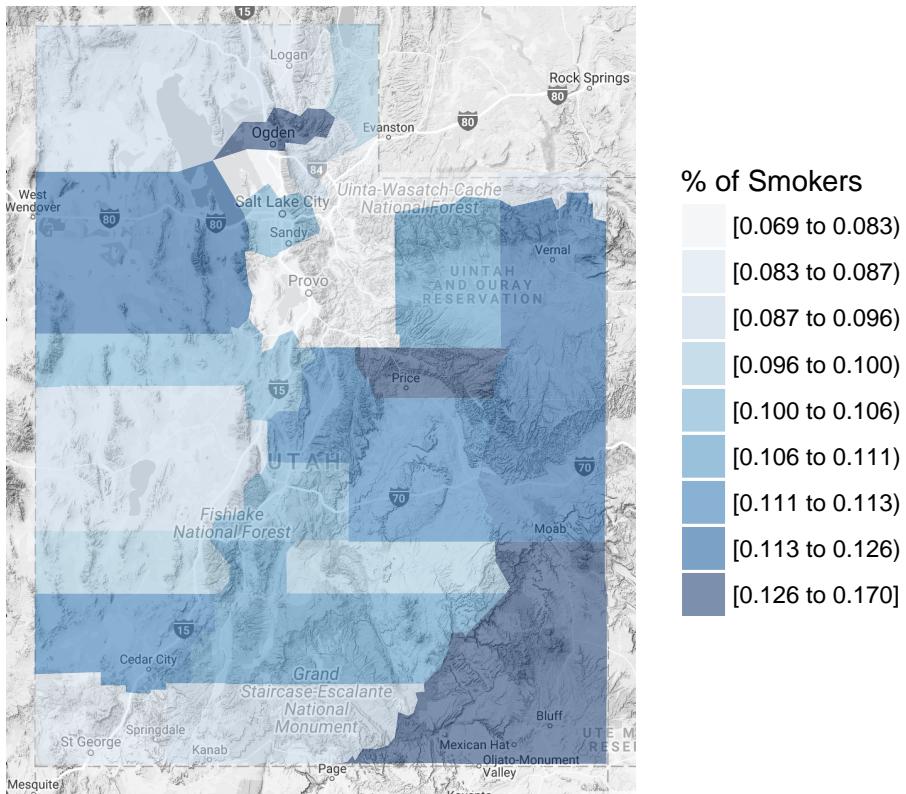
# build a dataset for smoking map
dhUtah_sm <- subset(dhUtah, select = c('FIPSCODE', 'Adult.smoking.Value'))
colnames(dhUtah_sm) <- c("region", "value")

#smoking
choro_ut_sm <- county_choropleth(dhUtah_sm, state_zoom="utah",
                                     legend = "% of Smokers",
                                     num_colors = 9, reference_map = TRUE) +
  ggtitle("Adult Smoking") +
  theme(plot.title = element_text(hjust = 0.5)) +
  coord_quickmap()

#plot the map
choro_ut_sm

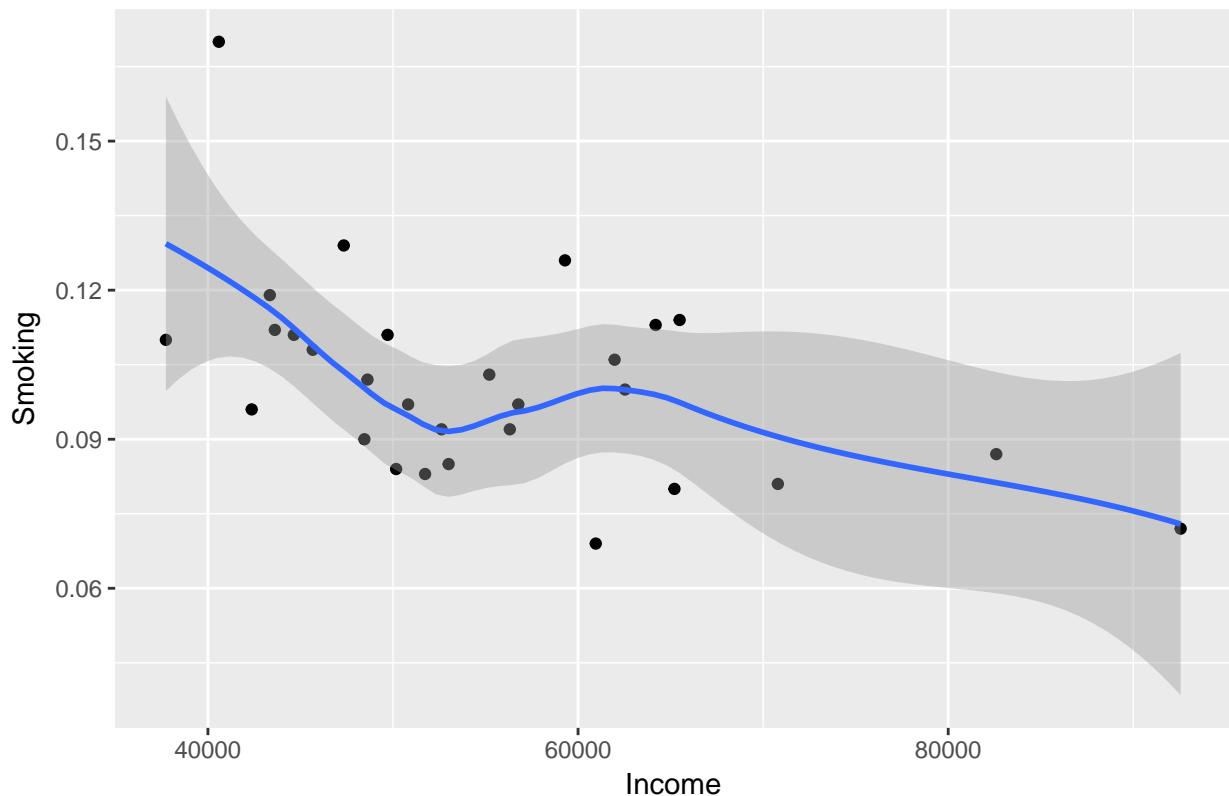
```

Adult Smoking



```
#adult smoking scatterplot
ggplot(dhUtah, aes(x=dhUtah$Median.household.income.Value,
y=dhUtah$Adult.smoking.Value)) +
  ggtitle("Smoking") +
  xlab("Income") + ylab("Smoking") +
  geom_point() +
  geom_smooth(method = 'loess')
```

Smoking



Uninsured adults (Top 5 counties)

```
#find top 5 counties for uninsured adults
top_unad_cty <- dhUtah %>%
  arrange(desc(Uninsured.adults.Value)) %>%
  select(County, Uninsured.adults.Value)

kable(head(top_unad_cty, 5))
```

County	Uninsured.adults.Value
Piute County	0.274
San Juan County	0.260
Grand County	0.249
Iron County	0.241
Millard County	0.240

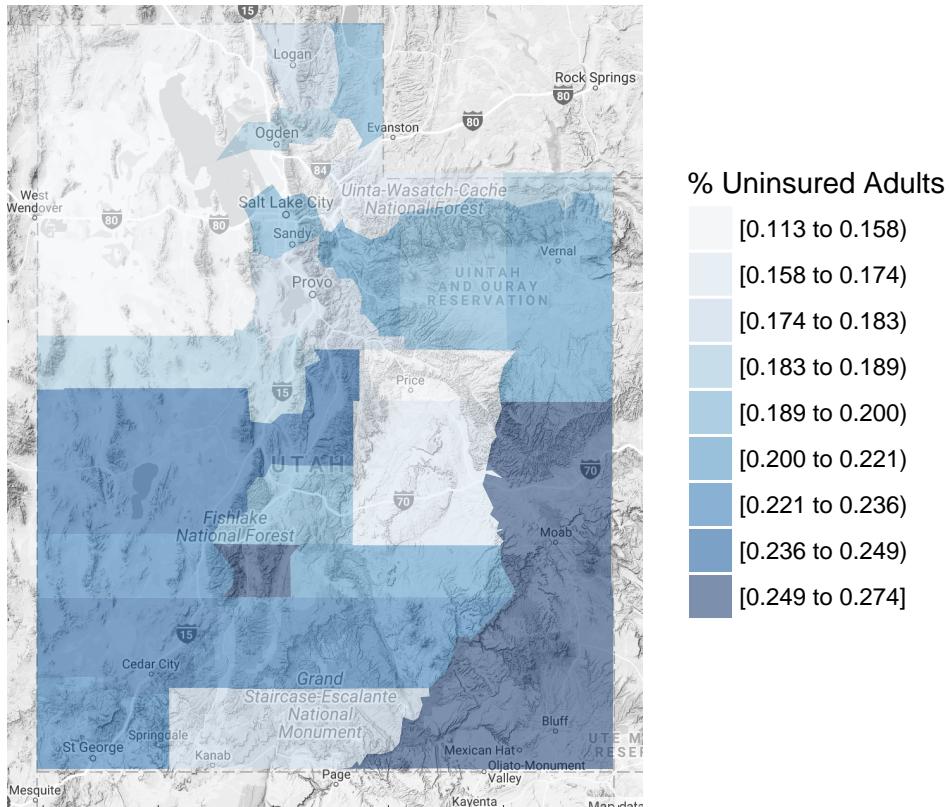
Uninsured adults map

```
# build a dataset for uninsured adults
dhUtah_ua <- subset(dhUtah, select = c('FIPSCODE', 'Uninsured.adults.Value'))
colnames(dhUtah_ua) <- c("region","value")
```

```
#uninsured adults
choro_ut_ua = county_choropleth(dhUtah_ua, state_zoom="utah",
                                 legend = "% Uninsured Adults",
                                 num_colors = 9, reference_map = TRUE) +
  ggtitle("Uninsured Adults") +
  theme(plot.title = element_text(hjust = 0.5)) +
  coord_quickmap()

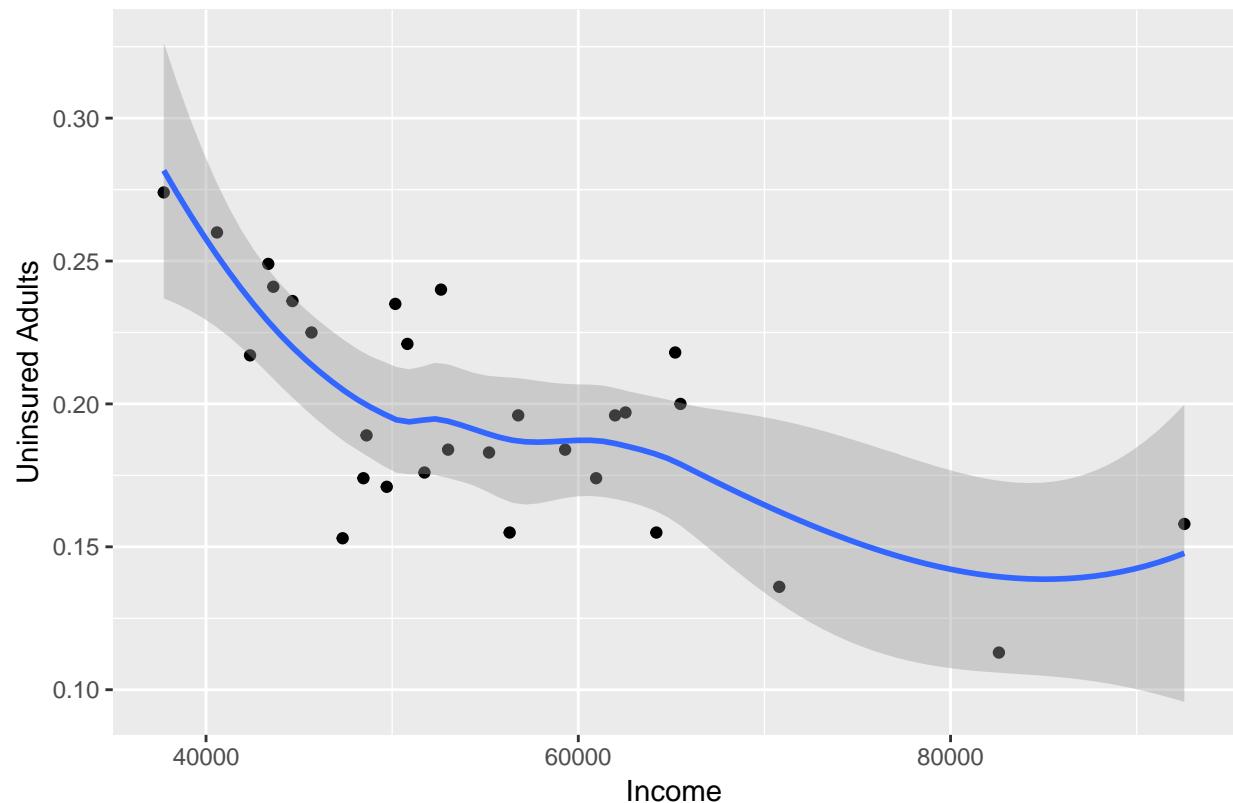
#plot the map
choro_ut_ua
```

Uninsured Adults



```
#uninsured adults scatterplot
ggplot(dhUtah, aes(x=dhUtah$Median.household.income.Value,
                     y=dhUtah$Uninsured.adults.Value)) +
  ggtitle("Uninsured Adults") +
  xlab("Income") + ylab("Uninsured Adults") +
  geom_point() +
  geom_smooth(method = 'loess')
```

Uninsured Adults



Uninsured children (Top 5 counties)

```
#find top 5 counties for uninsured children
top_unch_cty <- dhUtah %>%
  arrange(desc(Uninsured.children.Value)) %>%
  select(County, Uninsured.children.Value)

kable(head(top_unch_cty, 5))
```

County	Uninsured.children.Value
Piute County	0.191
Wayne County	0.168
Garfield County	0.152
Rich County	0.150
Wasatch County	0.147

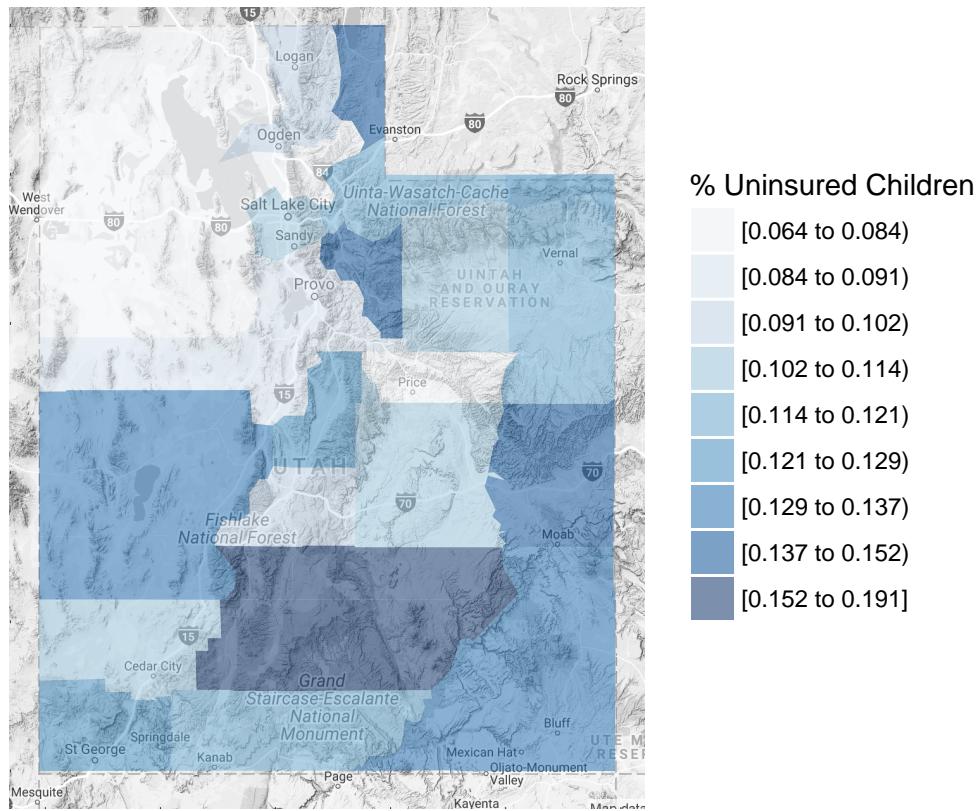
Uninsured children map

```
# build a dataset for uninsured children
dhUtah_uc <- subset(dhUtah, select = c('FIPSCODE', 'Uninsured.children.Value'))
colnames(dhUtah_uc) <- c("region","value")
```

```
#uninsured adults
choro_ut_uc = county_choropleth(dhUtah_uc, state_zoom="utah",
                                 legend = "% Uninsured Children",
                                 num_colors = 9, reference_map = TRUE) +
  ggtitle("Uninsured Children") +
  theme(plot.title = element_text(hjust = 0.5)) +
  coord_quickmap()

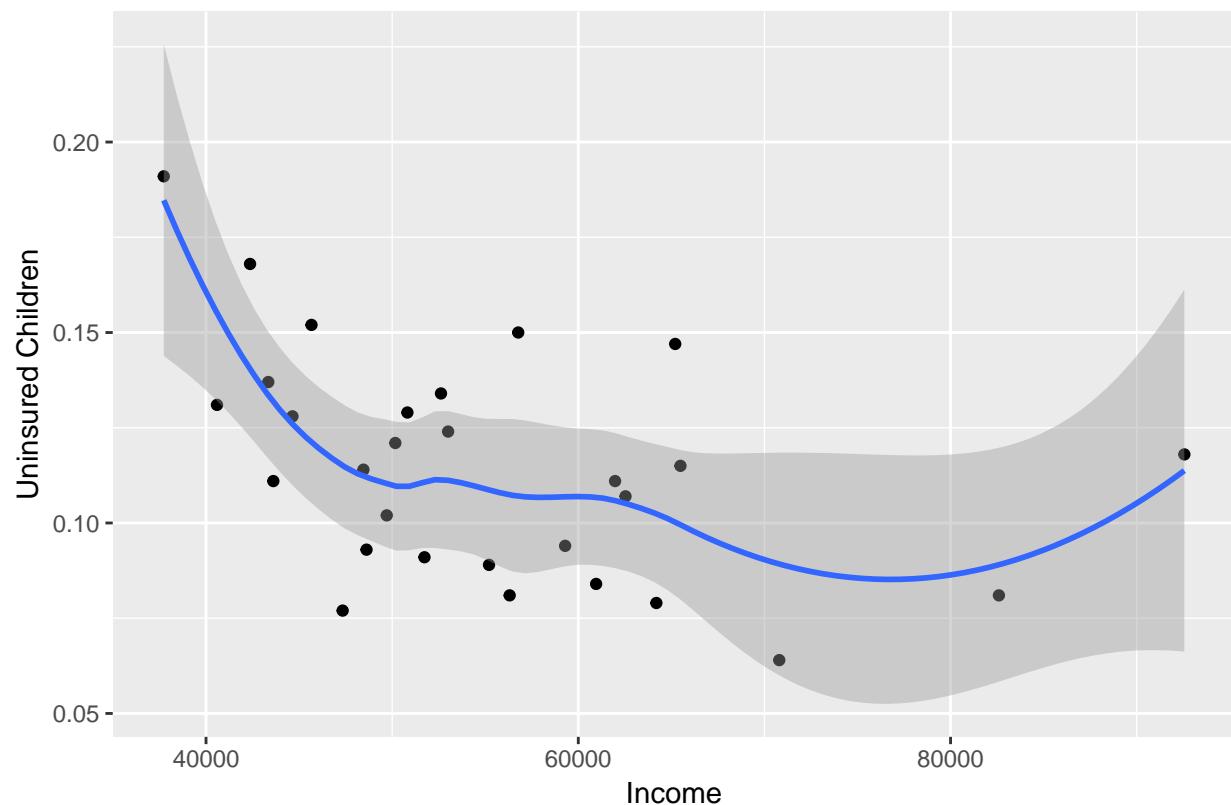
#plot the map
choro_ut_uc
```

Uninsured Children



```
#uninsured children scatterplot
ggplot(dhUtah, aes(x=dhUtah$Median.household.income.Value,
                     y=dhUtah$Uninsured.children.Value)) +
  ggtitle("Uninsured Children") +
  xlab("Income") + ylab("Uninsured Children") +
  geom_point() +
  geom_smooth(method = 'loess')
```

Uninsured Children



Conclusion

Piute County leads the state for uninsured adults and children, one of the reason can be attributed to the fact that Piute County is the lowest county when it comes to *Median Household Income*. San Juan County the second low median household county leads the state for smoking.

County	Median.household.income.Value
Piute County	37730
San Juan County	40590
Wayne County	42366
Grand County	43344
Iron County	43615