

ACS Data Through US Census Packages

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Preliminaries

```
install.packages("automap")
```

Packages

```
library(UScensus2010)
library(UScensus2010county)
library(UScensus2010tract)
library(ggplot2)
library(dplyr)
library(plyr)
```

ACS Data via US Census API

For this part of the workshop you will need to obtain a Census API Key: http://api.census.gov/data/key_signup.html. You can find out what variables are available at <http://api.census.gov/data/2014/acs5/variables.html> for the ACS.

```
key = Your Census API KEY here.
sf1variables <- c("P0010001", "P0030002", "P0030003", "P0030004",
  "P0030005")

# men, women, # bachelors deg, grad or prof deg, gini index,
# median income
acsvariables <- c("B00001_001E", "B01001_002E", "B01001_026E",
  "B06009_005E", "B06009_005E", "B19083_001E", "B06011_002E")

## SF1
WA_Census_Variables <- CensusAPI2010(sf1variables, state.fips = c("53"),
  level = "county", key, summaryfile = "sf1")

head(WA_Census_Variables)

##          fips P0010001 P0030002 P0030003 P0030004 P0030005
## 53001 53001     18728    11703      109      356      125
## 53003 53003     21623    20392      92       302      117
## 53005 53005     175177   144418     2221      1574     4691
```

```

## 53007 53007    72453    57484     236      700      588
## 53009 53009    71404    62092     596      3630     1007
## 53011 53011   425363   363397    8426      3624     17504

## ACS
WA_Census_Variables2 <- CensusAPI2010(acsvariables, state.fips = c("53"),
  level = "county", key, summaryfile = "ACS")

head(WA_Census_Variables2)

##           fips B00001_001E B01001_002E B01001_026E B06009_005E
## 53001 53001        1810       9145      8739       857
## 53003 53003        1841      10293     11070      1630
## 53005 53005       11132      83430     83647     17991
## 53007 53007        4697      35099     35896      7003
## 53009 53009        5730      35212     35426      7242
## 53011 53011       28901     204832    209984     45101
##           B06009_005E B19083_001E B06011_002E
## 53001        857       0.411     20867
## 53003       1630       0.436     22795
## 53005       17991       0.415     27609
## 53007       7003       0.432     23822
## 53009       7242       0.416     22167
## 53011       45101      0.416     27950

```

County Level Data

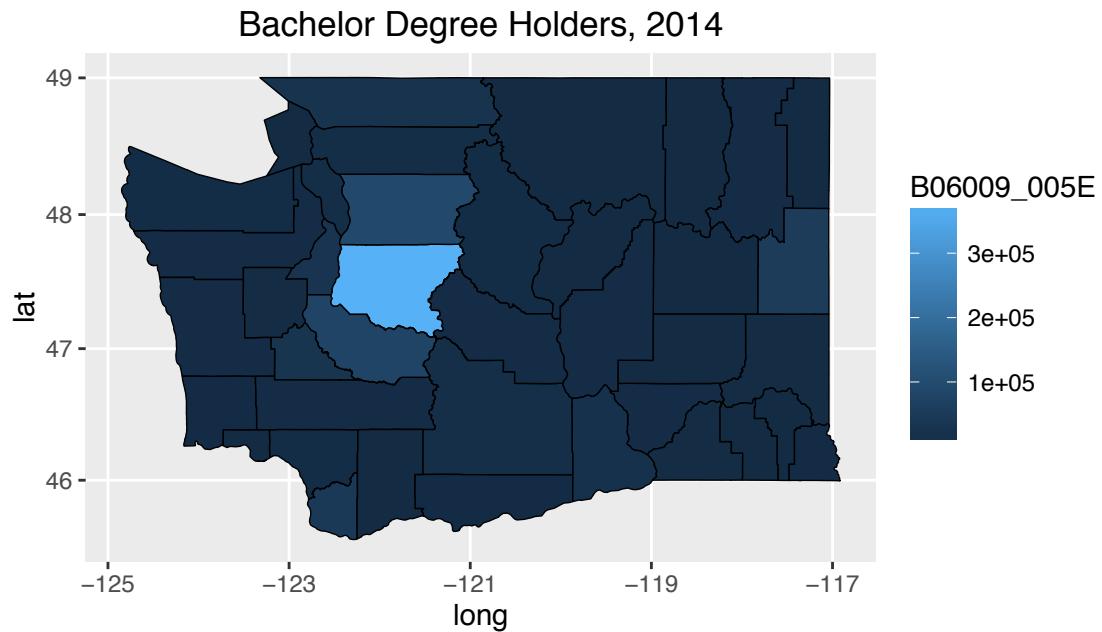
```

## ACS
WA_Census_Spatial <- CensusAPI2010Spatial(acsvariables, state.fips = c("53"),
  level = "county", key, summaryfile = "ACS")

WA_Census_Spatial@data$id <- rownames(WA_Census_Spatial@data)
WA_Census_Spatial.points = fortify(WA_Census_Spatial, region = "id")
WA_Census_Spatial.df = join(WA_Census_Spatial.points, WA_Census_Spatial@data,
  by = "id")

ggplot() + geom_polygon(data = WA_Census_Spatial.df, aes(x = long,
  y = lat, group = group, fill = B06009_005E), color = "black",
  size = 0.25) + coord_map() + ggtitle("Bachelor Degree Holders, 2014")

```



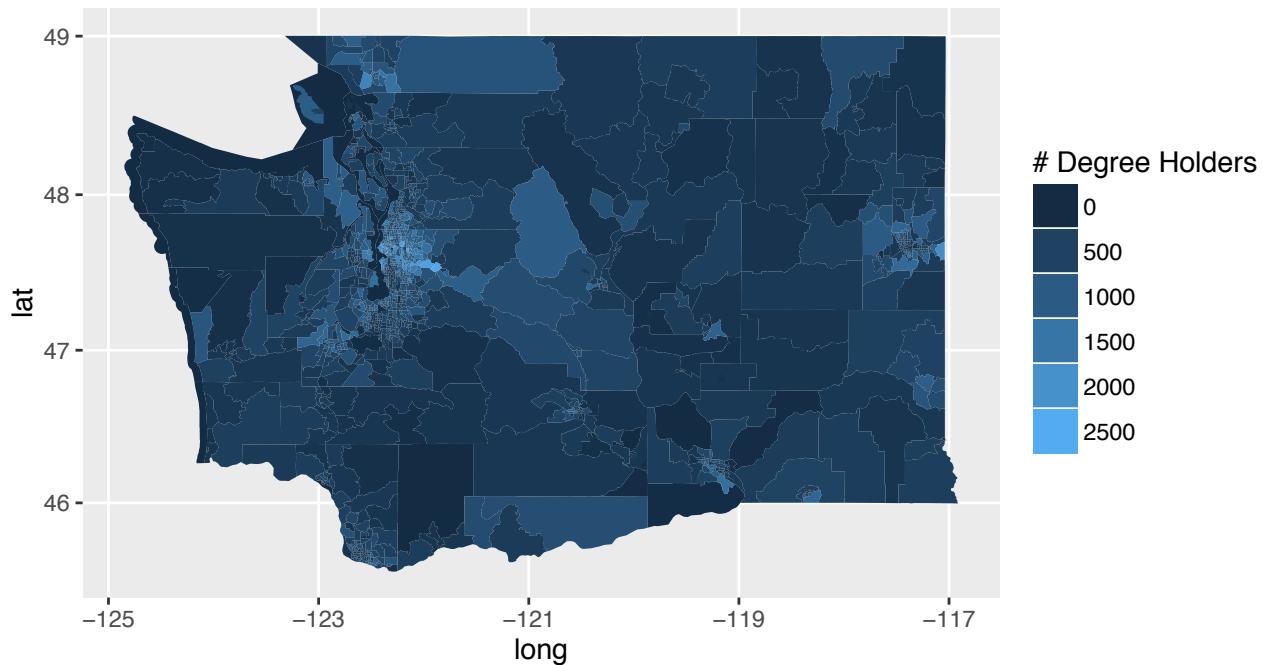
Tract Level Data

```
## ACS
WA_Census_Spatial <- CensusAPI2010Spatial(acsvariables, state.fips = c("53"),
    level = "tract", key, summaryfile = "ACS")

WA_Census_Spatial@data$id <- rownames(WA_Census_Spatial@data)
WA_Census_Spatial.points = fortify(WA_Census_Spatial, region = "id")
WA_Census_Spatial.df = join(WA_Census_Spatial.points, WA_Census_Spatial@data,
    by = "id")

ggplot() + geom_polygon(data = WA_Census_Spatial.df, aes(x = long,
    y = lat, group = group, fill = B06009_005E), color = NA,
    size = 0.1) + coord_map() + ggttitle("Bachelor Degree Holders, 2014") +
    guides(fill = guide_legend(title = "# Degree Holders", title.position = "top"))
```

Bachelor Degree Holders, 2014



Smooth Plots

```
library(automap)
```

Note the following requires ‘rgdal’ for spatial projection.

```
WA_Census_Spatial <- spTransform(WA_Census_Spatial, CRS("+proj=utm +zone=10 +datum=WGS84"))
sp <- SpatialPointsDataFrame(coordinates(WA_Census_Spatial),
  data = data.frame(den = WA_Census_Spatial$P0010001/areaPoly(WA_Census_Spatial),
  cdh = WA_Census_Spatial$B06009_005E), proj4string = CRS(proj4string(WA_Census_Spatial)))
atk <- autoKrige(cdh ~ 1, sp)

## [using ordinary kriging]

interp_data = as.data.frame(atk$krige_output)

##### Map
data(states)
WA <- states[states$acronym == "WA", ]
WA <- spTransform(WA, CRS("+proj=utm +zone=10 +datum=WGS84"))
map_base_data <- fortify(WA_Census_Spatial)
map_base_data_WA <- fortify(WA)
map_base_aesthetics <- aes(x = long, y = lat, group = group)
map_base <- geom_polygon(data = map_base_data, map_base_aesthetics)
borders <- geom_polygon(data = map_base_data_WA, map_base_aesthetics,
  color = "black", alpha = 0.8, size = 0.5, fill = NA)
LabelData <- data.frame(coordinates(WA_Census_Spatial), NAME = WA_Census_Spatial$fips,
```

```
stringsAsFactors = FALSE)

nbin = 40
data_temp <- interp_data
ggplot(data = interp_data, aes(x = x1, y = x2)) + geom_tile(aes(fill = var1.pred),
  color = NA) + stat_contour(aes(z = var1.pred), size = 0.3,
  alpha = 0.6, bins = nbin, color = "#999999") + scale_fill_gradient2(low = "blue",
  mid = "white", high = "red", midpoint = mean(data_temp$var1.pred)) +
  borders + # geom_point(data=longlat, aes(x=long,
# y=lat), alpha=.7, size=.3, color='black') + geom_text(aes(label
# = NAME, x = X1, y = X2), size=2, data=LabelData) +
theme(legend.title = element_blank(), title = element_blank(),
  axis.title.y = element_blank(), axis.title.x = element_blank())
```

