Uzbekistan Health Reforms: Within Kazakhstan Analysis
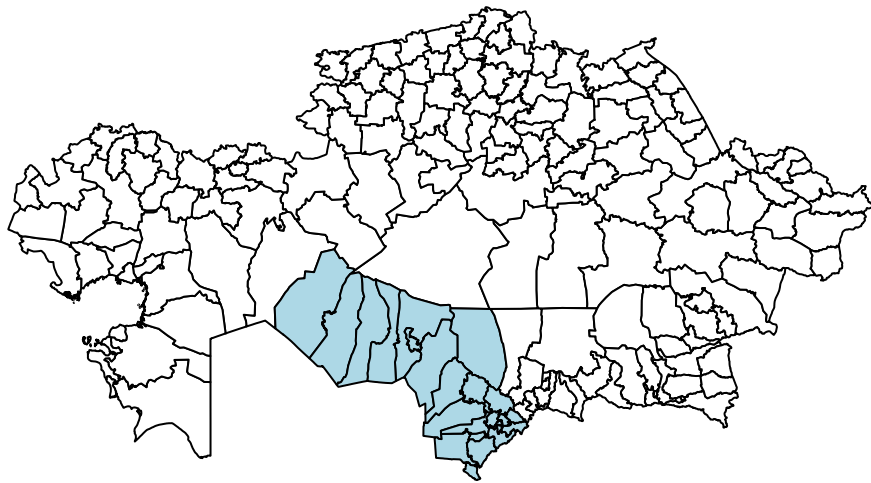
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OUR REGIONS OF INTEREST: BORDER WITH UZBEKISTAN

```r
map_kz@data  <- map_kz@data %>%
  mutate(color = if_else(NAME_1 %in% c("South Kazakhstan","Qyzylorda"), "lightblue", "white"))
plot(map_kz, col = map_kz@data$color, main = "Border regions with Uzbekistan")
```

Border regions with Uzbekistan


```r
zoomed_map <- map_kz[map_kz$NAME_1 %in% c('Qyzylorda','South Kazakhstan'), ]

zoomed_map@data  <- zoomed_map@data %>%
  mutate(color = if_else(NAME_1 %in% "South Kazakhstan", "lightblue", "lightcoral"))

plot(zoomed_map, col = zoomed_map@data$color, main = "Kyzylorda and Turkistan")
```

Kyzylorda and Turkistan
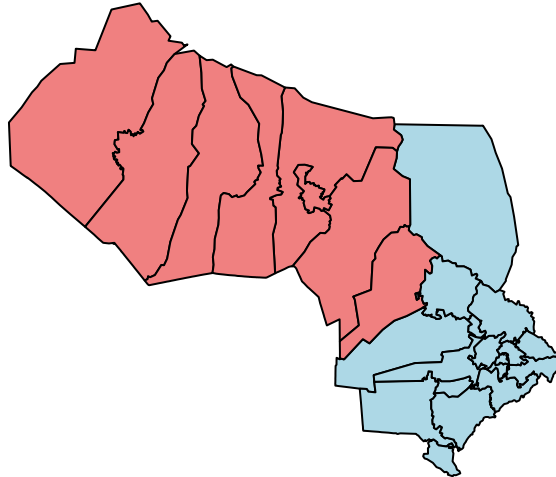

```
zoomed_map@data$NAME_2
```

```
##  [1] "Aralʻskiy"       "Karmakchinskiy"   "Kazalinskiy"      "Qyzylorda"
##  [5] "Shieliyskiy"     "Terenozekskiy"    "Zhalagashskiy"    "Zhanakorganskiy"
##  [9] "Arysskiy"        "Baydibekskiy"     "Chardarinskiy"    "Kazygurtskiy"
## [13] "Maktaaralʻskiy"  "Ordabasynskiy"    "Otrarskiy"        "Saryagashskiy"
## [17] "Sayramskiy"      "Shymkent"         "Suzakskiy"        "Tolebiyskiy"
## [21] "Turkestan"       "Tyulʻkubaskiy"
```

```r
zoomed_map@data$NAME_2 <- c("Aral", "Karmakshy", "Kazaly", "Kyzylorda city", "Shieli",  "Syrdariya", "Zl

# map automatically excludes Kentau city, which is not represented in the map data

comparisons <- turk_data %>%
  merge(kyz_data, by = c("Region", "year", "births_count", "doctors_per_capita", "IMR_all", "LOS", "pc_l
```

```r
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F.
  mutate(doctors_per_capita == as.numeric(doctors_per_capita) %>%
  select(doctors_per_capita)

zoomed_map@data$doctors_per_capita <- as.numeric(unlist(test))
```
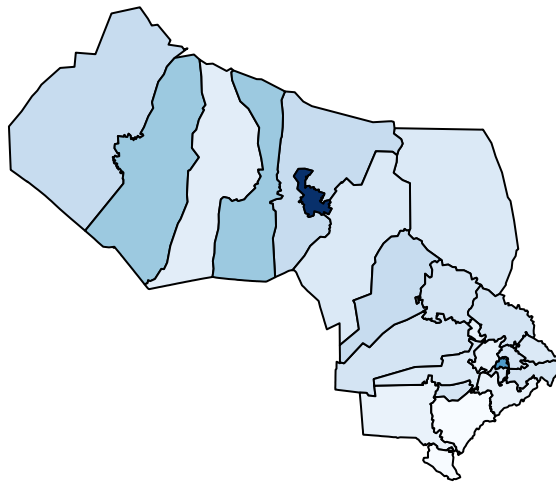
```
library(RColorBrewer)
my_colors <- brewer.pal(9, "Blues")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$doctors_per_capita, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Doctors per Capita, 2017")
```

Doctors per Capita, 2017


```
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F
  mutate(urban_percent == as.numeric(urban_percent)) %>%
  select(urban_percent)

zoomed_map@data$urban_percent <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Oranges")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$urban_percent, 30)
my_colors <- my_colors[as.numeric(class_of_country)]
```
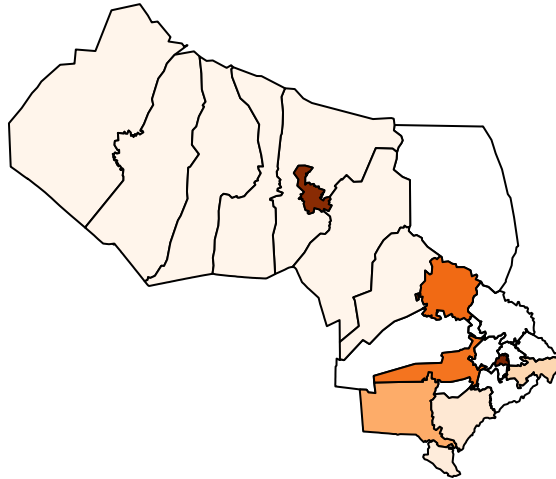
```
plot(zoomed_map , col=my_colors, main = "Urban Percentage of Population, 2017")
```

Urban Percentage of Population, 2017


```
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F.
  mutate(IMR_all == as.numeric(IMR_all)) %>%
  select(IMR_all)

zoomed_map@data$IMR_all <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Oranges")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$IMR_all, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Infant Mortality Rate, 2017")
```
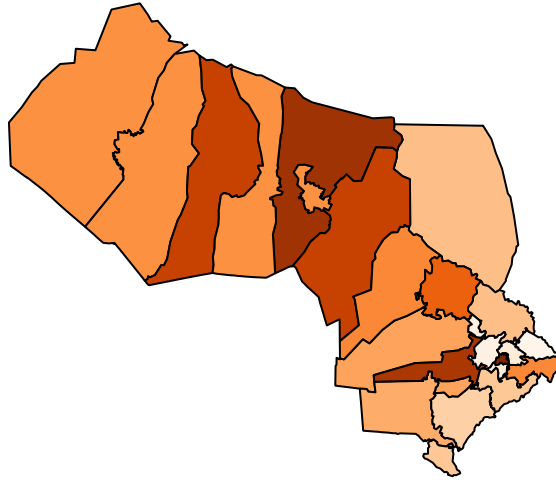
Infant Mortality Rate, 2017


```r
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F
  mutate(pc_TB == as.numeric(pc_TB)) %>%
  select(pc_TB)

zoomed_map@data$pc_TB <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Greens")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$pc_TB, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Tuberculosis, 2017")
```
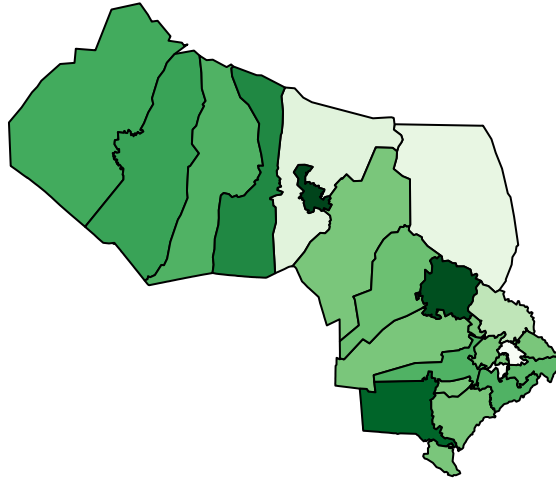
Tuberculosis, 2017


```r
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F.
  mutate(pc_cancer == as.numeric(pc_cancer)) %>%
  select(pc_cancer)

zoomed_map@data$pc_cancer <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Purples")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$pc_cancer, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Cancer Prevalence, 2017")
```
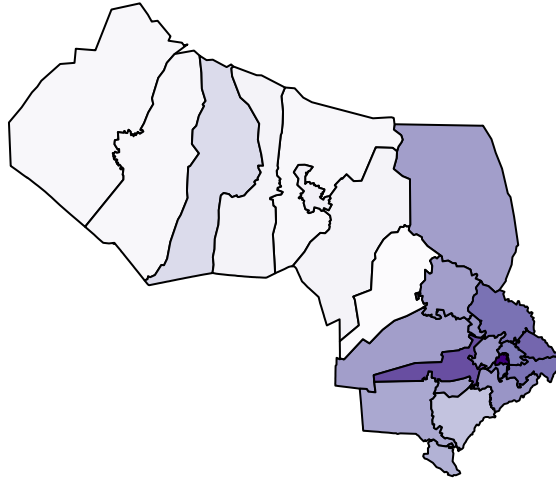
Cancer Prevalence, 2017


```
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F
  mutate(pc_hosp == as.numeric(pc_hosp)) %>%
  select(pc_hosp)

zoomed_map@data$pc_hosp <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Purples")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$pc_hosp, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Hospitals per capita, 2017")
```
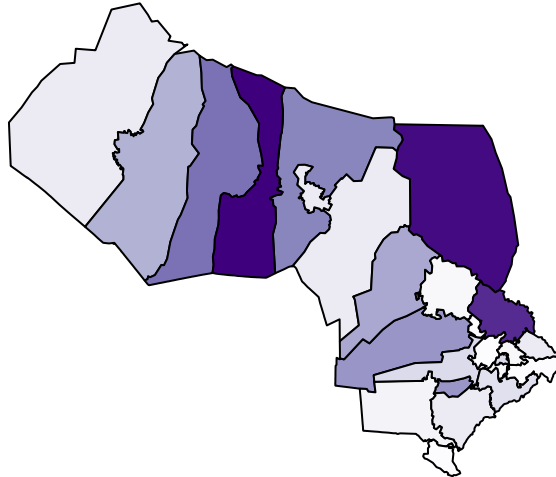
Hospitals per capita, 2017


```
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F
  mutate(pc_beds == as.numeric(pc_beds)) %>%
  select(pc_beds)

zoomed_map@data$pc_beds <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Reds")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$pc_beds, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Hospital beds per capita, 2017")
```
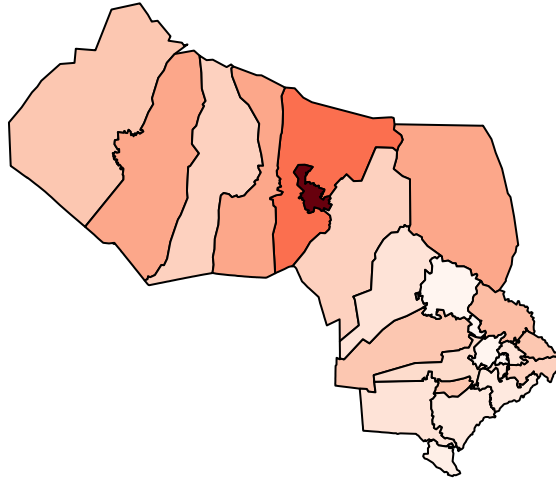
Hospital beds per capita, 2017

```r
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F
  mutate(LOS == as.numeric(LOS)) %>%
  select(LOS)

zoomed_map@data$LOS <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Blues")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$LOS, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Average Length of Hospital Stay, 2017")
```
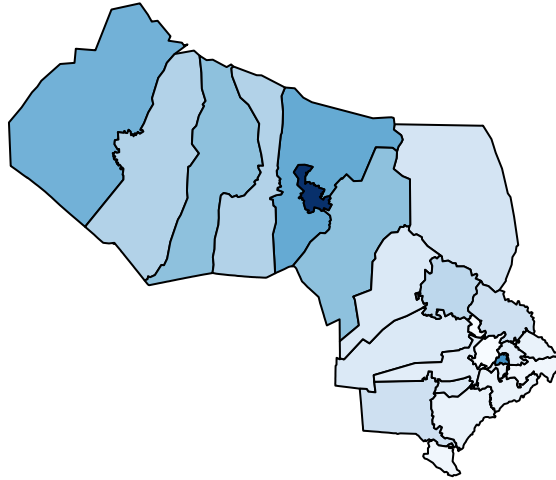
Average Length of Hospital Stay, 2017


```
test <- data.frame(zoomed_map@data$NAME_2)
test <- test %>%
  mutate(Region = zoomed_map.data.NAME_2) %>%
  merge(filter(comparisons, year == 2017, Region != "Kentau city"), by = "Region", all = TRUE, sort = F
  mutate(pop == as.numeric(pop)) %>%
  select(pop)

zoomed_map@data$pop <- as.numeric(unlist(test))

library(RColorBrewer)
my_colors <- brewer.pal(9, "Greens")
my_colors <- colorRampPalette(my_colors)(30)

class_of_country <- cut(test$pop, 30)
my_colors <- my_colors[as.numeric(class_of_country)]

plot(zoomed_map , col=my_colors, main = "Population, 2017")
```

Population, 2017