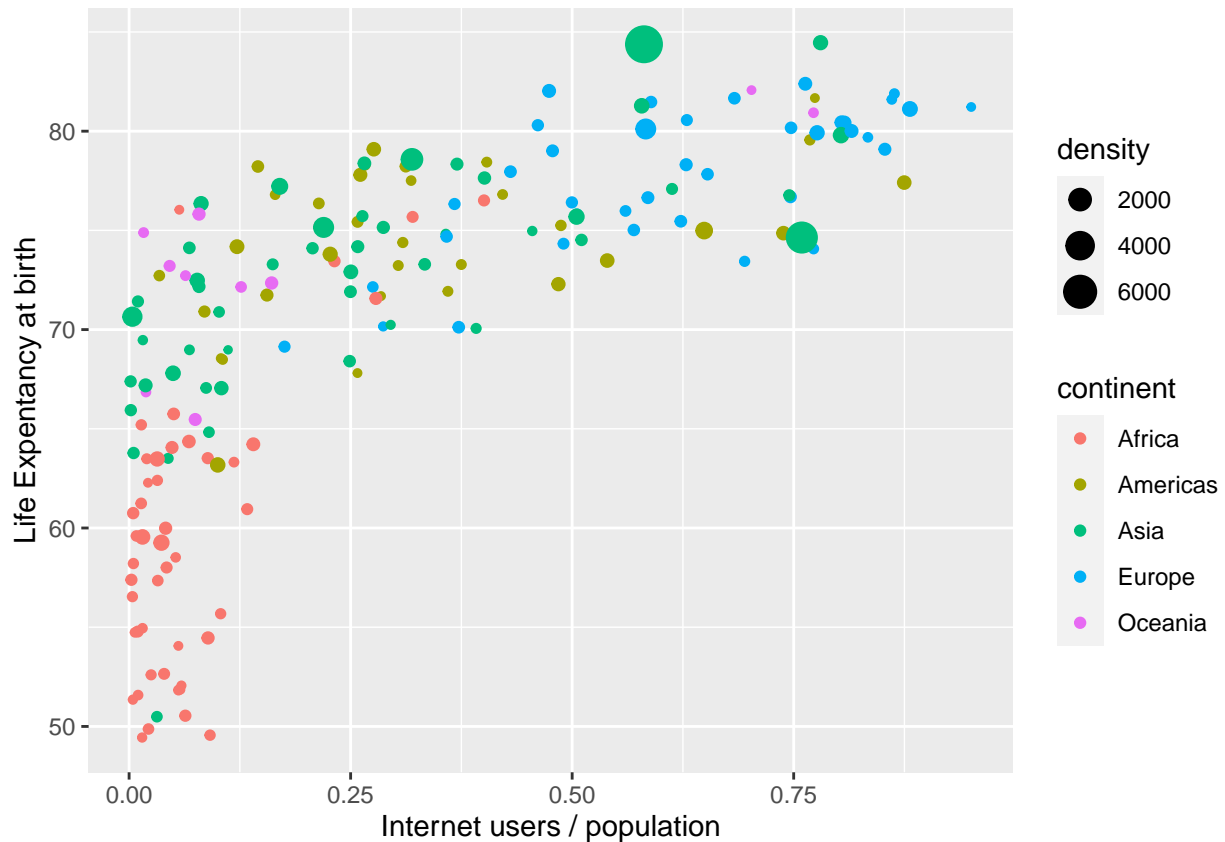# Statistics Project – Math 141

Dashiel Ward, Gavin Rimmer, Bailee Brunsmann, Harrison Nicholls

CIA Factbook

Question:

In a given nation, does the proportion of the population using the internet correlate to life expectancy at birth?

Dataset: What is it?

- Details on countries

Where does it come from?

- CIA Factbook

What is the description of each variable?

- See below

Variables:

Country - Categorical - Nominal Countries recognized by the CIA.

Area - Numerical - Continuous Land in Square km

Infant Mortality Rate - Numerical - Continuous   Infant mortality rate compares the number of deaths of infants under one year old in a given year per 1,000 live births in the same year. This rate is often used as an indicator of the level of health in a country.

Population - Numerical - Discrete   Population compares estimates from the US Bureau of the Census based on statistics from population censuses, vital statistics registration systems, or sample surveys pertaining to the recent past and on assumptions about future trends.

Population growth rate - Numerical - Continuous   Population growth rate compares the average annual percent change in populations, resulting from a surplus (or deficit) of births over deaths and the balance of migrants entering and leaving a country. The rate may be positive or negative.

Birth Rate - Numerical - Continuous   Birth rate compares the average annual number of births during a year per 1,000 persons in the population at midyear; also known as crude birth rate.

Death rate - Numerical - Continuous   Death rate compares the average annual number of deaths during a year per 1,000 population at midyear; also known as crude death rate.

Net migration rate - Numerical - Continuous   Net Migration rate compares the difference between the number of persons entering and leaving a country during the year per 1,000 persons (based on midyear population).

Maternal mortality rate – Numerical - Continuous   The Maternal mortality rate (MMR) is the annual number of female deaths per 100,000 live births from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes).

Life expectancy at birth – Numerical - Discrete   Life expectancy at birth compares the average number of years to be lived by a group of people born in the same year, if mortality at each age remains constant in the future. Life expectancy at birth is also a measure of overall quality of life in a country and summarizes the mortality at all ages.

Internet users – Numerical - Discrete   Internet users compares the number of users within a country that access the Internet. Statistics vary from country to country and may include users who access the Internet at least several times a week to those who access it only once within a period of several months.

Further Research:

Lee, Cheng-Wen, The Relationship between Internet Environment and Life Expectancy in Asia

Article explores this question specifically in Asia, with relevant take-away in emphasising the disparity between countries with advanced telecommunication services and those without in regards to their general economic development in a globalized market.

Alzaid, Ahmed, Musleh Alsulami, Komal Komal, Adel-Maraghi, Examining the Relationship between the Internet and Life Expectancy

Article explores this question globally, finding that the economic development of a country is greatly bolstered by internet development, and has both direct and indirect impacts on the average life expectancy of its citizens.

Exploratory plots:

```
## Rows: 177
## Columns: 13
## $ country               <chr> "Russia", "Canada", "United States", "China", ~
## $ area                  <dbl> 17098242, 9984670, 9826675, 9596960, 8514877, ~
## $ birth_rate            <dbl> 11.87, 10.29, 13.42, 12.17, 14.72, 12.19, 19.8~
## $ death_rate            <dbl> 13.83, 8.31, 8.15, 7.44, 6.54, 7.07, 7.35, 7.3~
## $ infant_mortality_rate <dbl> 7.08, 4.71, 6.17, 14.79, 19.21, 4.43, 43.19, 9~
## $ internet_users        <dbl> 40853000, 26960000, 245000000, 389000000, 7598~
## $ life_exp_at_birth     <dbl> 70.16, 81.67, 79.56, 75.15, 73.28, 82.07, 67.8~
## $ maternal_mortality_rate <dbl> 34, 12, 21, 37, 56, 7, 200, 77, 51, 540, 24, 5~
## $ net_migration_rate    <dbl> 1.69, 5.66, 2.45, -0.32, -0.15, 5.74, -0.05, 0~
## $ population            <dbl> 142470272, 34834841, 318892103, 1355692576, 20~
## $ population_growth_rate <dbl> -0.03, 0.76, 0.77, 0.44, 0.80, 1.09, 1.25, 0.9~
## $ continent             <chr> "Europe", "Americas", "Americas", "Asia", "Ame~
## $ density               <dbl> 8.332451, 3.488832, 32.451679, 141.262710, 23.~
```
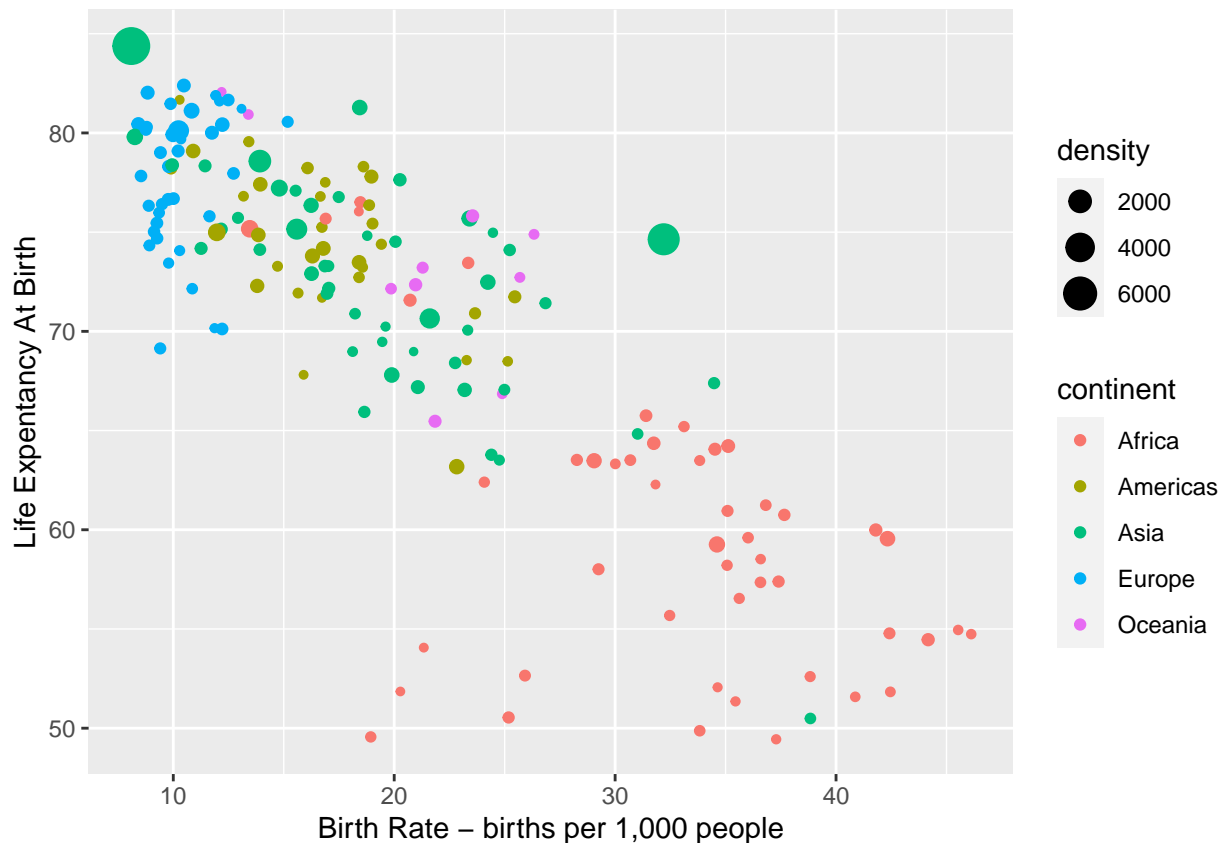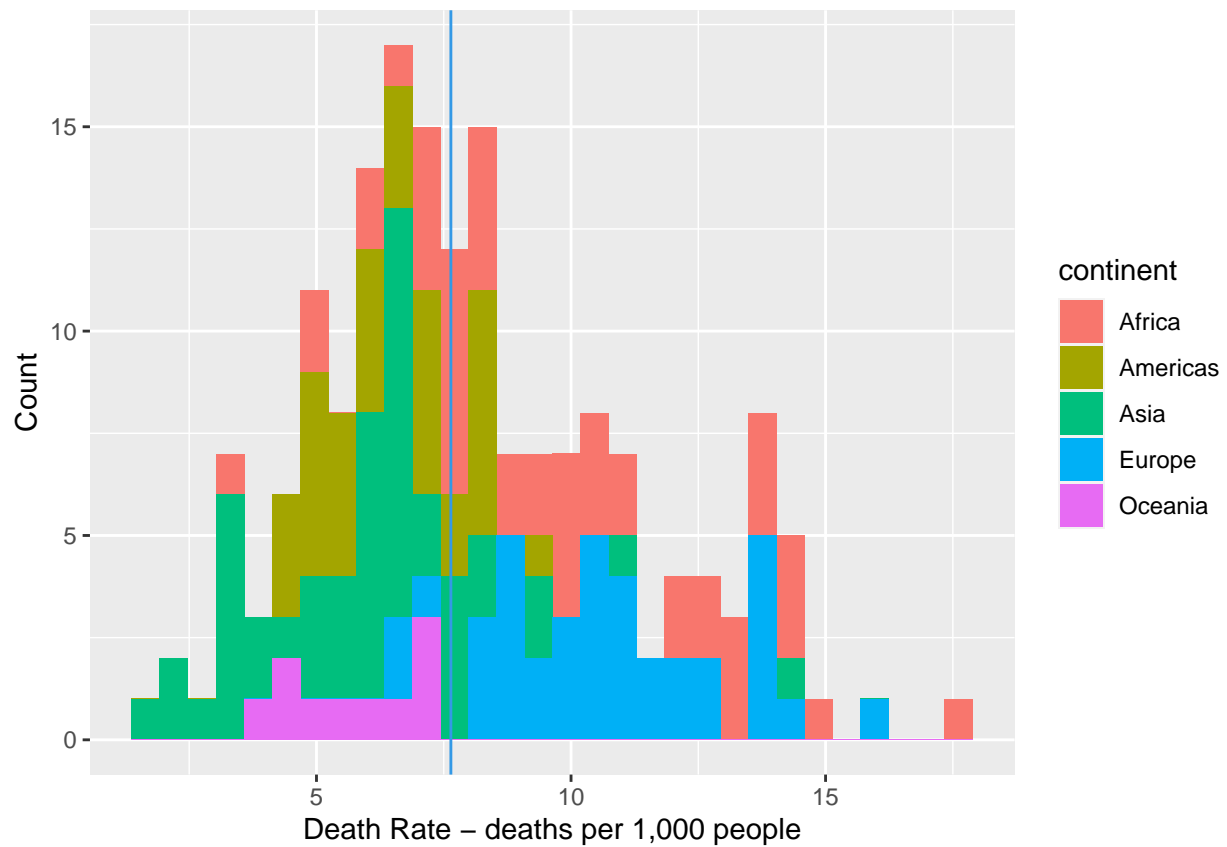
```
continentmembercounts <- cia %>%
  group_by(continent) %>%
  count()

groups <- cia %>%
  group_by(continent) %>%
  select(birth_rate) %>%
  summarize(
    birth_rate = mean(birth_rate)) %>%
  mutate(
    difference_from_mean = birth_rate - mean(cia$birth_rate)
      )
```

Adding missing grouping variables: `continent`

```
groups
```

```
## # A tibble: 5 x 3
##    continent birth_rate difference_from_mean
##    <chr>          <dbl>                <dbl>
## 1 Africa          32.2                 11.6
## 2 Americas        16.9                -3.66
## 3 Asia            19.4                -1.14
## 4 Europe          10.4                -10.2
## 5 Oceania         21.0                0.419
```