# Determinants of HIV

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# Outline

- Motivation
- Research Question
- Methodology
- Theoretical Framework
- Descriptive Statistics
- Findings
- Conclusion
- Limitations

# Motivation and Research Question

1. Understand why some countries failed to achieve MDG 6A

   - *MDG 6: Combat HIV/AIDS, malaria and other diseases*
   - *Target 6A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS*

2. Explore disease-specific determinants of health

**Research Question: Are community level factors significant determinants of HIV/AIDS incidence rates?**

# Methodology and Dataset

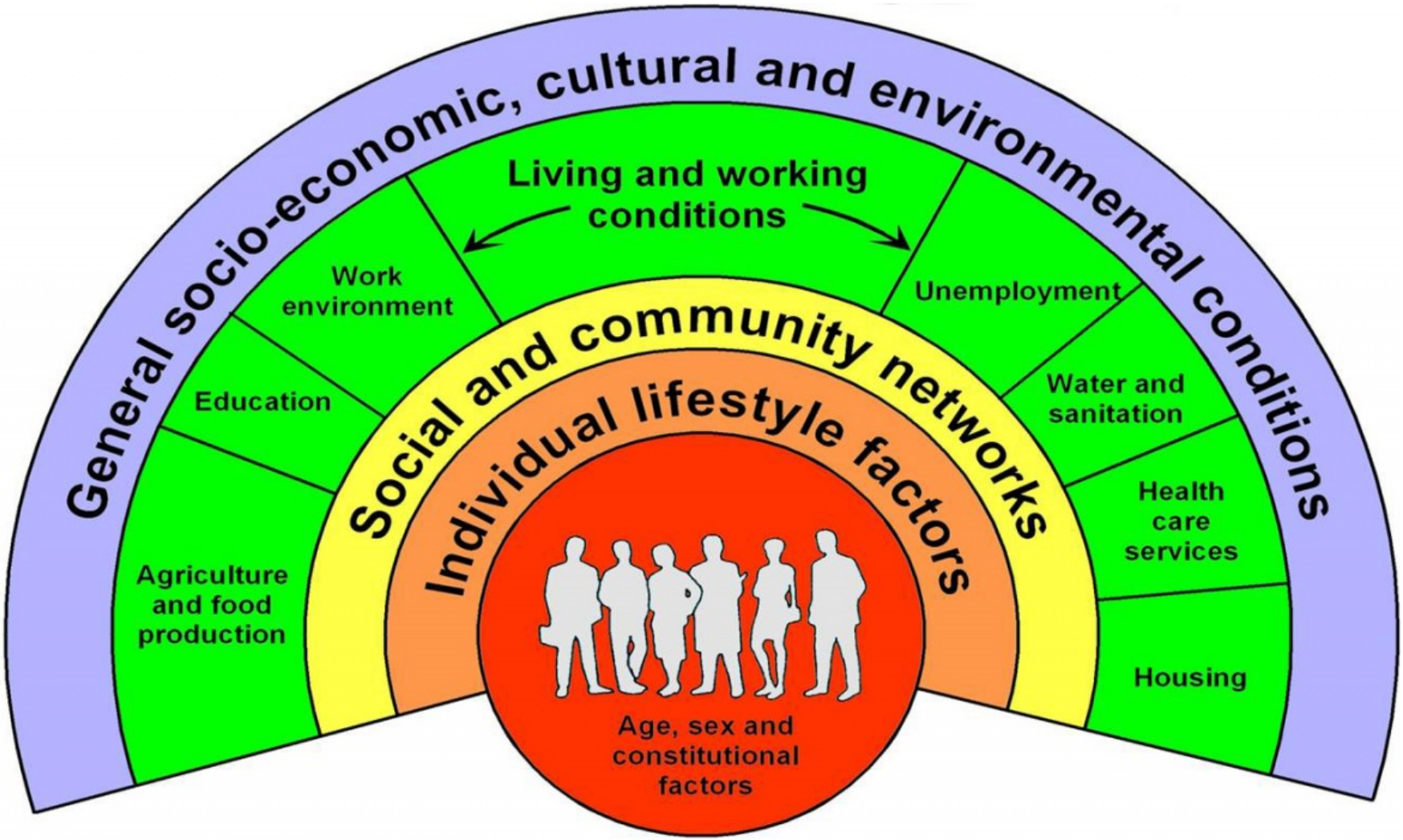
## Methodology

- We will. . .

## Datasets

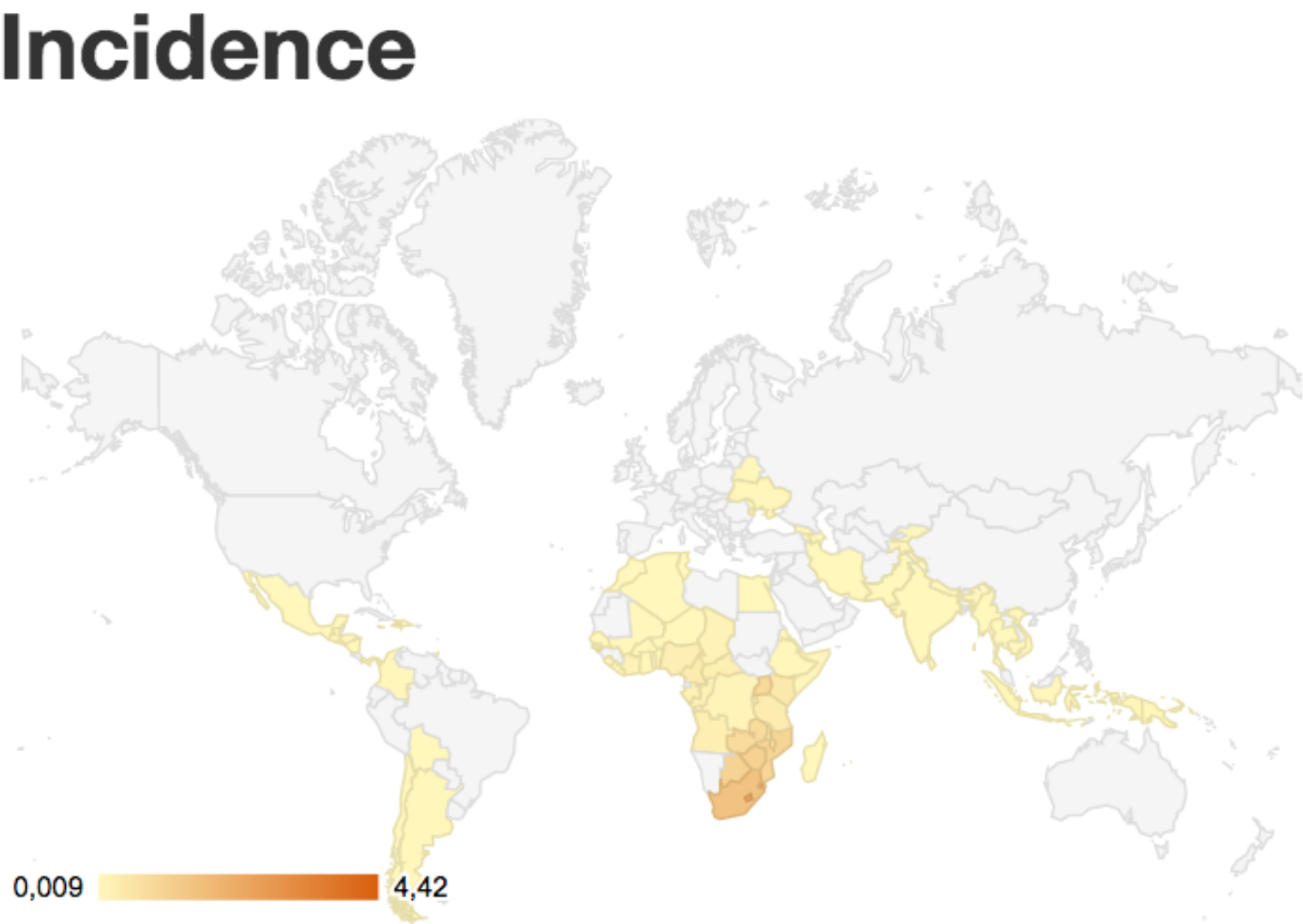
- We will use the World Development Indicators (WDI) for the independent variables and a dataset from UNAIDS for the HIV/AIDS prevalence rate.

# Theoretical Framework

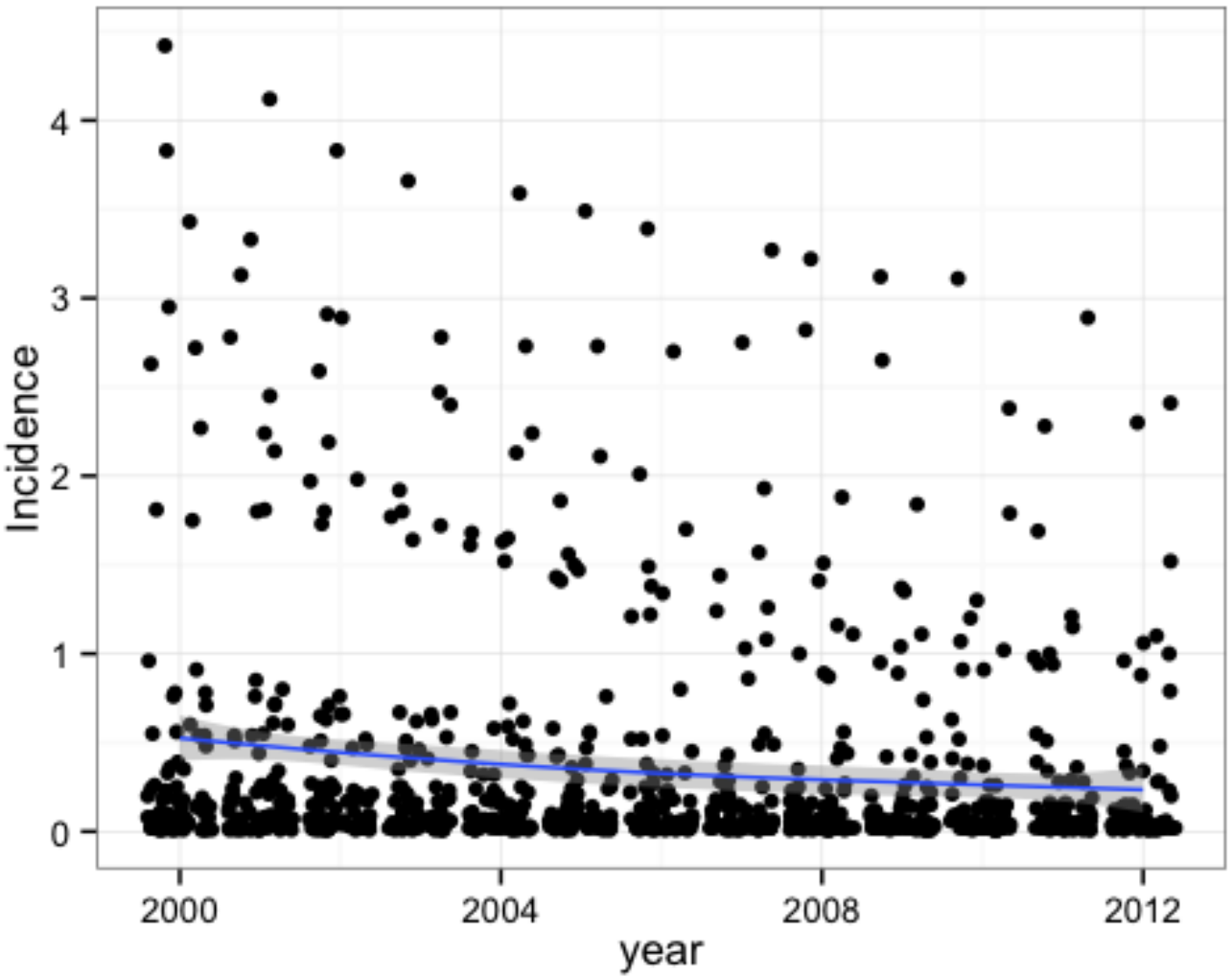



Source: Dahlgren and Whitehead, 1991

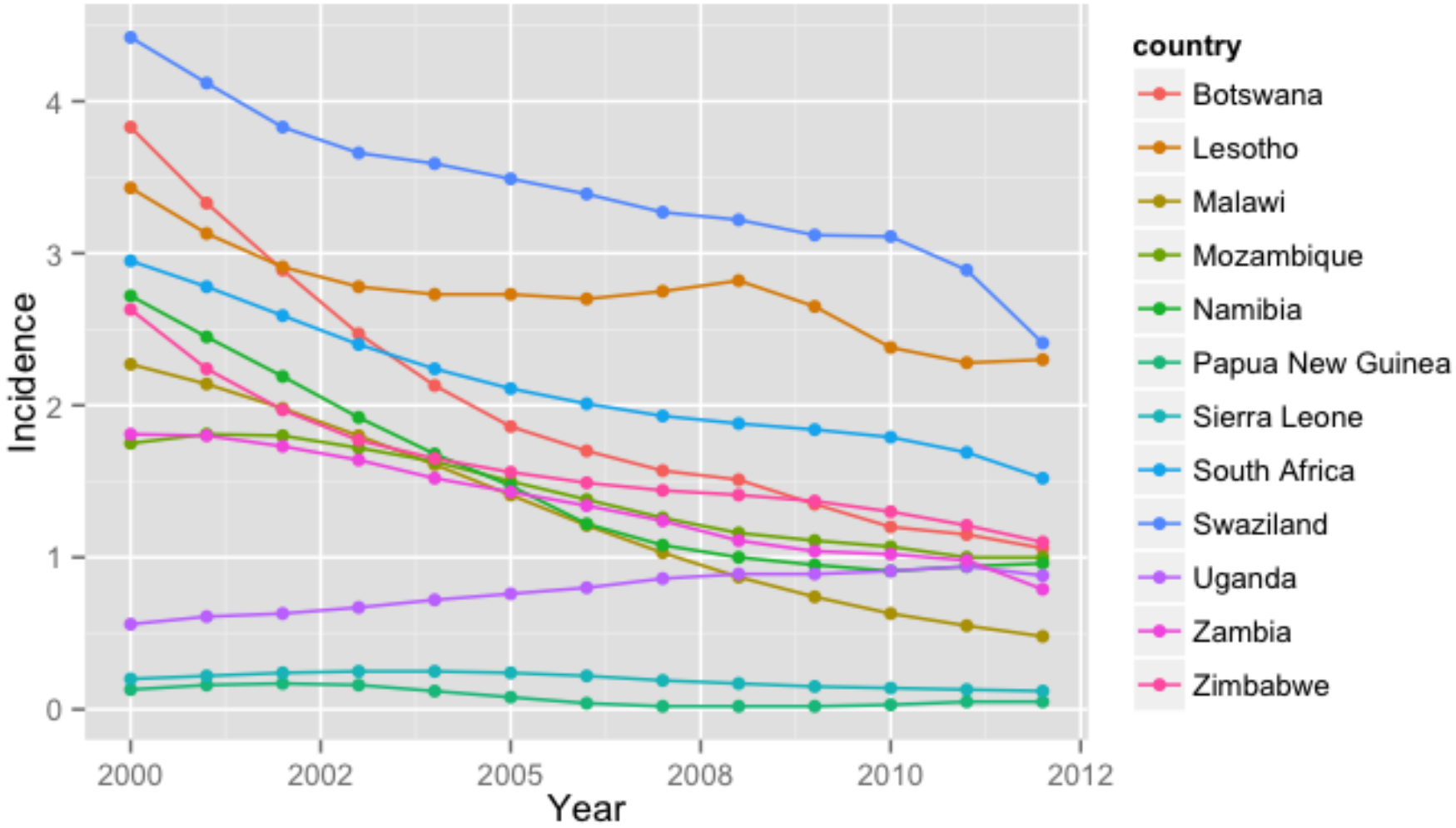
# Distribution of HIV Incidence Rate Worldwide



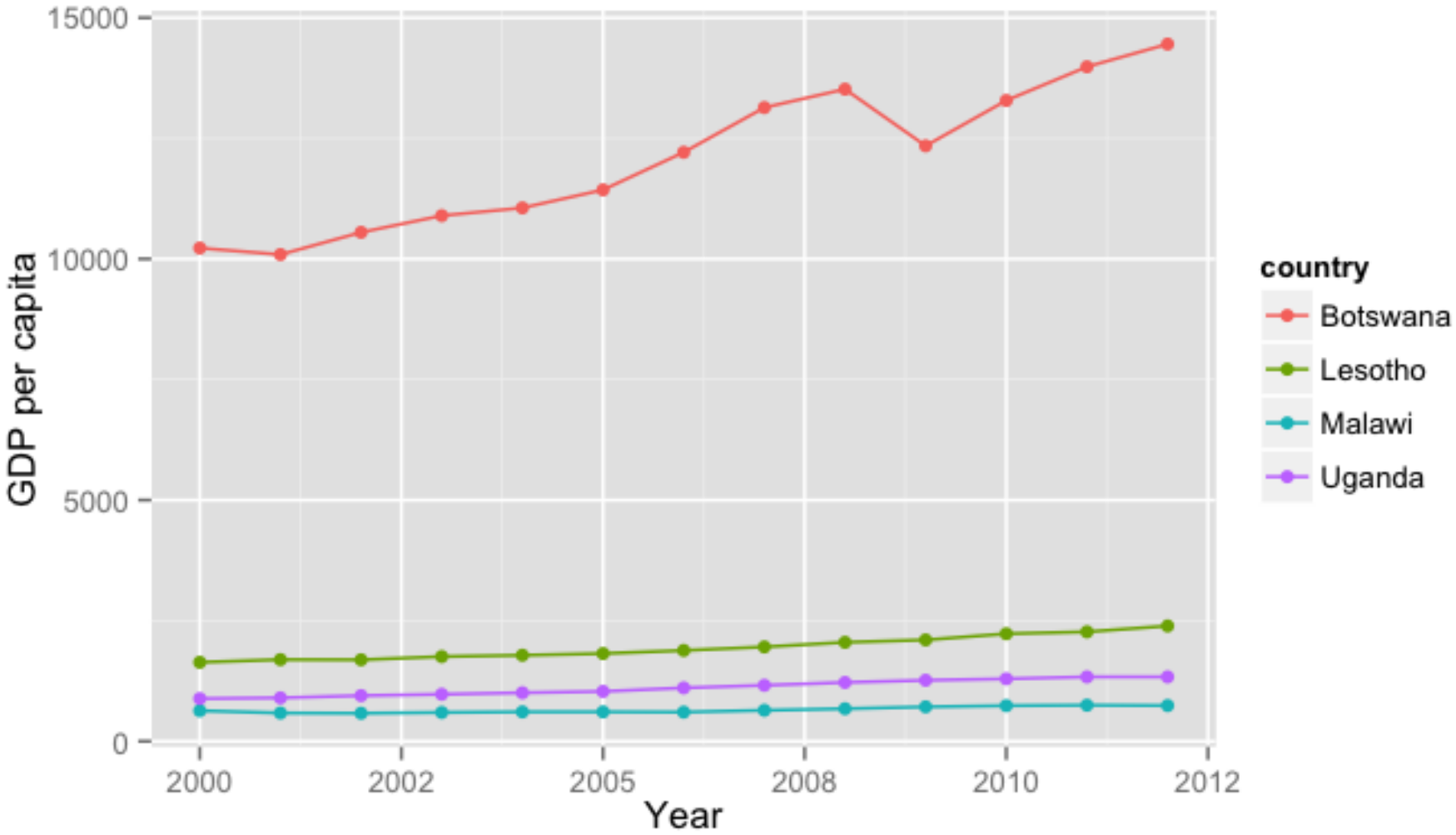
# HIV Incidence Rates over Time



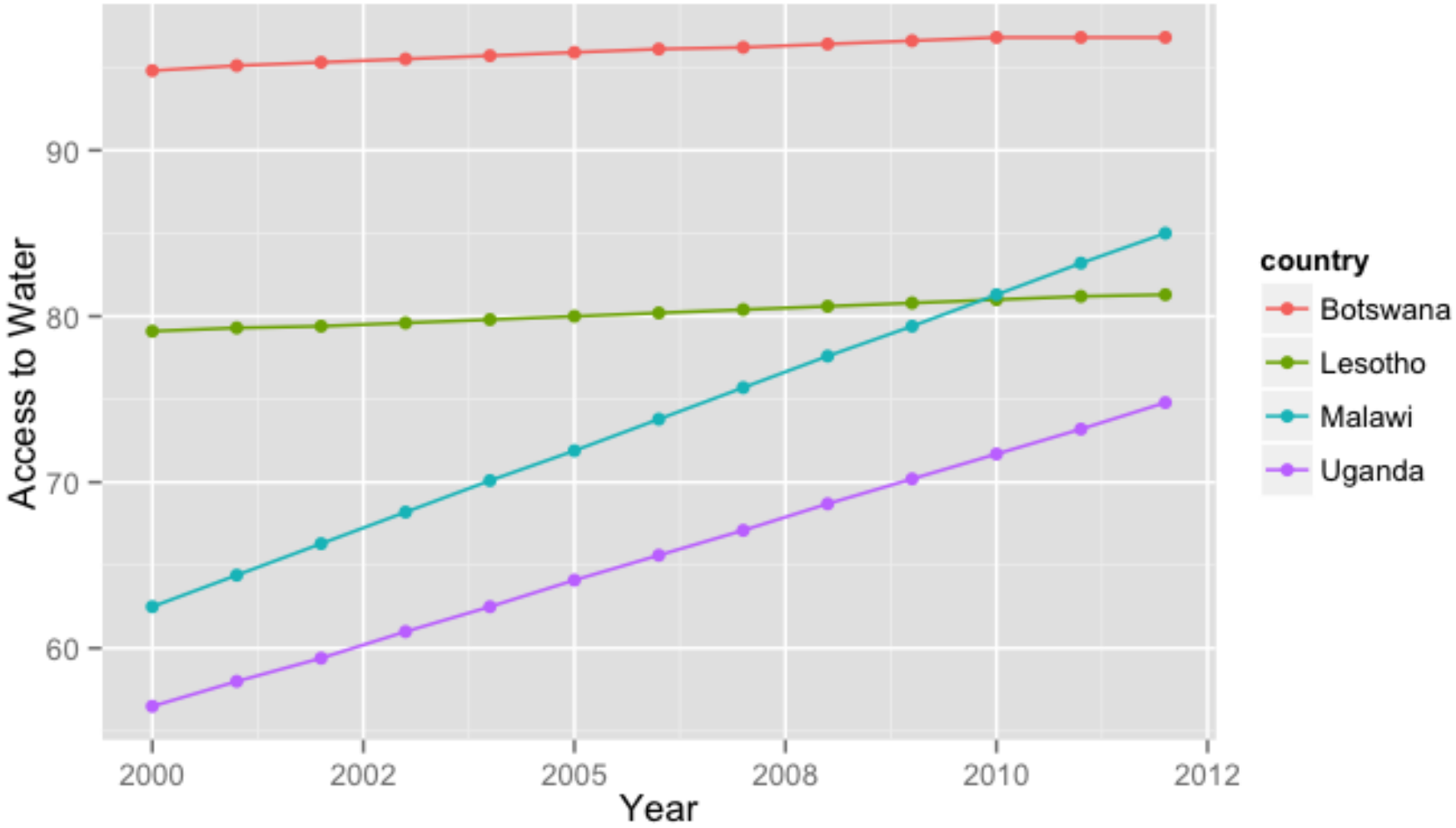
# Interesting Cases for HIV Incidence Rates



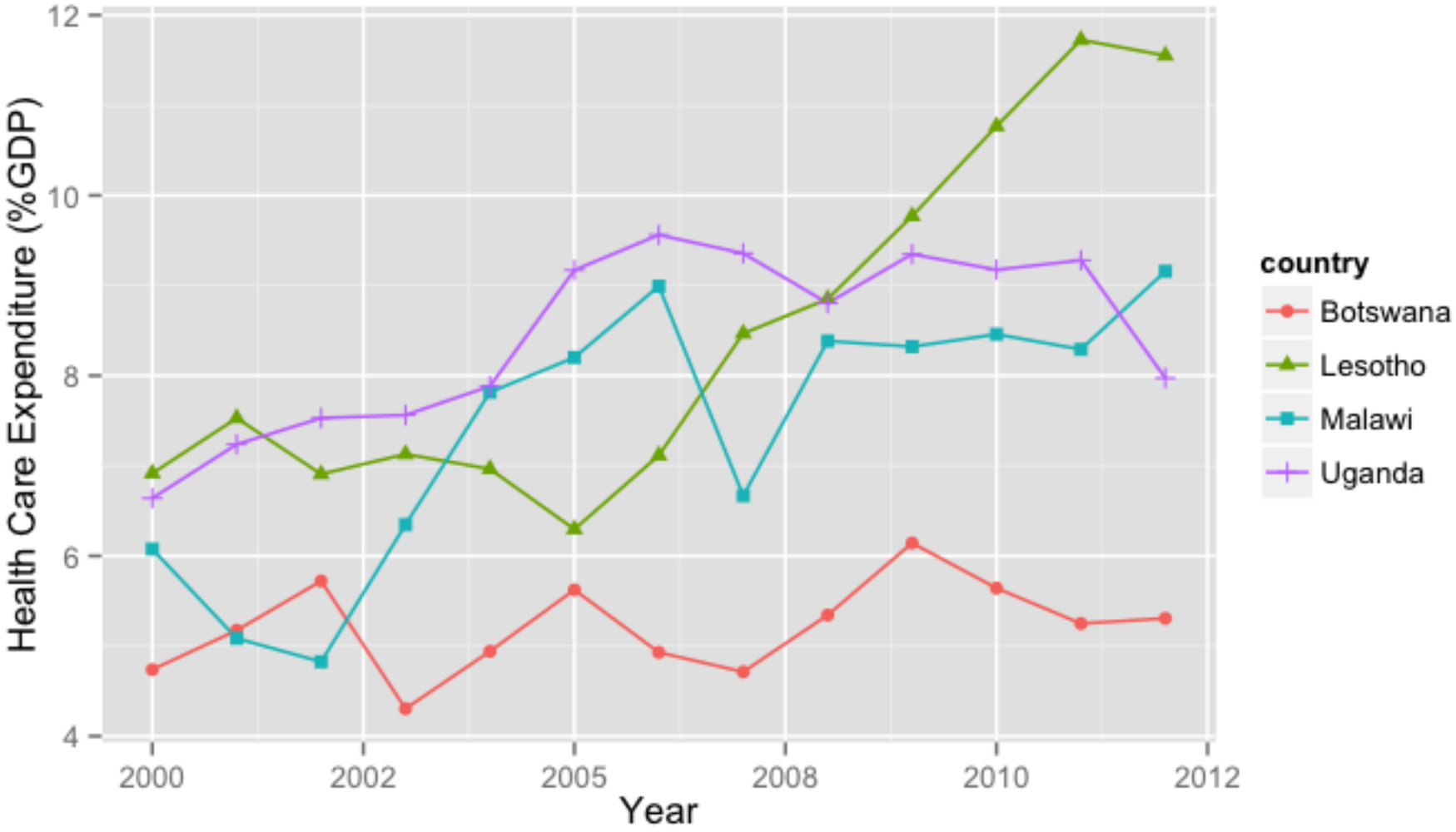
# GDP per capita in Selected Countries



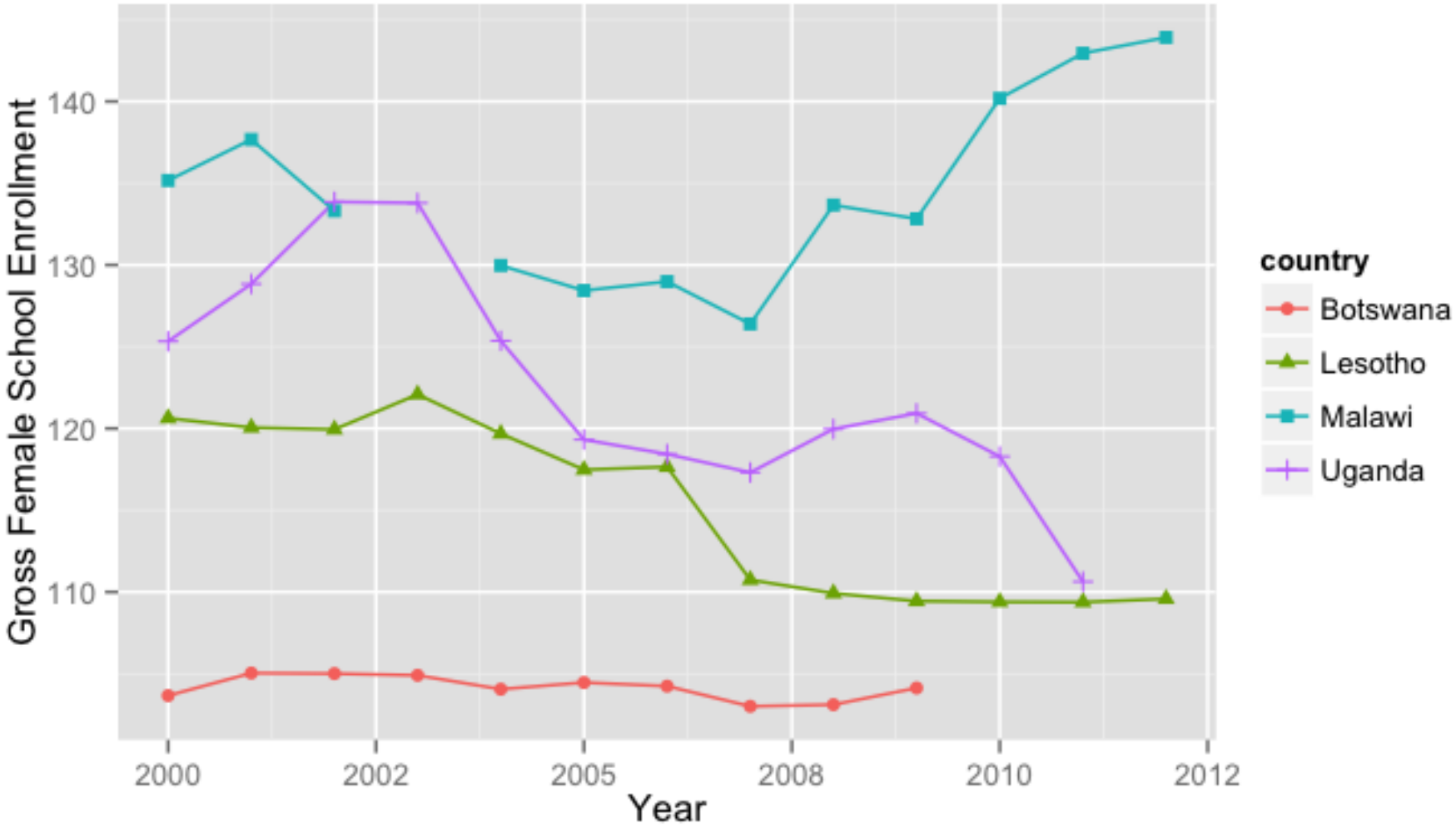
# Access to Water in Selected Countries



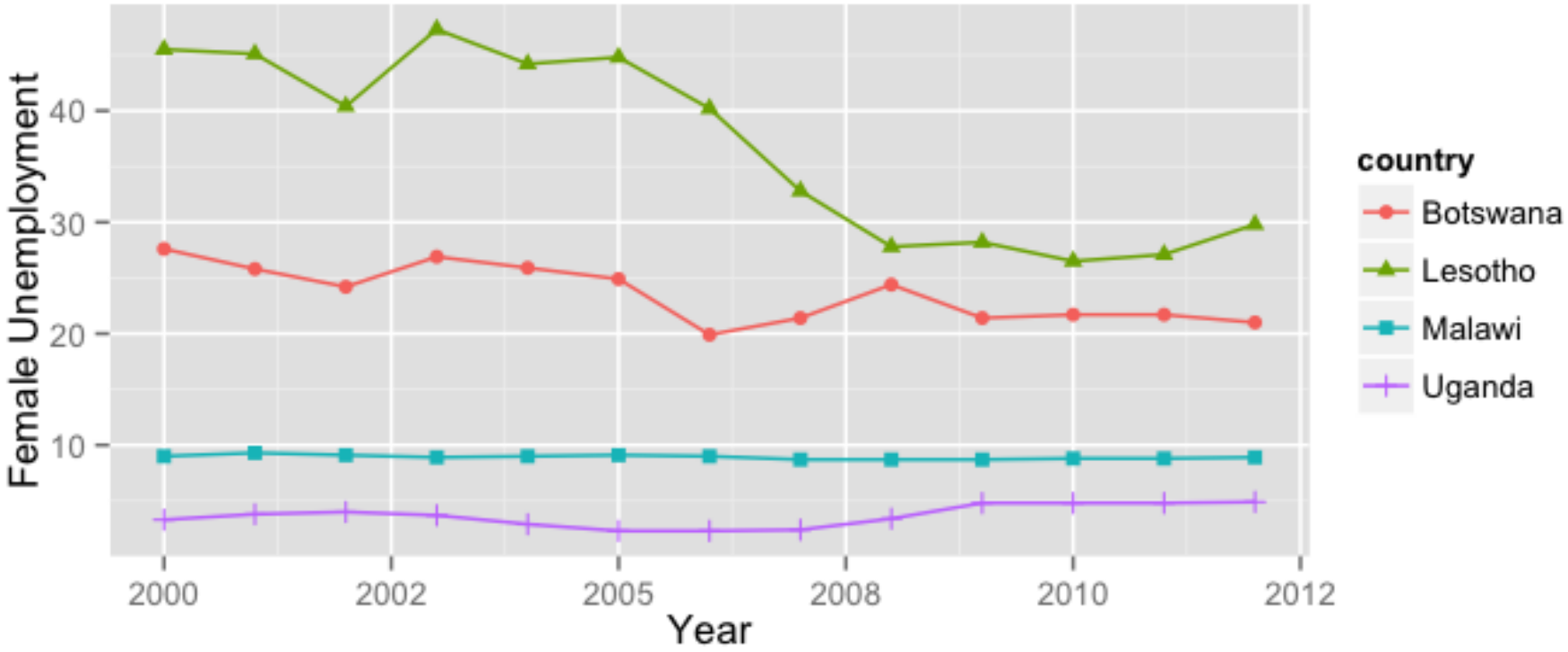
# Health Care Expenditure in Selected Countries



# Female School Enrollment in Selected Countries



# Female Unemployment in Selected Countries



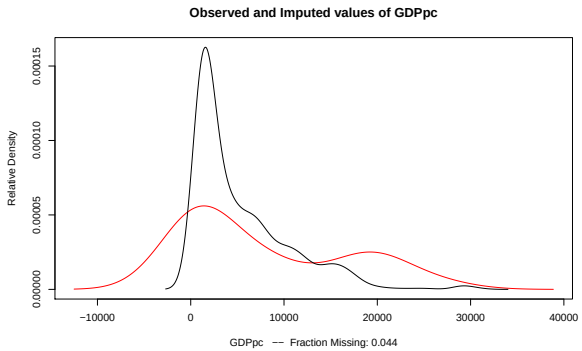
# The Model

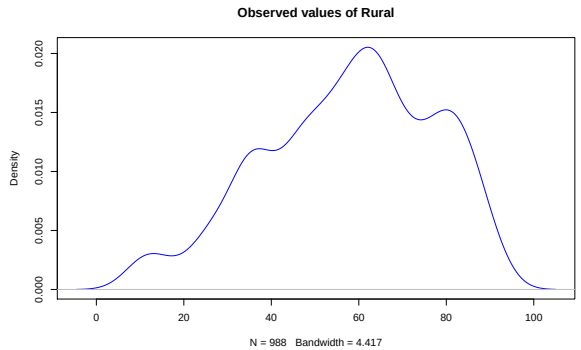
To answer our research question we will estimate the following equation:

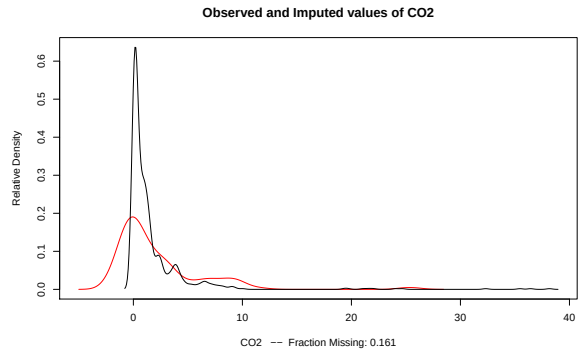
$$I_{it} = \beta_0 + \beta_1 SE_{it} + \beta_2 WLC_{it} + \beta_3 SCN_{it} + \beta_4 ILF_{it} + \epsilon_{it}$$

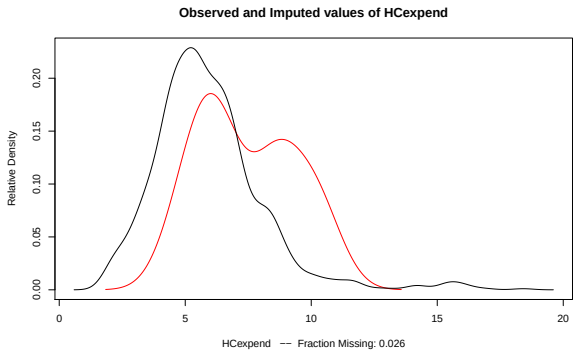
Where I stands for HIV/AIDS incidence, SE stands for socioeconomic factors, WLC stands for working and living conditions, SCN stands for social and community networks and ILF stands for individual lifestyle factors.

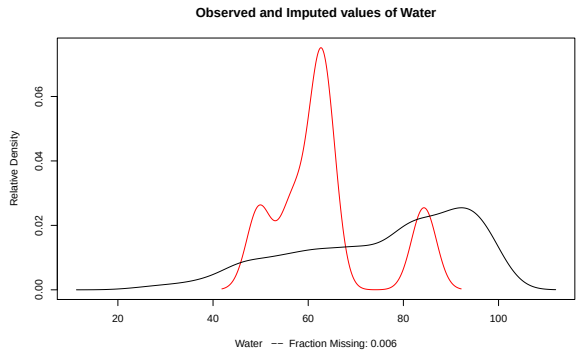
# Imputed Missing values

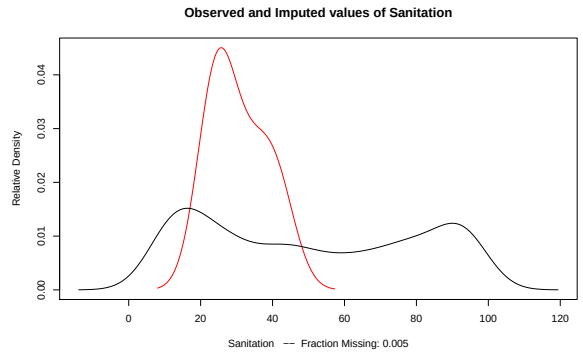


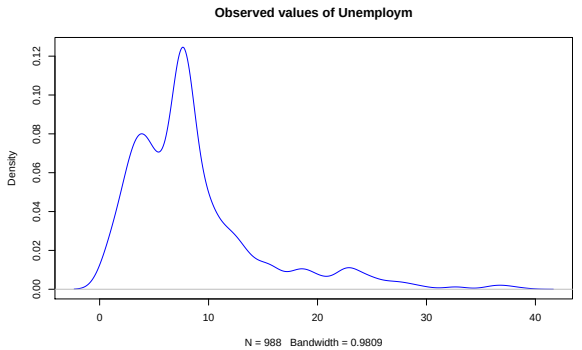



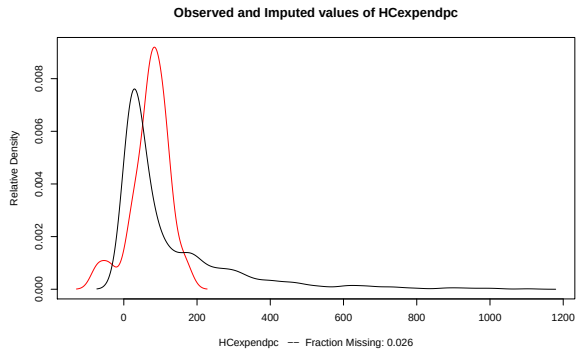



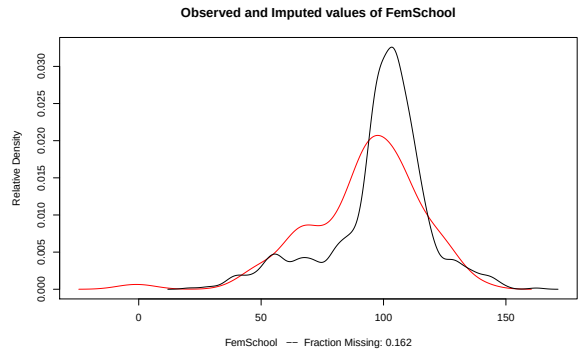



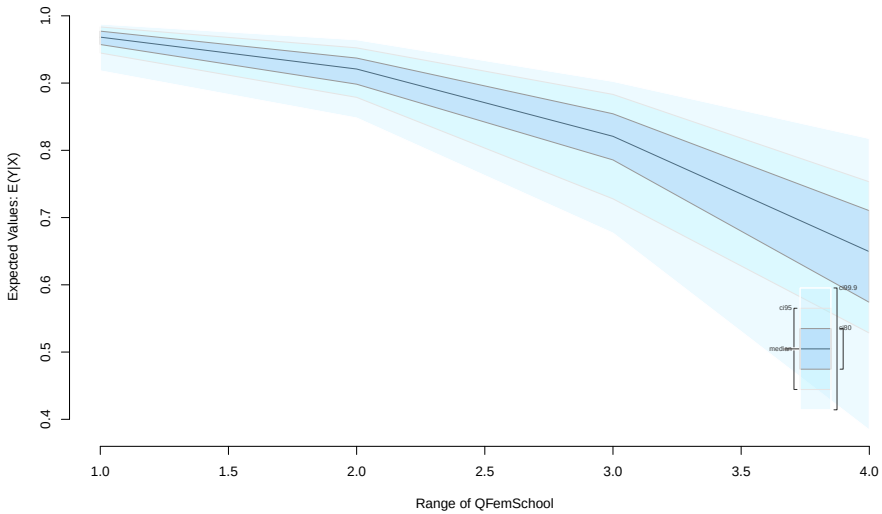



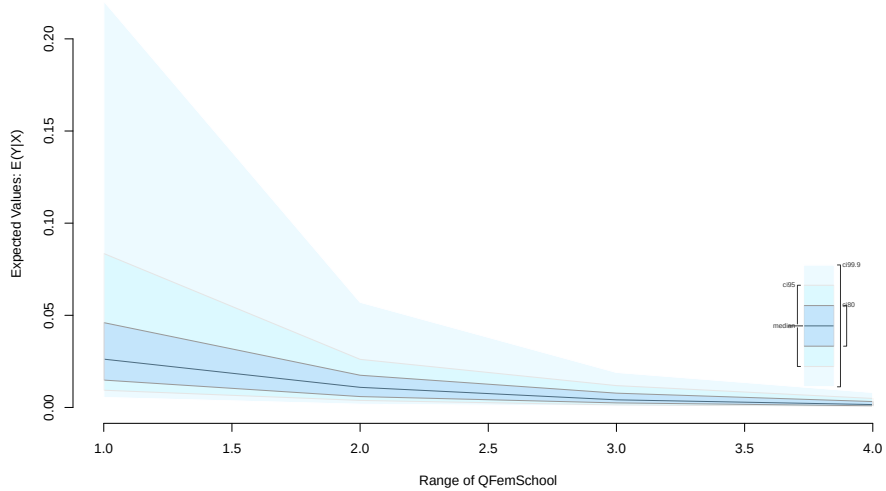



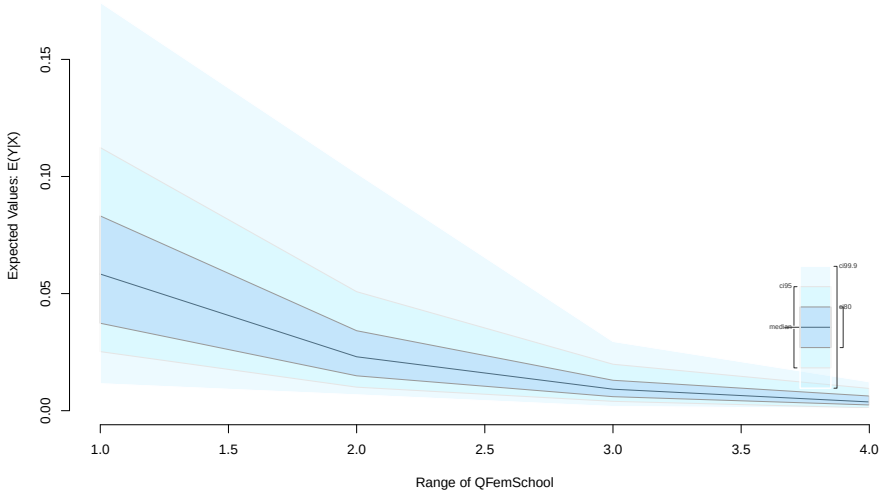
# Logistic Regression Results - Model 1

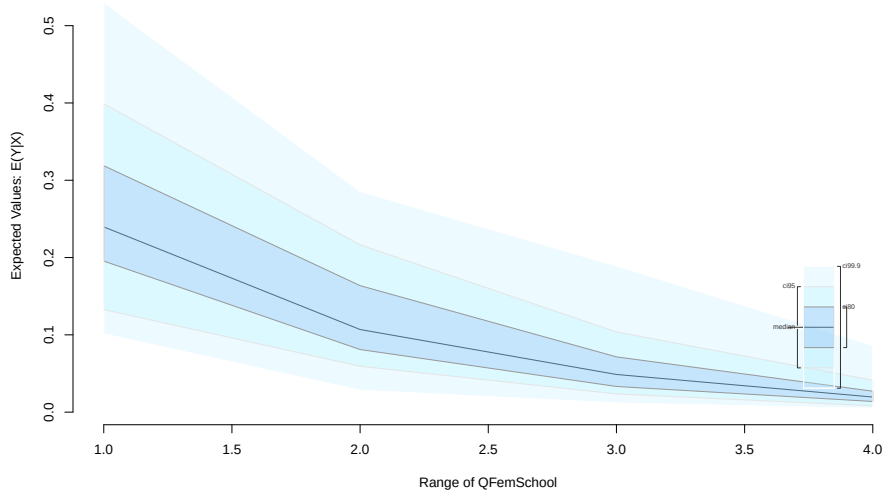
| | Value | Std. Error | t-stat | p-value |
|---|---|---|---|---|
| (Intercept) | -35.7052146 | 7.5638208 | -4.7205262 | 0.0000121 |
| lGDPpc | 0.2957439 | 0.3635105 | 0.8135773 | 0.4189035 |
| lRural | -2.5610253 | 0.5466307 | -4.6851107 | 0.0000033 |
| lCO2 | -0.5317398 | 0.2260079 | -2.3527483 | 0.0244095 |
| lHCexpend | 0.7629979 | 0.3867790 | 1.9726971 | 0.0489340 |
| lWater | -2.6040957 | 0.8478967 | -3.0712416 | 0.0021610 |
| lSanitation | 0.9441110 | 0.2773367 | 3.4042055 | 0.0006640 |
| lLifeExpect | 19.0060790 | 1.8232494 | 10.4242890 | 0.0000000 |
| lDPT | -0.6768010 | 1.0612375 | -0.6377470 | 0.5245870 |
| lMeasles | 1.6762264 | 1.1521579 | 1.4548583 | 0.1461228 |
| Inverse | 1.8257186 | 0.2575601 | 7.0885160 | 0.0000000 |
| lFemSchool | -5.7395264 | 0.8276530 | -6.9347016 | 0.0000001 |

# Predicted Probabilities - Female School Enrollment

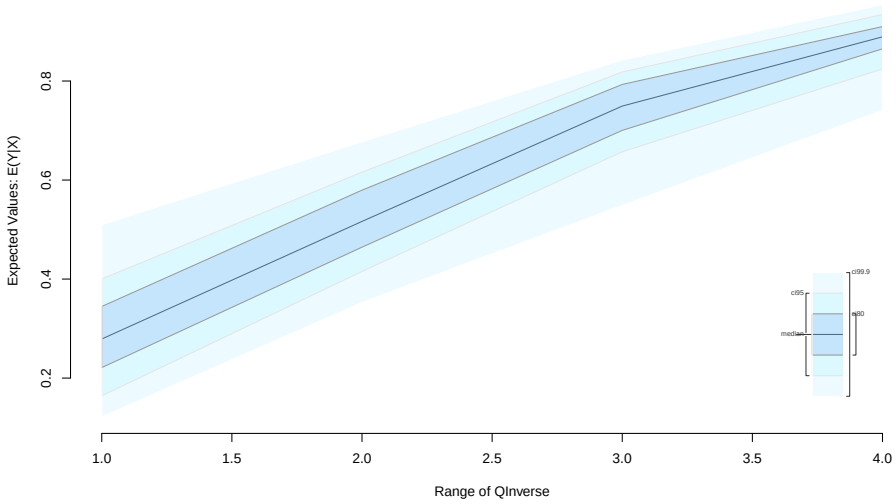


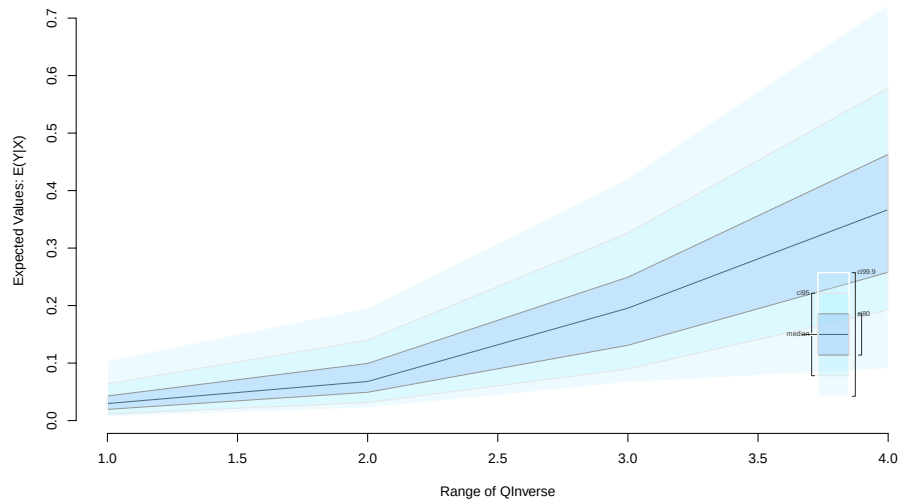



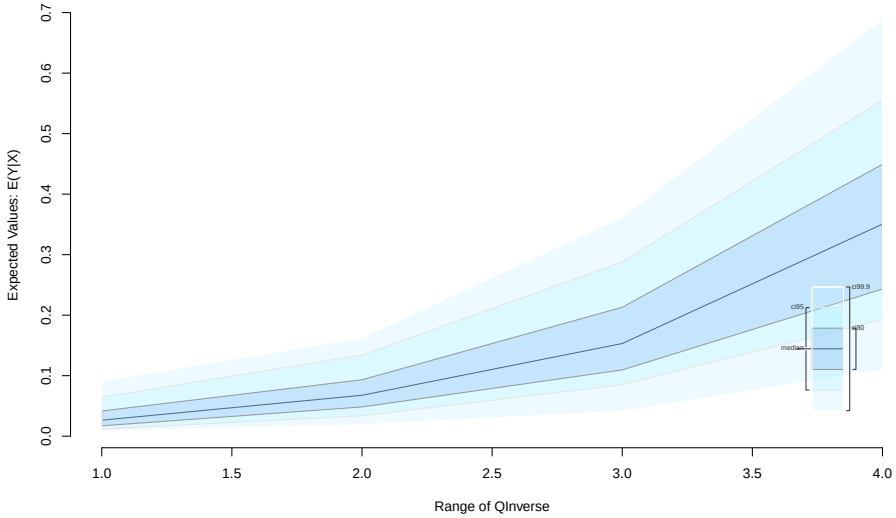



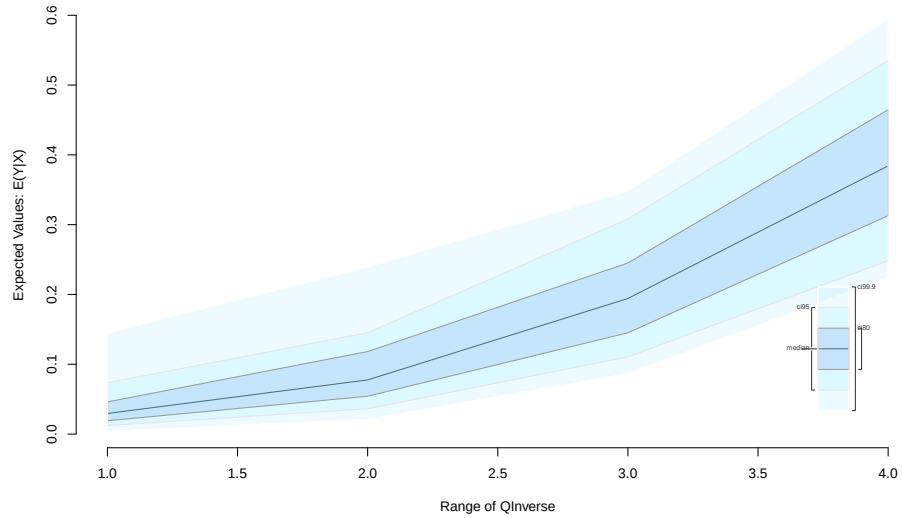



# Predicted Probabilities - Female Unemployment



# Simple Linear Regression Results - Model 2

| | Value | Std. Error | t-stat | p-value |
|---|---|---|---|---|
| (Intercept) | 7.2890542 | 1.5699137 | 4.6429648 | 0.0000035 |
| lGDPpc | 0.0128523 | 0.0738454 | 0.1740433 | 0.8618888 |
| lRural | 0.1997294 | 0.1362996 | 1.4653702 | 0.1428815 |
| lCO2 | 0.0988345 | 0.0323371 | 3.0563758 | 0.0026704 |
| lHCexpend | 0.4234439 | 0.1131647 | 3.7418371 | 0.0002837 |
| lWater | -0.3462461 | 0.1780275 | -1.9449022 | 0.0518262 |
| lSanitation | 0.0693481 | 0.0700069 | 0.9905891 | 0.3219475 |
| lLifeExpect | -3.4223108 | 0.3249499 | -10.5318121 | 0.0000000 |
| lDPT | 0.6089181 | 0.2442667 | 2.4928416 | 0.0126768 |
| lMeasles | -0.0927219 | 0.2423974 | -0.3825204 | 0.7020796 |
| Inverse | -0.4283765 | 0.0478764 | -8.9475491 | 0.0000000 |
| lFemSchool | 0.5672268 | 0.1462569 | 3.8782924 | 0.0001413 |

# Fixed Effects Regression Results - Model 2

| | Value | Std. Error | |
|---|---|---|---|
| (Intercept) | -0.5689423 | 3.5887731 | -0.15 |
| lGDPpc | 0.0424296 | 0.1374318 | 0.30 |
| lRural | 2.9918860 | 0.5986235 | 4.99 |
| lCO2 | 0.0648936 | 0.0461823 | 1.40 |
| lHCexpend | -0.0122352 | 0.1078728 | -0.11 |
| lWater | -1.3687453 | 0.3551010 | -3.85 |
| lSanitation | -0.5179264 | 0.3222561 | -1.60 |
| lLifeExpect | -0.7740581 | 0.3255796 | -2.37 |
| lDPT | 0.8011866 | 0.2000353 | 4.00 |
| lMeasles | -0.7092685 | 0.1929945 | -3.67 |
| Inverse | -0.1140604 | 0.1006554 | -1.13 |
| lFemSchool | -0.0183450 | 0.1261862 | -0.14 |
| as.factor(country)Burundi | -3.7854519 | 0.5346724 | -7.07 |
| as.factor(country)Cameroon | -1.8312915 | 0.2628418 | -6.96 |
| as.factor(country)Central African Republic | -2.7843503 | 0.4203009 | -6.62 |

# Conclusions - Model 1

1. **Logistic Regression Results of Model 1 (all countries)**

- Generally in line with hypothesis
- Most of the variables are statistically significant
- Only Immunisation Variables and GDP per capital are not significant

2. **Predicted Probabilities of Model 1 (selected countries)**

- Direction of effect of Female School Enrollment matches initial assumptions for all case studies
- Direction of effect of Female Unemployment does not match initial assumptions for any case study

# Conclusions - Model 2

3. **Linear Regression of Model 2 (countries with incidence above mean)**

- Significance of some variables changes
- Female School Enrollment and Female Unemployment remain highly significant
- Effect of Female Schooling becomes positive (!)

4. **Fixed Effects Regression of Model 2 (countries with incidence above mean)**

- Significance of some variables changes compared to simple linear model
- Female School Enrollment and Female Unemployment become insignificant
- Immunisation rates for DPT & Measles become highly significant (!)