

# Determinants of HIV

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# Outline

- Motivation
- Research Question
- Methodology
- Literature Review
- Descriptive Statistics
- Findings
- Conclusion and 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*

Source: <http://www.mdgmonitor.org/goal6.cfm>

- 2 Explore disease-specific determinants of health

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

# Methodology and Dataset

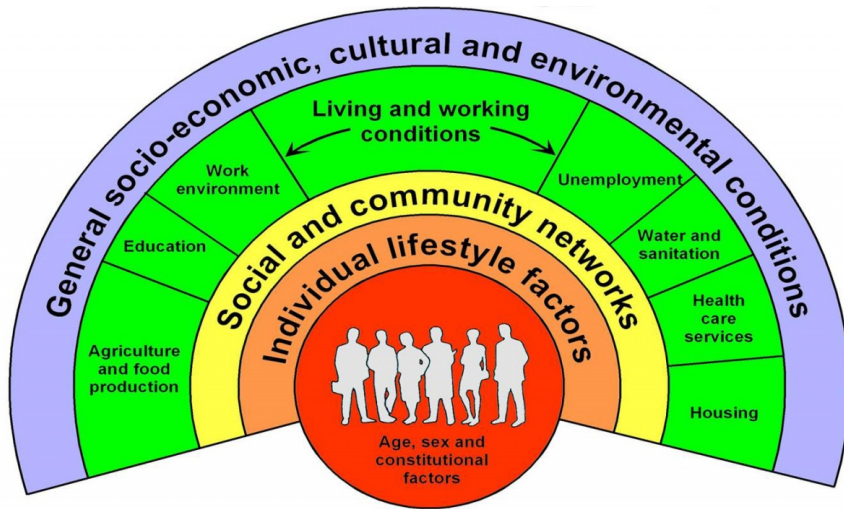
## Methodology

- 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.

# Literature Review



Source: Dahlgren and Whitehead, 1991

# Descriptive Statistics

# Incidence

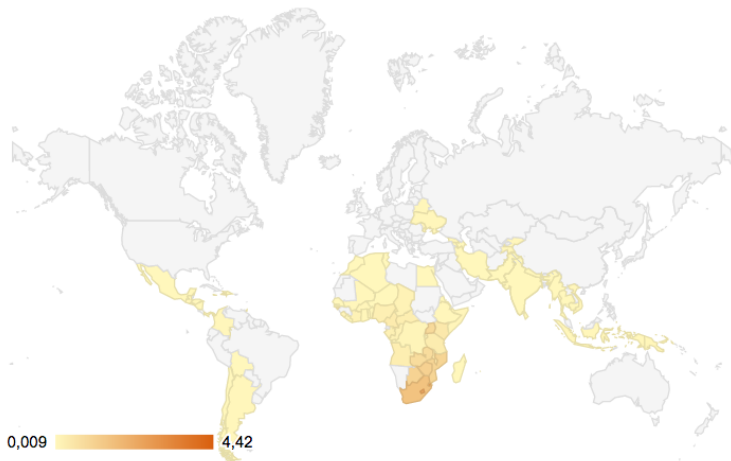


Figure 2: Incidence Rate over Time

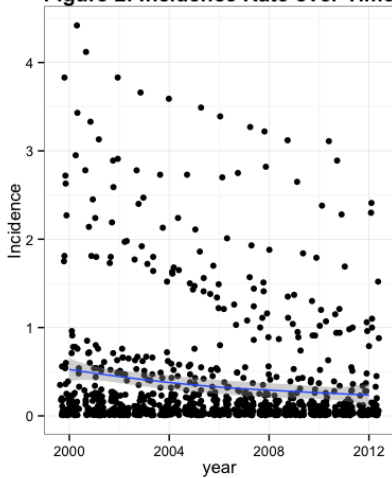
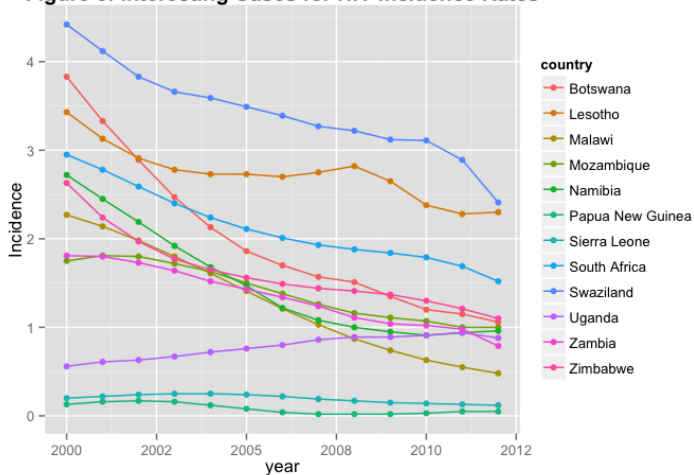
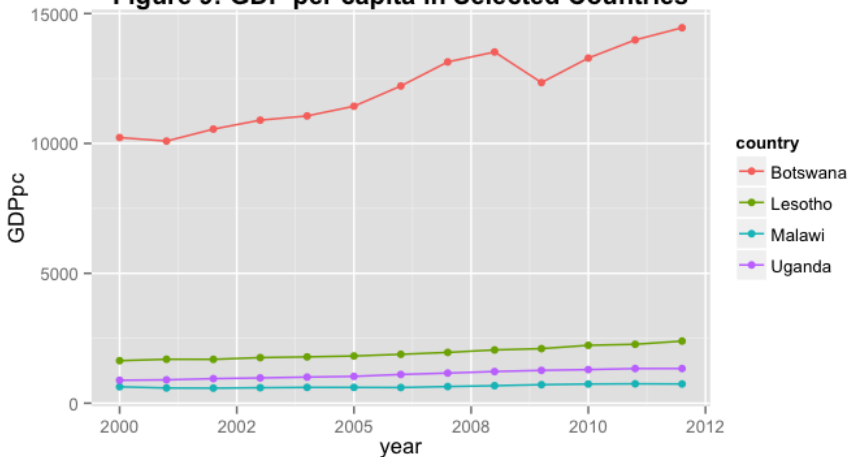




Figure 6: Interesting Cases for HIV Incidence Rates



**Figure 9: GDP per capita in Selected Countries**



**Figure 7: Access to Water in Selected Countries**

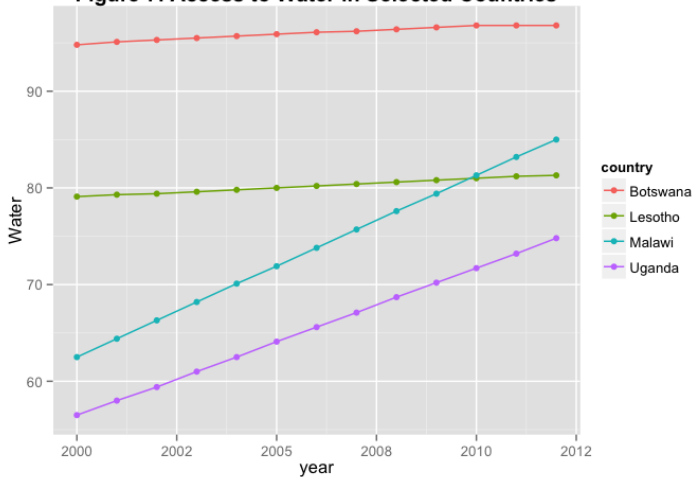
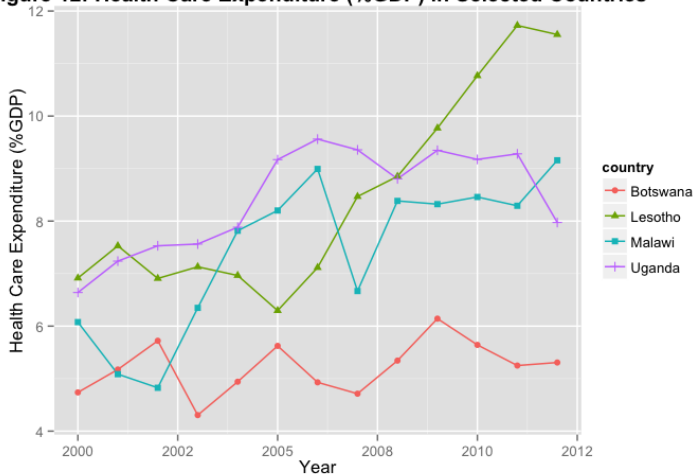
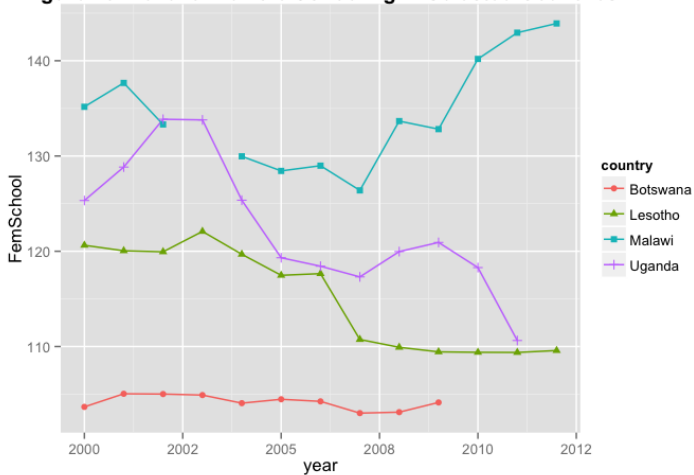


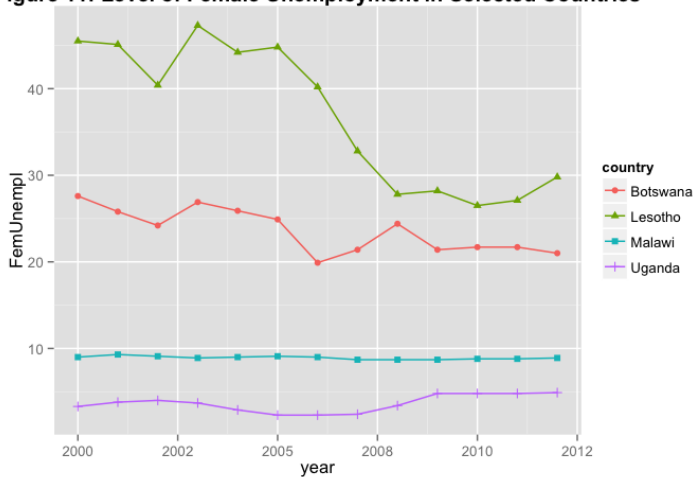
Figure 12: Health Care Expenditure (%GDP) in Selected Countries



**Figure 10: Level of Female Schooling in Selected Countries**



**Figure 11: Level of Female Unemployment in Selected Countries**



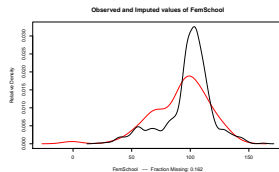
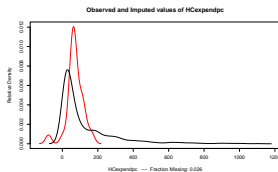
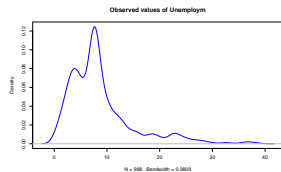
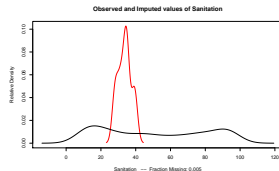
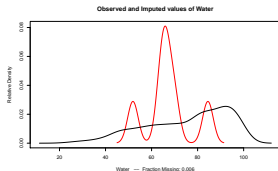
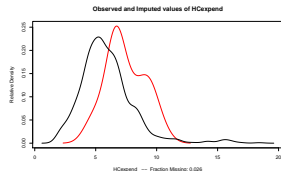
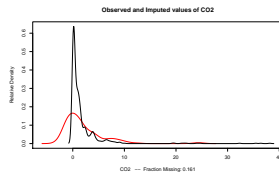
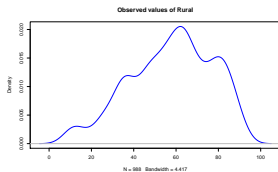
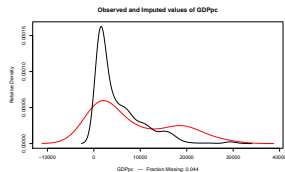
# The Model

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



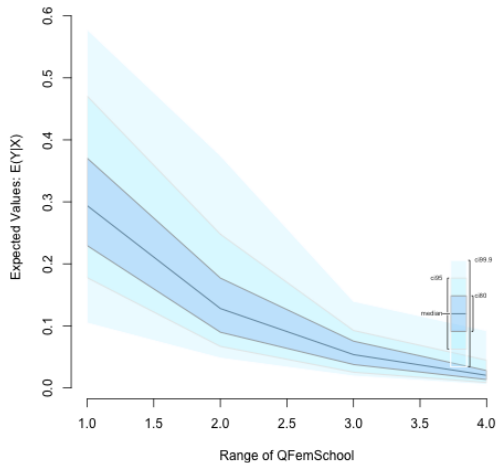


# Logistic Regression Results - Model 1

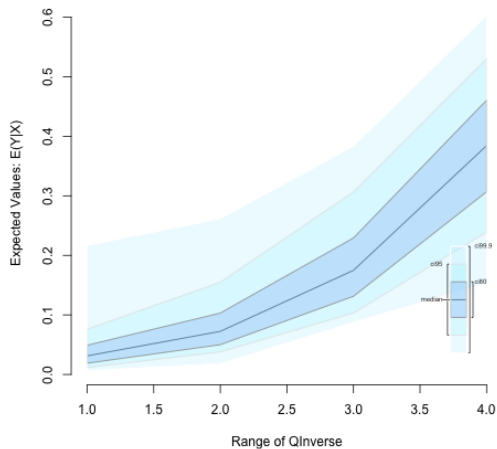
	Value	Std. Error	t-stat	p-value
(Intercept)	-38.0034684	6.6906734	-5.6800663	0.0000000
IGDPpc	0.3143425	0.3334705	0.9426397	0.3461042
IRural	-2.6476499	0.5359180	-4.9404011	0.0000008
ICO2	-0.5688374	0.1915342	-2.9699004	0.0029958
IHCexpend	0.9112177	0.4008124	2.2734267	0.0237940
IWater	-2.4775949	0.8667003	-2.8586525	0.0044262
ISanitation	0.9500695	0.2845887	3.3383956	0.0008650
ILifeExpect	19.5435091	1.7879953	10.9304030	0.0000000
IDPT	-0.7048933	1.0249747	-0.6877178	0.4920765
IMeasles	1.6275409	1.1961476	1.3606522	0.1752495
Inverse	1.8510302	0.2665304	6.9449130	0.0000000
IFemSchool	-5.7644452	0.7466756	-7.7201463	0.0000000

# Predicted Probabilities

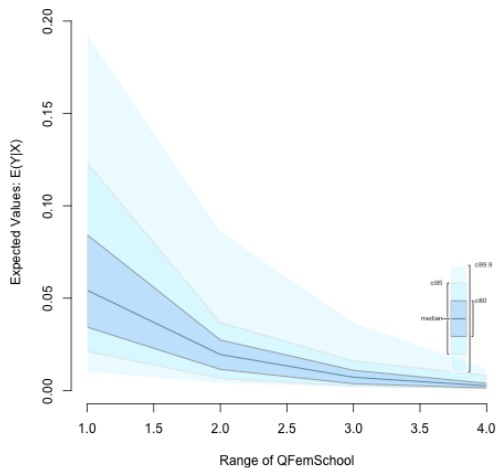
# Malawi



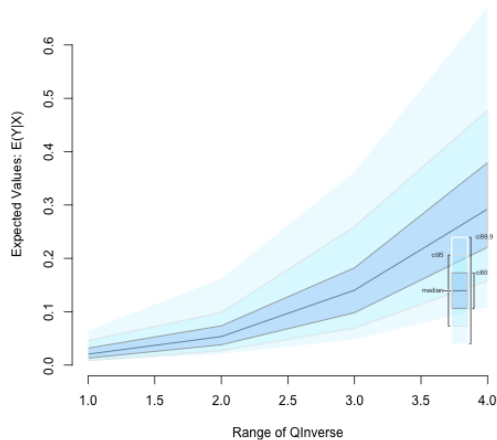
# Malawi 2



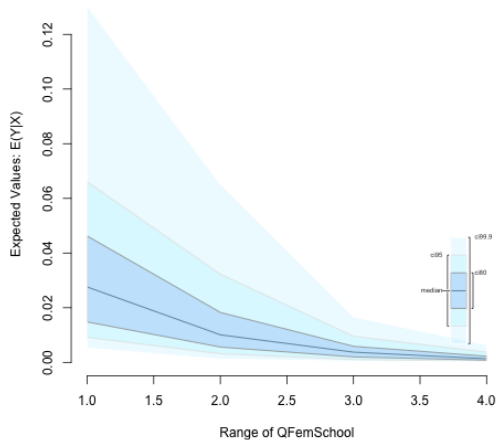
# Botswana



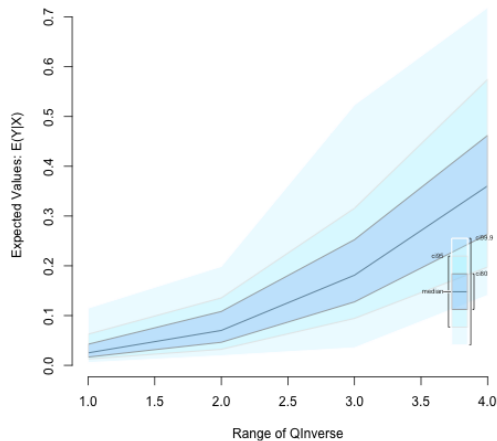
# Botswana 2



# Lesotho

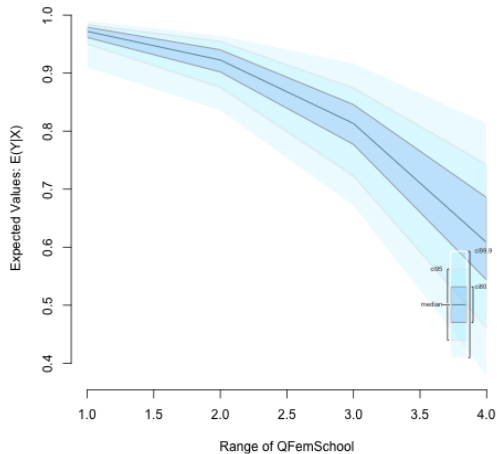


# Lesotho 2

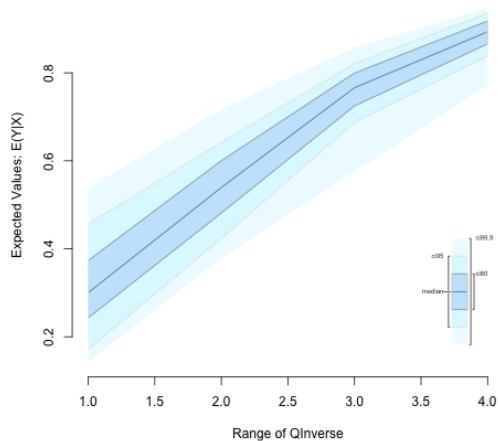




# Uganda



# Uganda 2



## Simple Linear Regression Results - Model 2

	Value	Std. Error	t-stat	p-value
(Intercept)	7.4135619	1.5948345	4.6484836	0.0000038
IGDPpc	0.0111467	0.0729668	0.1527634	0.8786090
IRural	0.2128989	0.1375969	1.5472656	0.1220804
ICO2	0.1043960	0.0305850	3.4133110	0.0006490
IHCexpend	0.3843351	0.1087051	3.5355761	0.0004533
IWater	-0.3474257	0.1988756	-1.7469499	0.0847827
ISanitation	0.0683528	0.0723309	0.9450020	0.3452506
ILifeExpect	-3.4950652	0.3465722	-10.0846680	0.0000000
IDPT	0.6021796	0.2421510	2.4867940	0.0128909
IMeasles	-0.0858047	0.2405058	-0.3567678	0.7212710
Inverse	-0.4198519	0.0484064	-8.6734818	0.0000000
IFemSchool	0.6161168	0.1790289	3.4414385	0.0030104

## Fixed Effects Regression Results - Model 2

	Value	Std. Error	
(Intercept)	-0.1891935	3.6296491	-0.05
IGDPpc	0.0491541	0.1392015	0.35
IRural	2.8943299	0.5974648	4.84
ICO2	0.0495482	0.0333084	1.48
IHCexpend	-0.0213087	0.0991582	-0.21
IWater	-1.3923678	0.3725961	-3.73
ISanitation	-0.5484204	0.3440102	-1.59
ILifeExpect	-0.8189907	0.3587338	-2.28
IDPT	0.7968069	0.1977675	4.02
IMeasles	-0.6968858	0.1961662	-3.55
Inverse	-0.1183545	0.1010525	-1.17
IFemSchool	0.0499597	0.2199542	0.22
as.factor(country)Burundi	-3.7196539	0.5644537	-6.58
as.factor(country)Cameroon	-1.8399848	0.2623831	-7.01
as.factor(country)Central African Republic	2.7078212	0.4176137	6.60

# Conclusions and Limitations - 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 all case studies

## Conclusions and Limitations - 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 (!)

⇒ Variable that remains significant over both Models and all specifications is Life Expectancy