

# Investigating Connections between Gender Equality and HIV Prevalence Rates

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## **Main Goal**

This project serves to identify and examine large scale connections between HIV prevalence across the globe and gender equality indicators. The initial global analysis will lead to smaller scale case studies designed to lead to a greater understanding of factors and variables at work in the spread of HIV. Our hypothesis is that countries with a higher degree of gender equality will have lower rates of HIV among the population.

## **Background**

The Human Immunodeficiency Virus epidemic is second only to the Black Death as the largest epidemic in human history. As of 2014, over 35 million people or 0.5% of the world are reportedly living with HIV/AIDS, with over 25 million cases concentrated in Sub-Saharan Africa. What makes HIV unique is its structure as retrovirus, meaning it copies RNA into DNA within a host T cell in order to attack the immune system from within, leaving victims severely immunocompromised. Its ability to mutate quickly has eluded traditional treatment, however, the secondary transmission rate hovers around 2-5, which has provided researchers with some external methods of control.

Since its emergence in 1960, the spread of Human Immunodeficiency Virus has been heavily influenced by outside factors. Wildlife spillover launched the epidemic, however the subsequent handling and development of worldwide health infrastructure depended heavily on existing social and political norms, particularly relating to gender and education. Prevalence, meaning the percentage of a given population infected, of an emerging infectious disease is inherently dependent on the context of the environment in which it appears. HIV is unique because it had never been seen before in humans, placing a significant weight on education to guide the upcoming generation through uncharted territory. This establishes the question of whether or not basic access to secondary school has the power to hinder infectivity in a susceptible population.

Additionally, as sexual contact is the most common method of HIV transmission, the idea of gender equality and status as an underrepresented factor rises to our attention. While data pertaining to seats held by women in national parliament is casted to represent general attitudes and representation of gender in society, female enrollment rates provide a glimpse at the immediate future climate of gender relations, allowing us to examine these paradigms from several angles.

Much research exists that suggests gender inequality in education and employment directly impedes economic growth. These effects display a marked increase in acuity in the sub-Saharan region of Africa, a region also dramatically impacted by HIV and AIDS. It is our intention to begin investigating whether this connection extends beyond what has been already documented.

A majority of the data has been gathered from 2010, which incidentally marks the beginnings of a decline in worldwide HIV prevalence according to UNAIDS. We can consider this period a stabilizing point in the epidemic, though several regions still fluctuate between sudden bursts and declines in new cases. However, it is important to keep in mind the potential for distortions in prevalence reporting, particularly in religious or politically unstable countries with low surveillance. Access to sexual education and contraception are also extraneous factors that could carry some relevance depending on the situation of the nation in question.

### **Scope & Characteristics**

Our project is ostensibly a look at worldwide relationships between our chosen gender equality indicators and the spread of HIV. Data obtained at a global scale will necessarily be far less than an accurate depiction of the connections in question. The spread of HIV is connected to many factors beyond the scope of our project, and these factors vary significantly from region to region. Therefore, the global picture obtained through initial analysis will be used as a framework for more in depth inspection conducted at the national level.

This secondary national evaluation will serve to identify the many internal and external factors affecting a given country's HIV prevalence rate. Data then determined to be extraneous to our central question could be used in future analysis to produce weighted values to reevaluate the impact of gender equality on the HIV rates. A full assessment of this type, however, would require more time and resources than were available for our investigation.

The indicators selected by our group to signify efforts towards gender equality are the Gender Parity Index for secondary gross enrollment, and the percentage of seats held by women in national parliament. HIV prevalence rates are used to represent the impact of HIV on each country.

The Gender Parity Index was chosen as an indicator because equal access to education is a vital aspect of gender equality. A country's GPI rating is determined by first dividing the number of children currently enrolled in school by the expected population of children of relevant age. The resulting number is multiplied by 100 and is known as the gross enrollment ratio (GER). The GPI is then calculated by dividing the female GER by the male GER. Therefore, a GPI of between 0 and 1 indicates a disparity in favor of males, while a GPI over 1 indicates a disparity favoring females. Problems exist with this indicator, for instance there is no indication that a GPI closer to one is a result of increased female enrollment, or decreasing male enrollment. Neither does a country's GPI communicate information on overall access to, or participation in, education.

By looking at the percentage of seats held by women in a given country's parliament, a rough initial estimate can be made as to that culture's gender relations and attitude towards women. Obviously, more information is necessary to make an informed statement about gender

equality. For instance, parliamentary bodies may not be representative of a population's wishes if elections are not truly free and open. Furthermore, as in the case of North Korea, certain parliaments may be more or less puppet legislatures wielding no real power, rendering the members' identities essentially meaningless.

HIV prevalence refers to the percentage of a given population living with HIV. Of the data on HIV made available by the UN databases, the numbers for HIV prevalence were found to be the most complete and included the most commonality with our other datasets. Prevalence data gives a good estimation of the impact HIV is having in a specific country, but there are problems with the data as well. The downside to using this data is that it denotes all people living with the disease, rather than new infection rates. Furthermore, higher prevalence rates may be observed in regions with more access to antiretroviral drugs and quality medical care that serves to extend the life expectancy of those infected with HIV. Conversely, other regions may have more new cases of HIV, but less access to drugs, meaning a shorter life expectancy for those infected, leading to lower prevalence rates. In this way, countries that are doing a better job managing HIV care may have higher prevalence rates than those countries with shorter life expectancies for newly infected individuals.

### **Objectives & Criteria**

Throughout the course of our investigation, it became clear that it was beyond the scope of our report to produce a meaningful and valid determination as to the precise relationship between gender equality and HIV. Rather, it was determined that we would more closely examine countries that seemed to support our hypothesis (i.e. countries found to have a high number of women serving in parliament, high GPI ratings, and low HIV prevalence rates), as well as those countries that appeared to refute our prediction (i.e. countries found to have few women serving in parliament, high disparity in secondary education in favor of males, and low rates of HIV). To assist in our selection of relevant countries for more in-depth study, four initial world maps were created.

For the purposes of our evaluations, HIV prevalence was divided into five or six levels of severity: 0-0.1, 0.1-0.5, 0.5-1, 1-5, 5-15 (or maximum value on relevant map), and 15-maximum value among relevant countries (all values are percentages). These numbers were arrived at after determining that HIV rates below .5% would be considered low, and prevalence rates above 1% would be considered high for the purposes of our project. It is worth noting that prevalence rates of 1% are considered a generalized epidemic by most organizations. However, these rough groupings were more suited to our purposes for initial assessment. The remaining criteria for each map is as follows:

- HIV Prevalence in Countries with Above Average GPI: Countries that were found to be above the global average (0.9847) for gender parity rates in secondary education are displayed along with HIV prevalence rates.
- HIV Prevalence in Countries with Below Average GPI: Countries that were found to be below the global average (0.9847) for gender parity rates in secondary education are displayed along with HIV prevalence rates.
- HIV Prevalence in Countries with Above Average Female Representation in Parliament: Countries that were found to be above the global average (22.4%) for seats held by women in their respective parliamentary bodies are displayed along with HIV prevalence rates.
- HIV Prevalence in Countries with Below 10% Female Representation in Parliament: Countries that were found to have below 10% of their parliamentary seats held by women are displayed along with HIV prevalence rates.

## Methodology

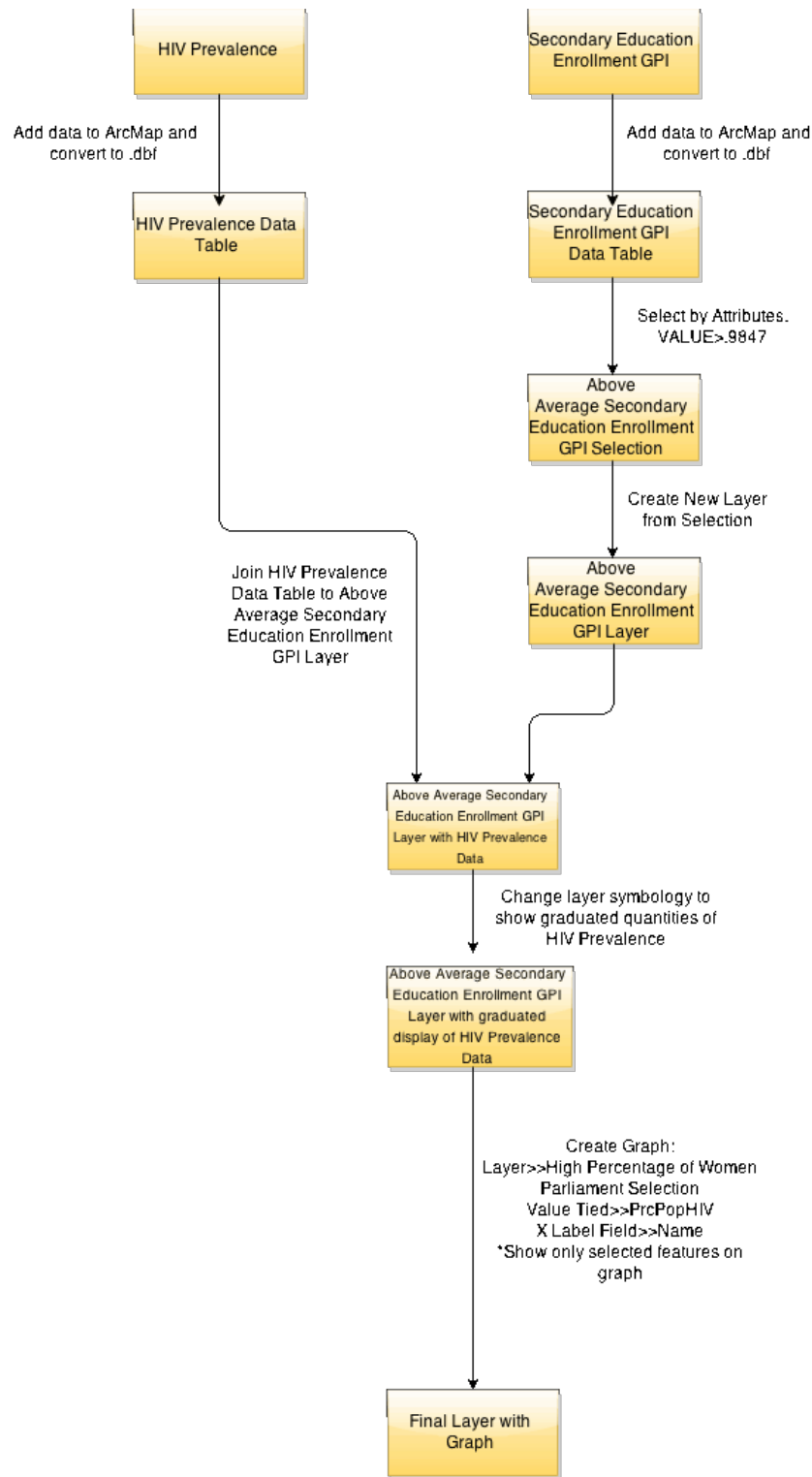


Figure 1: Example of process used to create global maps for initial analysis. This flowchart describes the process used to create the "HIV Prevalence in Countries with Above Average GPI" world map. Flowcharts for all maps can be found in Appendix A

As described in the “Objective & Criteria” section, our group determined that four world maps would be created to begin examining the relationship between our chosen gender equality indicators and HIV prevalence rates. As illustrated in the flowcharts above, the pertinent data tables were joined with HIV prevalence data and the world map in order to bring the tabular and geographic components together for ease of analysis. The gender equality indicators were analyzed independently of one another to determine individual relationships with HIV prevalence. A secondary categorical filter was then applied to each indicator to examine values above and below thresholds specific to the data in question, resulting in four separate world maps.

In addition to the tools and processes described above, graphs were created from the HIV prevalence layer to easily examine and compare prevalence rates in relevant countries. The statistics tool was also utilized to give the group initial impressions about how worldwide prevalence rates related to our chosen gender equality indicators.

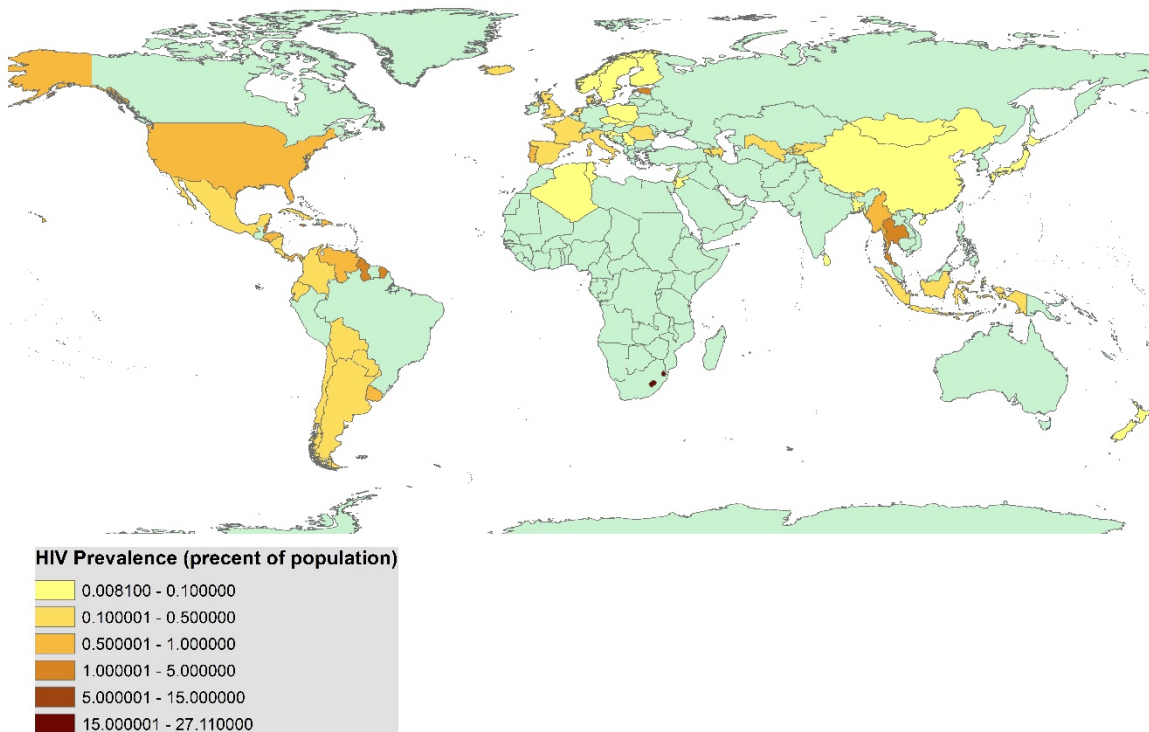
Using the four world maps to guide our investigation, the eight countries to be investigated further were selected. The countries as well as justification for their selection follow:

- **Mexico**- Supports hypothesis, high GPI, high percentage of women in parliament, low HIV prevalence
- **Sweden**- Supports hypothesis, high GPI, high percentage of women in parliament, low HIV prevalence
- **Nigeria**- Supports hypothesis, low GPI, low percentage of women in parliament, high HIV prevalence
- **Belize**- Mixed results, high GPI, low percentage of women in parliament, high HIV prevalence
- **Lesotho**- Refutes hypothesis, high GPI, high percentage of women in parliament, high HIV prevalence
- **Estonia**- Refutes hypothesis, high GPI, high percentage of women in parliament, high HIV prevalence
- **Mozambique**- Mixed results, low GPI, high percentage of women in parliament, high HIV prevalence
- **Pakistan**- Mixed results, low GPI, high percentage of women in parliament, low HIV prevalence

The above countries were then researched to determine additional factors contributing to their individual HIV prevalence rates, as well as more in depth analysis of the current climate of gender relations. These analyses can be seen below in the “Results” section.

## Results & Discussion

### HIV Prevalence in Countries with Above Average GPI

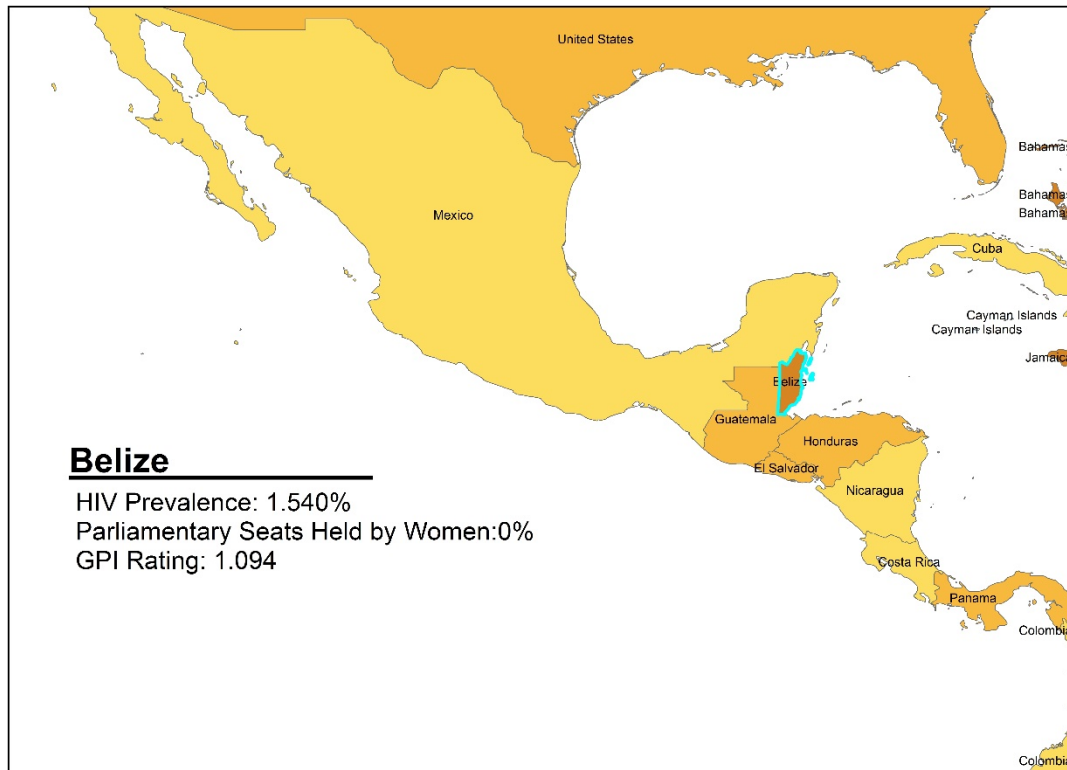


*Figure 2: Example of world map created for initial analysis. All world maps can be found in Appendix B.*

When examining the world maps created for preliminary analysis, it at first appeared that our group's hypothesis was refuted on all accounts. For the GPI maps it was found that countries with high GPIs had a mean HIV prevalence rate of 1.14% while those countries with lower secondary education rates for girls displayed a mean HIV prevalence rate of 1.07%. Likewise, and more striking, countries with greater than 22% of their parliamentary seats held by women had a mean HIV prevalence rate of 2.72%, while those countries with less than 10% of their parliamentary seats held by women showed a mean HIV prevalence of 1.62%.

As discussed above, worldwide analyses of HIV rates are susceptible to significant distortion due to the many disparate factors at work in spreading the disease. To get a more accurate picture of factors relevant to prevalence rates, individual case studies follow below.

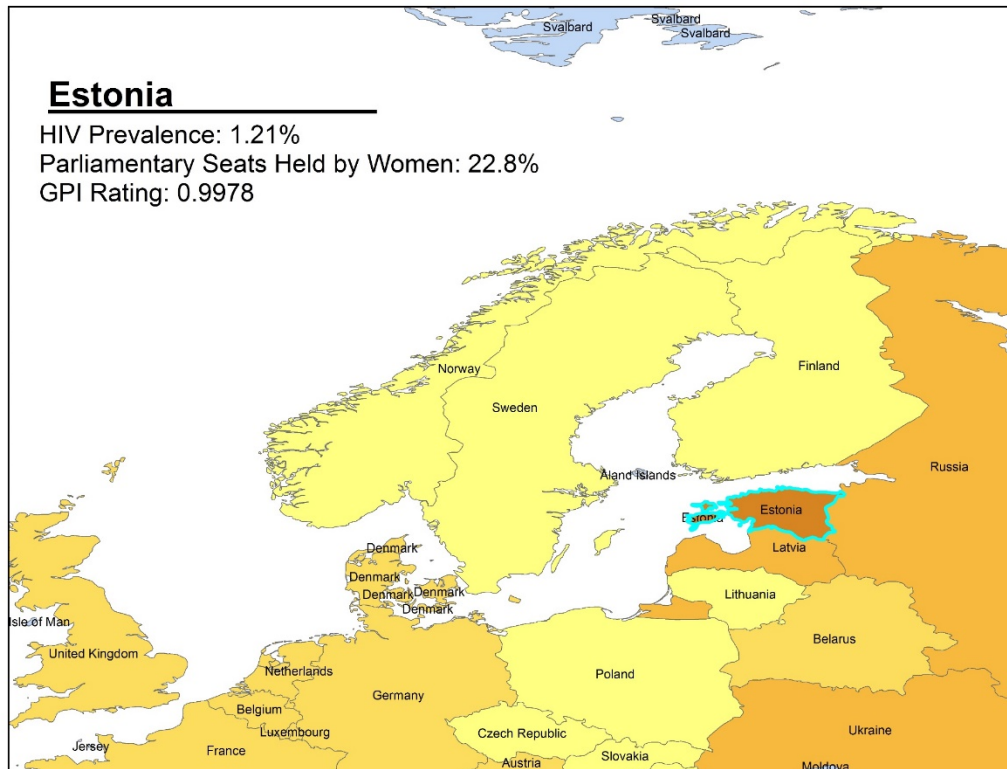




Our study of Belize yielded mixed results. We observed a high HIV Prevalence Rate of 1.54%. Though Secondary Education Enrollment GPI is high (1.09441), Belize is far from achieving gender equality—as evidenced by there being zero female representation in parliament.

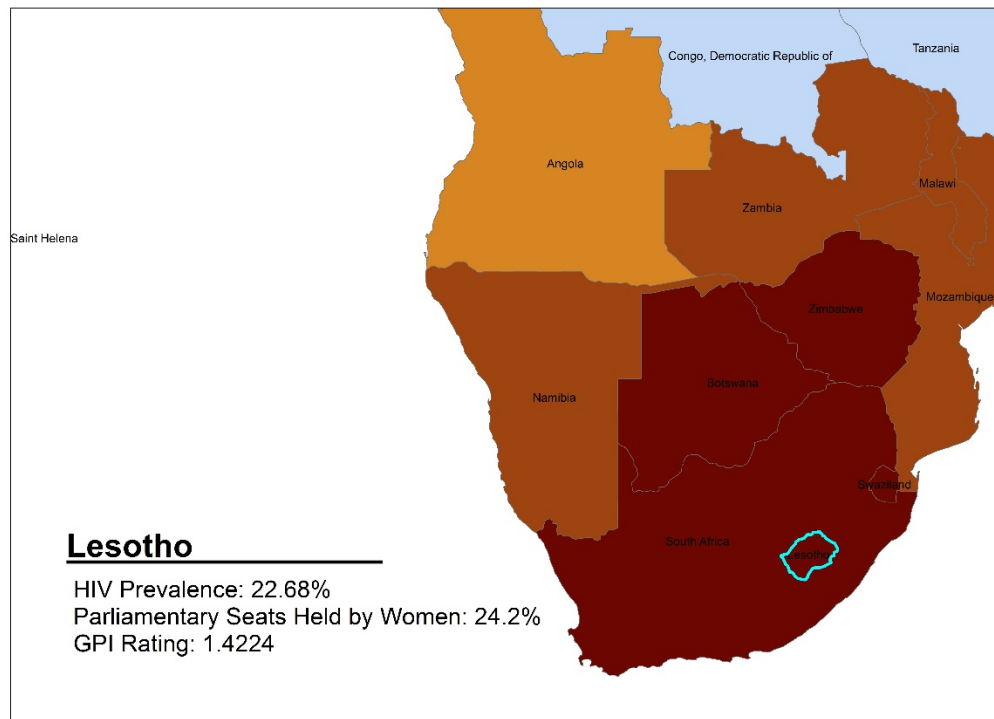
Culturally, Belize is male dominated. Women are not in a position to negotiate their own sexual interactions which can result in lack of contraception or protection, unwanted sexual contact, and retaliatory violence. Furthermore, inter-marital sexual assault is not viewed as rape by many men. Despite this power imbalance females are looked down upon and blamed for bringing HIV into families, regardless of whether or how they contracted HIV.

An estimated 2000 of the 3600 known cases of HIV in Belize affect females, yet male attitudes surrounding the disease prevents many women and girls from seeking treatment. Cultural stigma is hindering efforts to control the spread of HIV.

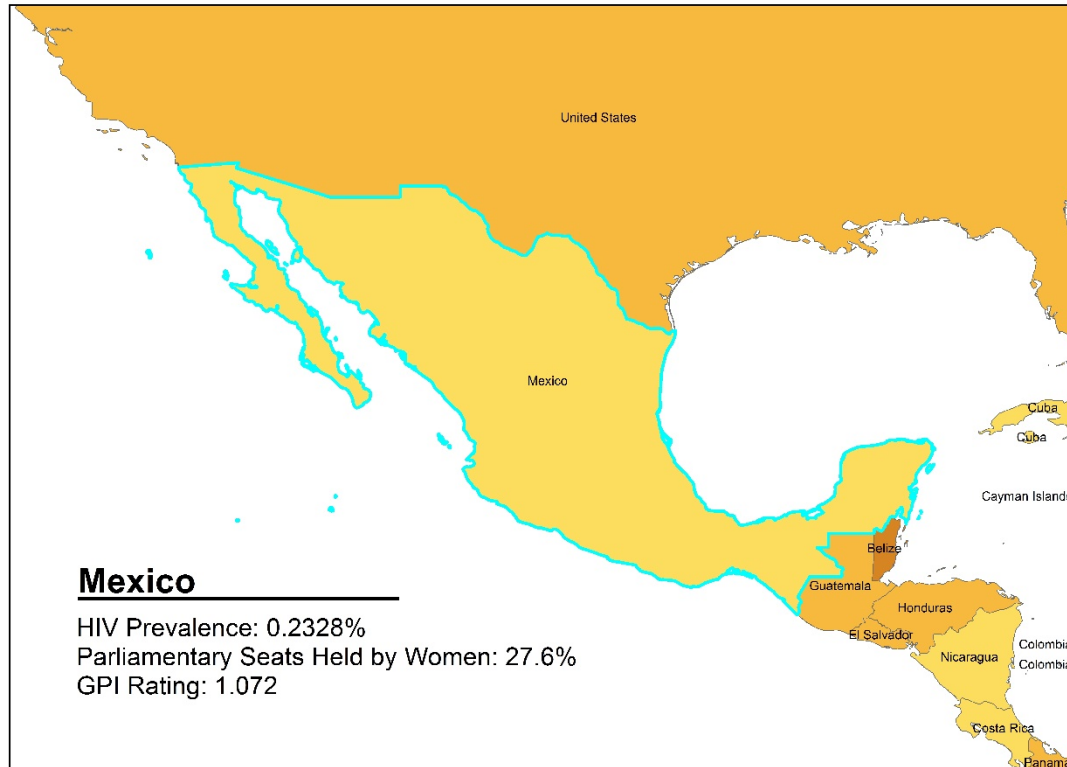


Estonia is fairly unique in its situation. Though we observed high gender equality (Secondary Education Enrollment GPI 0.99783 and Percentage of Parliamentary Seats Held by Women 22.8%), we also saw a remarkably high HIV Prevalence Rate of 1.21%.

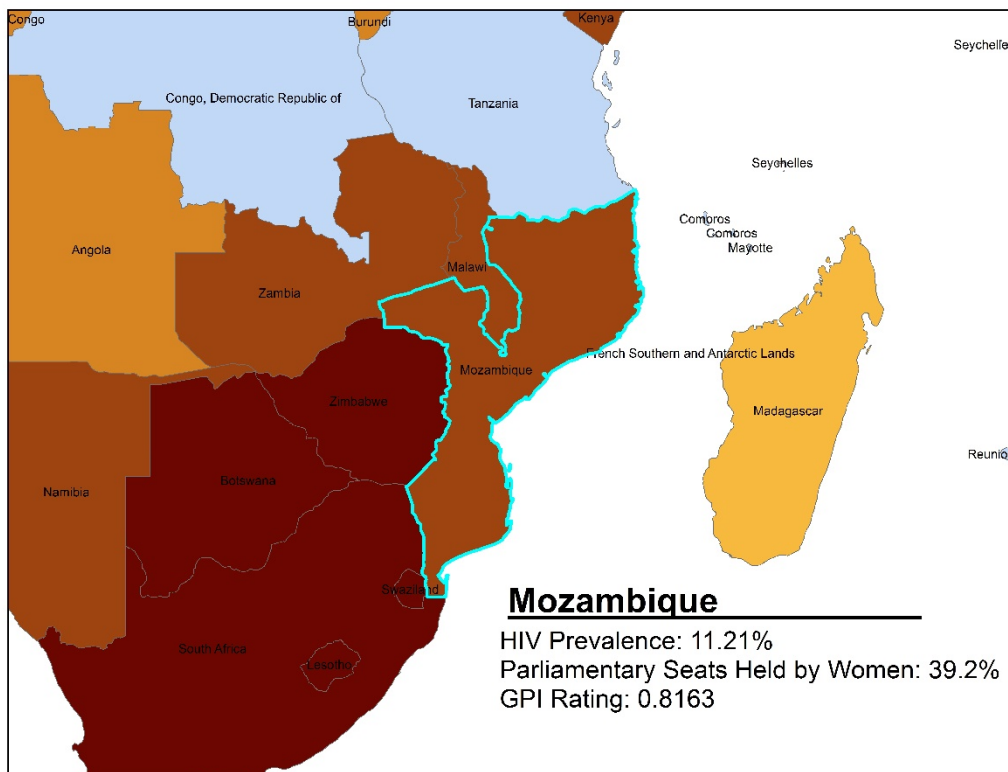
The occurrence of HIV in Estonia does not appear to be directly related to gendered concerns, but rather rampant intravenous drug use. HIV infection occurs most prominently in people under 25 years of age. Further infection occurs through both heterosexual and homosexual intimate relationships amongst intravenous drug users and their partners.



Lesotho is ranked eighth in bridging the gap between the sexes by the World Economic Forum and boasts high representation, and yet it has the second highest HIV prevalence in the world. The gender politics in this country are unique. A majority of men go out of country to work in South African mines, leaving the women to work at home in the textile industry. The literacy rates for women exceed men at 93%, however many advocates point out the social context of low self-esteem that propels women's issues, with HIV standing at the top of them. There is a large stigma against perceived 'over ambitious' women, and while progress is being made, negative refraction can run deep. Much HIV transmission comes from usual factors such as prostitution and drug use, which are also issues of poverty that cannot stand up to high education rates. Rural populations where women's voices are traditionally muted are also vulnerable. The impact of HIV in Lesotho has created a developmental downward spiral that threatens equality gains and all aspects of life. Gender has suffered and access to sex education and resources is difficult to promote at a pace where it can rival the spread of disease. The culture of grandparents having to raise children of their own offspring who have died of HIV/AIDS creates a barrier to education, as many cannot afford to care for the kids or get them to school with all of the supplies they need. Low life expectancy also leaves children orphaned. Half of the population lives in such a low income quartile that they have no access to proper sex or healthcare education, and this has been targeted as a foundation issues that needs to be implemented in order to reduce prevalence rates.

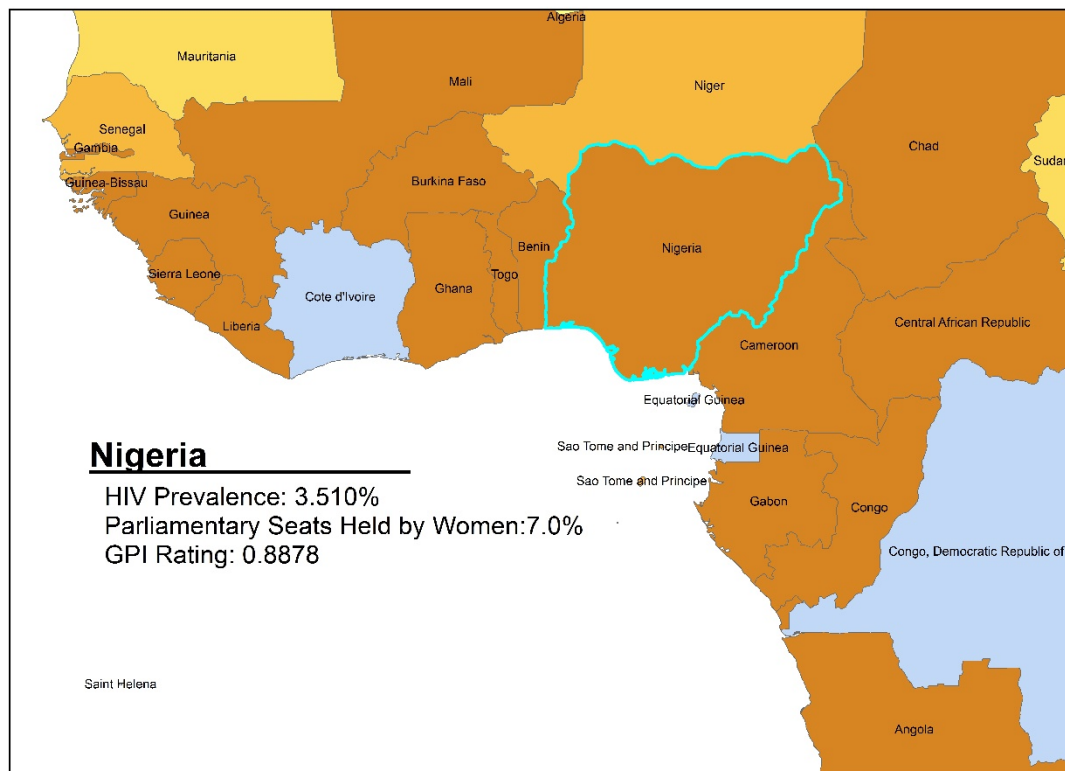


While high drug use can spike HIV prevalence rates in the cities, Mexico has fought back the epidemic through evaluating susceptible sexual behavior. The main concentration of the fight has been against at risk sex workers who perpetuate high transmission and, in impoverished areas, poor methods of STI preventative birth control. While the disease has traditionally been most prevalent in homosexual men, a rise in heterosexual transmission proves that these vulnerable workers are usually women, and through the past couple of the female voice has gained traction in the fight for proper HIV care. Forums and NGOs established especially for women are a new trend, however state and district level women’s advocacy has accelerated their role in policy making and treatment initiatives. The acknowledgement of this issue has shown a high positive gender initiative, viewing the HIV epidemic in the area as a holistic problem that has the capacity to transcend the concentrated areas in which the disease already exists



Young women and girls in Mozambique represent the most vulnerable part of the population. UNICEF reported that prevalence rates for the age groups of 15-19 years and 20-24 years are three times higher than that of boys and young men of the same age, most likely due to stringent and oppressive social structures that take sexual power out of the hands of women. The severe lack of government resources has left a large portion of prevention and treatment programs in the hands of conservative religious authorities, who choose to preach abstinence only programs, which puts women at a severe disadvantage. This lack of knowledge contributes to an inability for young women to protect themselves properly both in wanted and unwanted sexual advances, as well as a fallout afterwards when they are left not knowing how to handle their new HIV positive status.

Mother to child transmission cases are also abundant in the region, often leaving an overwhelming amount of sick children as orphans to be looked after by the state. Mozambique is also unique in its gender politics because while almost 40% of its parliament is made up of women, lax laws regarding rape such as Article 223 which allows a rapist of a girl under 18 to go free if he marries her, adding onto existing legislation that further shelters sex offenders who can be complicit in the spread of HIV. Many outside activist cite cultural norms to have swayed female legislators under the influence of their male peers, but as more feminist groups move against the Parliament, that still waits to be seen.



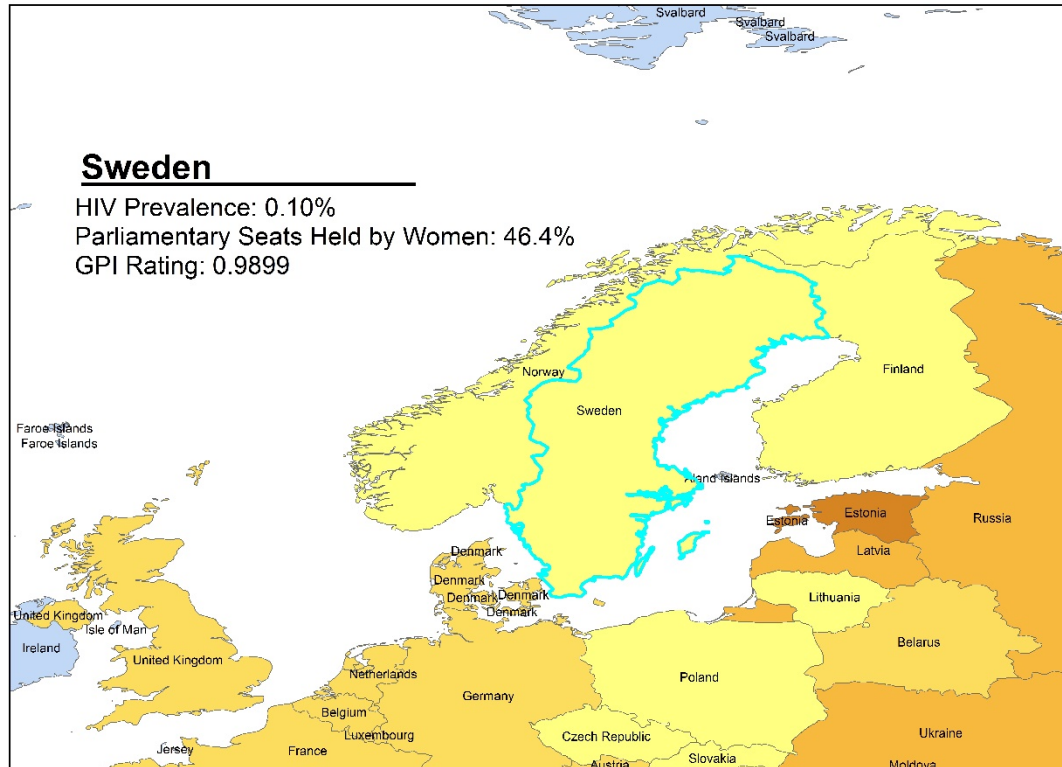
Nigeria is a member of the unfortunate club of developing countries that, despite having 95% of HIV cases, only receive about 12% of the aid. The high incidence of infections in women, particularly young mothers, has been swept under the rug for many years to keep up pride in appearances, and this rejection of feminization has become evident in recent years as a linchpin for transmission. Because sex is considered such a taboo topic, many religious and cultural leaders ban sex education, reducing the amount of school received HIV preventative information to 23% in 2009. When women are married, in particular, access to education can shut off entirely, however as women are notably married younger in this area, half by age 15, it is hard to reach them before they are under the thumb of a husband and his family. Female sex workers and homosexual men are also at a significantly higher risk than the norm but little has been done to address this compared to the efforts to protect transport workers and soldiers who move infections across borders, accounting for 40% of all new HIV infections in Nigeria.



Pakistan returned mixed, and possibly inaccurate, results. We observed a low HIV Prevalence rate of 0.0401%, however UNAIDS suggests that HIV instances are severely underreported in Pakistan and other Middle Eastern countries. Underreporting can be attributed to social stigma, lack of public and healthcare provider education, and an absence of HIV surveillance efforts.

Despite a fairly high Percentage of Parliamentary Seats Held by Women (22.2%), Pakistan still suffers from drastic gender inequality. Female political representation is largely due to a constitutional quota that requires certain political seats to be filled by women. In reality, Pakistani women in politics have very little power – it is virtually impossible for a woman not from a wealthy family of political pedigree to run for office. Women must gain permission from their husbands and male relatives to run for office, whom they often defer to for their political moves. As a result, initiatives to improve women’s education, healthcare, and other rights are largely neglected.

Females in Pakistan do not have equal access to education, as seen by a Secondary Education Enrollment GPI of .77221. Furthermore, it is estimated that only 42% of Pakistani women are literate. Lack of education, lack of adequate healthcare, and extreme poverty leave women especially vulnerable to HIV infection.



In Sweden we observed a HIV prevalence rate of 0.1%. Since the first recorded instance of HIV in Sweden occurred in 1981, they have taken great measures to prevent the spread infection.

Notably, Sweden has criminalized the transmission of HIV. New diagnoses are accompanied by a disclosure obligation which legally requires HIV-positive people in Sweden to reveal their status before having sex. HIV-positive individuals are legally prohibited from having unprotected sex, regardless of consent or actual disease transmission. Failure to disclose HIV status and/or engaging in unprotected sex will result in an aggravated assault charge and a prison sentence.

Sweden also recognizes the correlation between gender inequality and the spread of HIV. They rank above average in both Secondary Education Enrollment GPI (0.98995) and Percentage of Parliamentary Seats Held by Women (46.4%). Swedish government officials are publically critical of countries lacking in gender equality and cite poor education, sexual violence against women, and unequal power balance in sexual relationships as major factors in the continuing spread of HIV.



## **Conclusions**

As made clear through our research, the causes and underlying factors contributing to the prevalence of HIV are multi-faceted and can vary from country to country. Through attempting to examine possible gender components of the spread of HIV, we were met with the daunting task of separating a single cause from all others.

Some of the difficulty in this endeavor arises from the necessity of using surrogate data that was not specifically tailored to our needs. If it were within our abilities to have data collected from countries of interest, balancing new HIV incidence rates against existing cases, with supplementary data on the background of infected people, our research may have developed more in line with our initial objectives. However, with such a proliferation of data, the time required for analysis would grow exponentially. As with all research, the primary constraints on our report were lack of resources and time.

On a global scale, high concentrations of HIV outside of the endemic point in Sub-Saharan Africa can seem almost random, however they do significantly stem from gender issues covered by our indicators- such as access to education, poverty, risk of falling into drug use or sex work, and sexual power inequity, which simply manifest in diverse unquantifiable ways. The case studies that arose from our initial investigation shed light on the role of these other known impediments to the reduction of HIV rates, and illuminate the difficulties in taking a holistic approach to a nuanced issue. Nevertheless, the research conducted here provides a sound foundation of evidence suggesting that a gender component to HIV prevalence does exist, and that promotion of gender equality is an important factor in fighting the spread of this disease.

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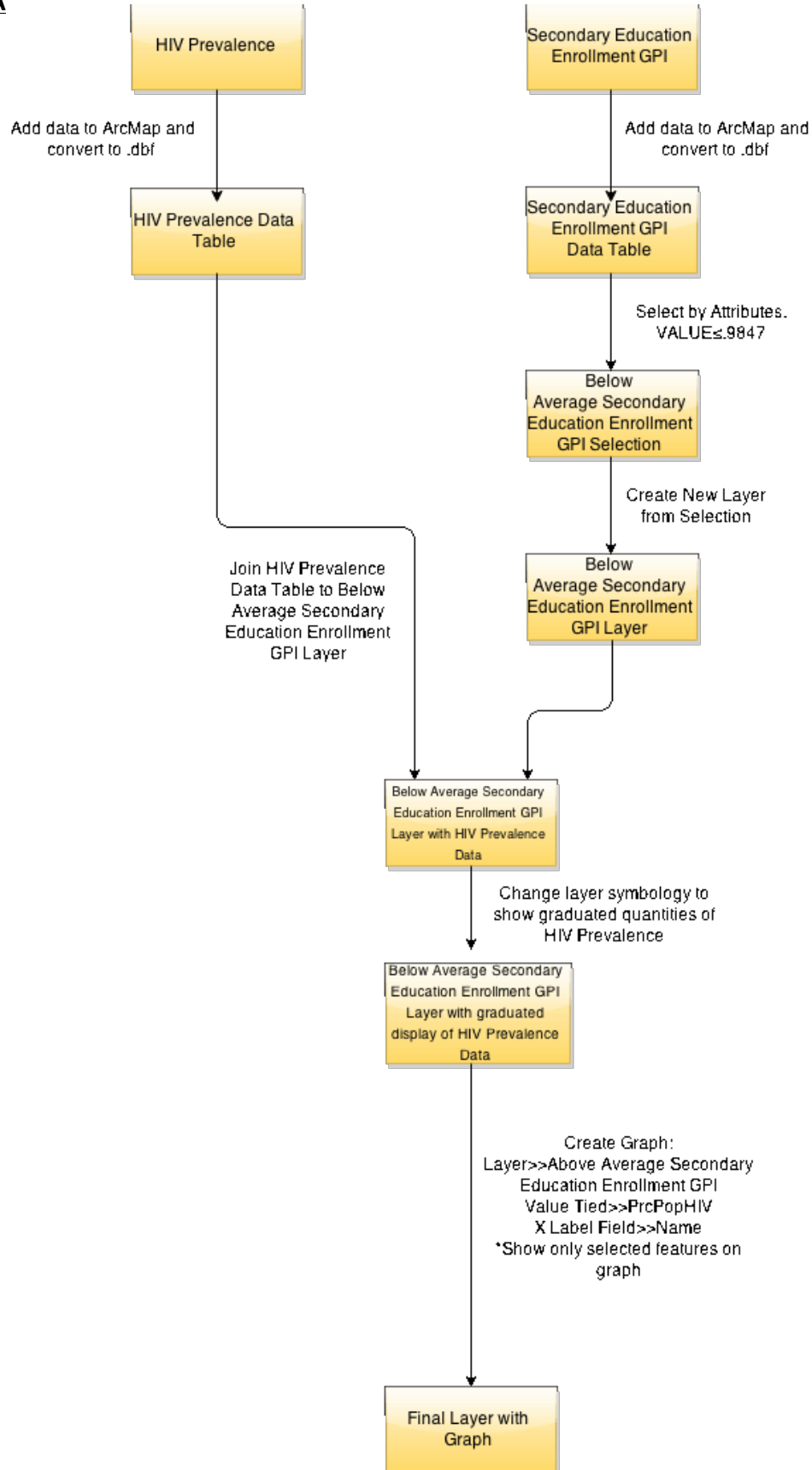
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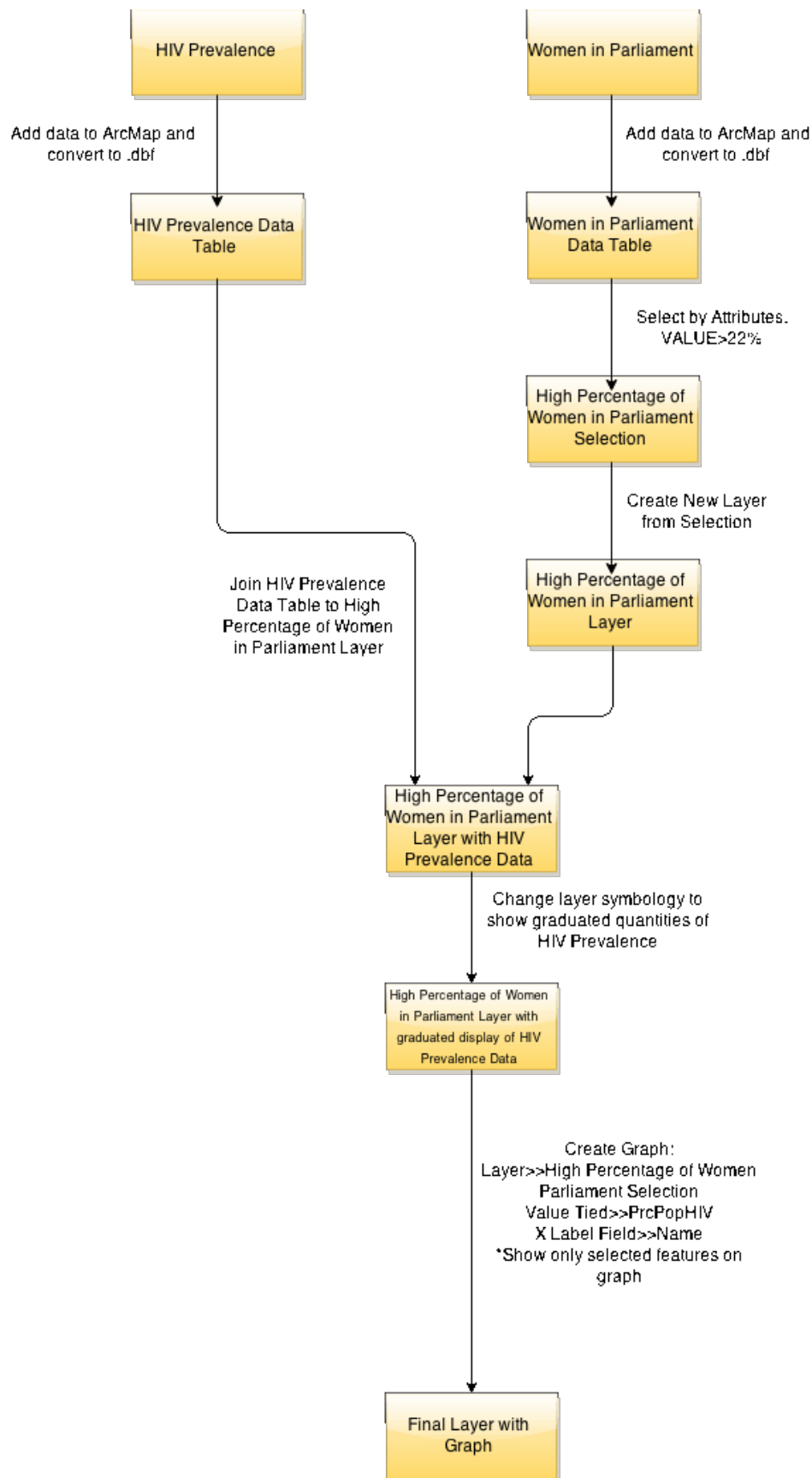
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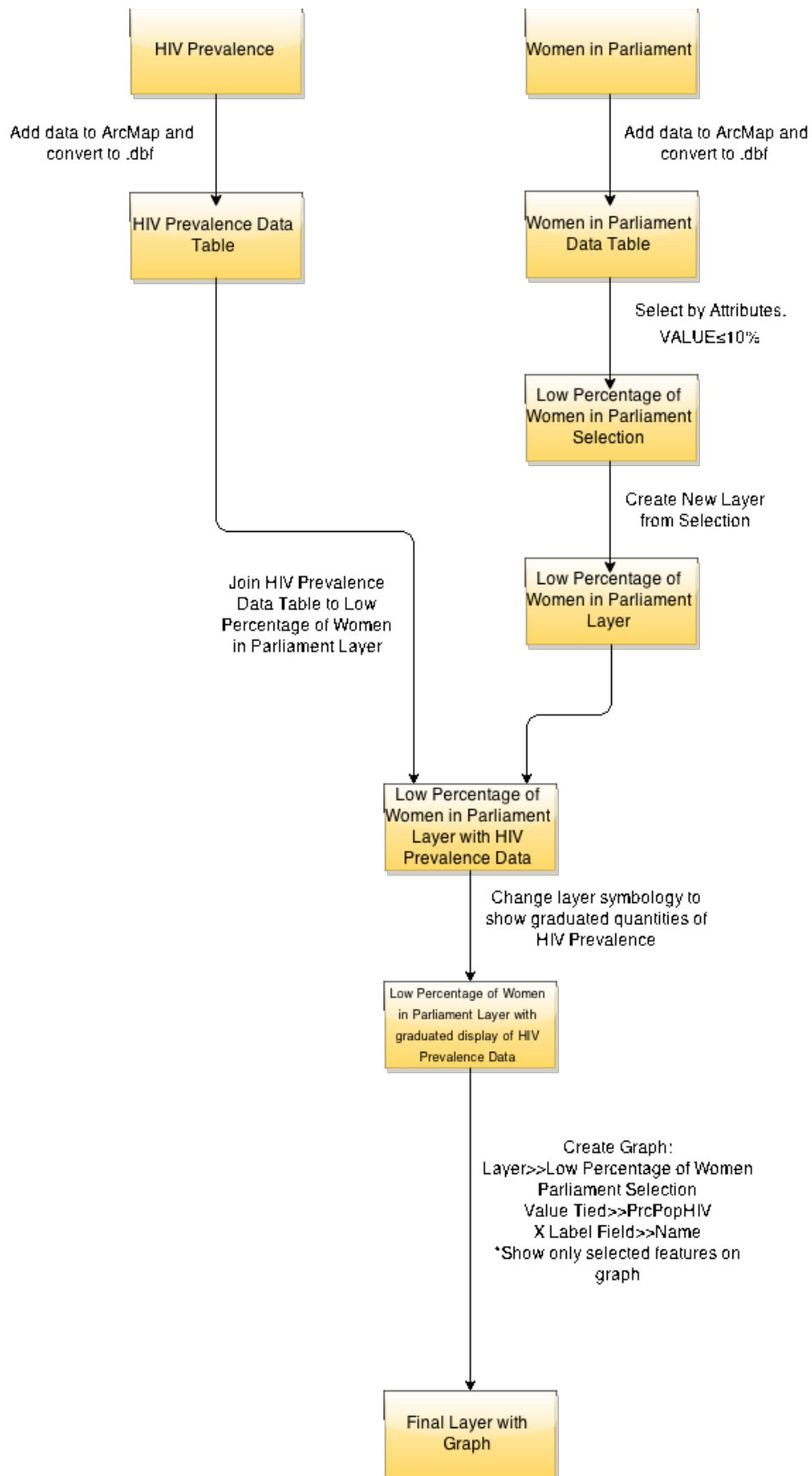
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## Appendix A

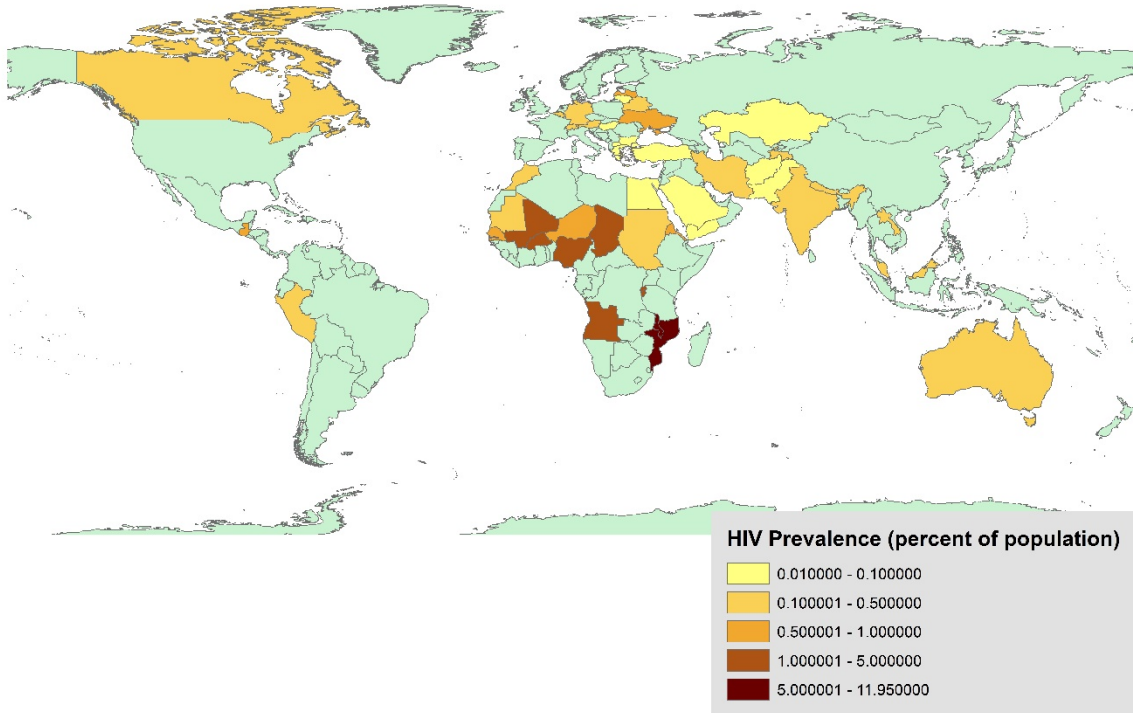




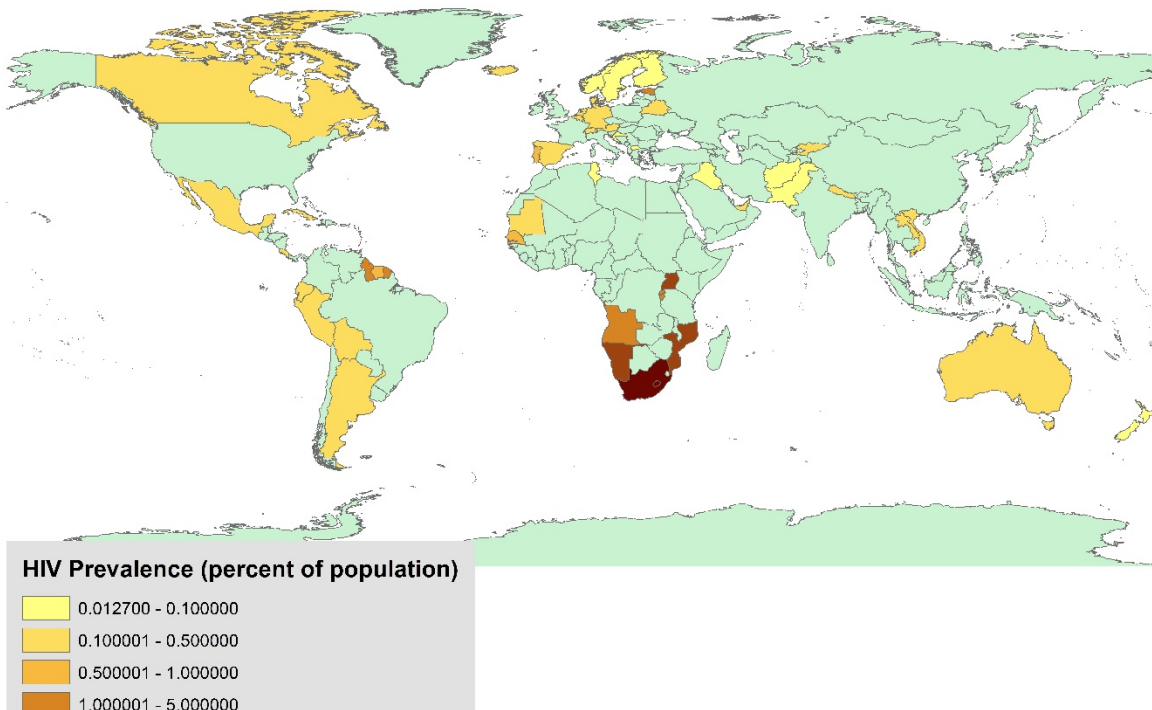


## Appendix B

### HIV Prevalence in Countries with Below Average GPI Ratings



### HIV Prevalence in Countries with Above Average Female Representation in Parliament



**HIV Prevalence in Countries with  
Below Average Representation of Women in Parliament**

