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### Analysis and Interpretation of Factors Leading to Increased AIDS Prevalence in Sub-Saharan Africa

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# Analysis and Interpretation of Factors Leading to Increased AIDS Prevalence in Sub-Saharan Africa

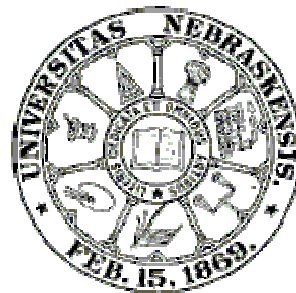
By

William Kalhorn

An Undergraduate Thesis  
Presented to the Faculty of  
The Environmental Studies Program at the  
University of Nebraska at Lincoln  
In Fulfillment of Requirements for the  
College of Agricultural Sciences and Natural Resources

Major: Environmental Studies  
Emphasis: Natural Resources  
Thesis Adviser: Dr. Mary Willis  
Thesis Reader: Dr. Shimelis Beyene

UNIVERSITY OF  
**Nebraska**  
Lincoln



**Abstract:**

My thesis research project focuses on the major factors that are contributing to the worst disease epidemic on the planet today. I have aimed to determine what may be some of the most important factors contributing to highly variable difference in HIV/AIDS prevalence rates are among the regions of East, West, and South Africa. The HIV/AIDS epidemic has been growing and expanding to new areas of the world since the first case arose in 1959 in what is now called Kinshasa, Congo (Avert, 2011). The AIDS/HIV epidemic is believed to have originated on the African continent, and this is where the disease is currently causing the most problems (Avert, 2011). In particular, Sub-Saharan Africa is experiencing disease prevalence rates unlike anywhere else in the world (Avert, 2011). In order for the countries being most impacted by HIV to begin reversing the effects of this disease on their country, it is important to know which factors could be potentially the most important to do so. For comparison, this project focuses on three Sub-Saharan countries that are currently experiencing varying rates of HIV/AIDS disease prevalence. The country of Zimbabwe, located in Southern Africa, has one of the highest HIV/AIDS prevalence rates in the world. By comparing Zimbabwe with the East African country of Kenya, as well as the West African country of Ghana, I will be able to establish what some clear differences are between these three distinct regions of Africa.

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## **Acknowledgments**

I would personally like to thank Dr. Mary Wills for her expertise, support, and guidance during this research project. Working with her has helped me to become knowledgeable about this deadly disease. It is now a personal life goal of mine to be able to one day provide quality health care as a registered nurse or nurse anesthetist in one of these countries in need of dedicated health care workers.

I would also really like to thank Sara Cooper and Dave Gosselin for their assistance and support throughout this year-long project, as well as for their dedication to the School of Natural Resources.

## **Introduction**

The AIDS epidemic in both urban and rural Sub-Saharan Africa is having a devastating impact on many parts of African society. This disease has affected millions of people and continues to have a detrimental effect on a wide range of societal features including the following: household incomes, increased risk for health care workers, food and crop production, workplace conditions, human life expectancy, the infrastructure of local and governmental economies, as well as the shape, size, and structure of African families to name a few. In this thesis project, I take a closer look at just what some of the common characteristics of this disease are in Sub-Saharan Africa. I will focus on this geographical region in because currently two-thirds of all people in the world infected with AIDS are living in Sub-Saharan Africa. At the same time, this region contains only roughly 10% of the world's population ("HIV/AIDS Policy, Sub-Saharan Africa"). In 2008 alone, 1.4 million adults and children died in Sub-Saharan Africa as a result of AIDS (AVERT).

Within Sub-Saharan Africa as a whole, some of the countries making up the region known as Southern Africa are experiencing some of the highest rates of HIV/AIDS prevalence in the world. Zimbabwe is used as my examples from this region. Using this country from the heavily infected Southern Africa region, I will then examine two of the other Sub-Saharan African regions, East and West Africa. In particular, I have chosen Kenya from East Africa, as well as Ghana from West Africa for comparison. Through gaining knowledge of the current HIV/AIDS prevalence rates in these other regions and analyzing common factors among all three regions, I hope to provide a better understanding of what the differences between these regions are and what may be leading to the current high or low rates of HIV/AIDS prevalence.

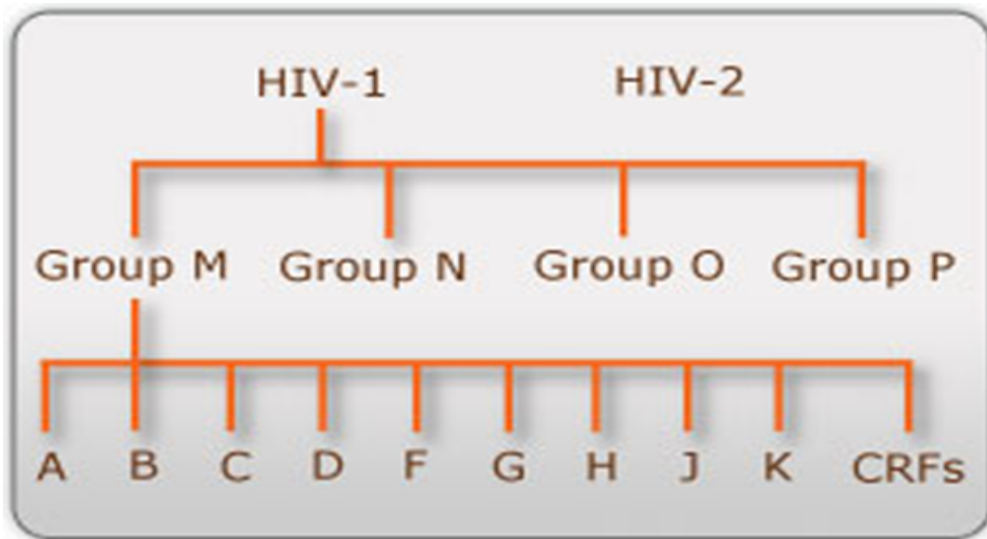
Having a better understanding of the AIDS epidemic in the regions of Sub-Saharan Africa is crucial to realizing the tragic impacts that this disease can have on not only small communities, but countries and a continent as a whole. The majority of scientific research

taking place today focuses on understanding certain risk factors within an AIDS-affected population that may be contributing to an increase in the HIV/AIDS prevalence within that country or population. Risk factors and their associated population characteristics were identified through analysis of current literature. These include but are not limited to the following: the age of the overall population, national religion, female contraceptive use, male circumcision practices, sexually transmitted disease rates, marital status, urbanization of the country, education of HIV/AIDS, access to anti-retroviral drugs, GDP of the country, age at first marriage, and age at first intercourse. As mentioned earlier, the factors that can contribute to a country having an increased rate of HIV/AIDS prevalence are many in number, and can combine in different ways to create a unique situation not only in each country of these regions, but also within much smaller populations within the countries. It is for this reason that there does not seem to be one applicable fix that can be applied to any one region. Through analyzing the current literature available, I can possibly draw a connection between possible differences that are leading to high HIV/AIDS prevalence rates in the region of Southern Africa and those in East and West Africa which are experiencing significantly lower rates of the infection (AVERT).

To fully understand HIV/AIDS, it is also important to understand the background of the disease and where it originated. HIV is known as a, “lentivirus,” or a disease that attacks the immune system (AVERT). Literally translated, the name means, “slow virus,” for the way it takes a long time for adverse effects to appear in the human body. Lentiviruses are all part of a larger group of viruses known as retroviruses (AVERT). It is believed the current HIV virus originated from the Simian Immunodeficiency Virus, which is thought to be over 32,000 years old (AVERT). In 1999, researchers discovered that the Simian Immunodeficiency Virus, or SIV, was almost genetically identical to today’s HIV virus. The SIV strain was obtained from a captive chimpanzee, once common to

West-Central Africa (AVERT). It is believed that the disease was able to cross species from chimpanzees into humans due to patient zero coming into contact with contaminated chimpanzee blood (AVERT).

The modern HIV virus has two major subtypes, HIV-1 and HIV-2 (Fig .1). Worldwide, HIV-1 is the predominant form affecting the most humans (AVERT). The HIV-1 virus can be further broken down into four groups; M, N, O, and P (Fig.1). Of these four groups, group M has proven to be the most dangerous, consisting of more than 90% of HIV-1 infections. (AVERT). One particular reason why HIV is so particularly difficult to understand and treat is its ability to mutate (“A chink in HIV’s evolutionary armor”). Over the years, the disease has genetically mutated from population to population, causing various sub-types of the disease to arise within HIV-1 group M. Known sub-types of HIV-1 group M include; A, B, C, D, F, G, H, J, K, and CRFS (AVERT).



**Figure 1: HIV-1/HIV-2 known groups and sub-groups**

The predominant sub-type found within Sub-Saharan Africa is sub-type C, and this sub-type accounts for roughly 50% of infections around the world (Fig. 2) (AVERT).

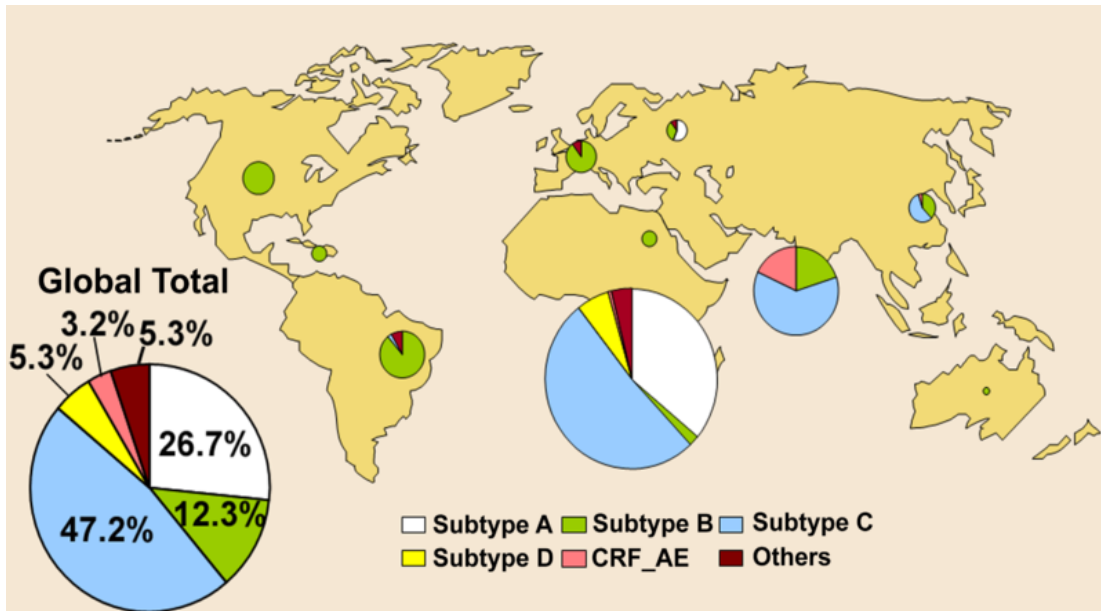


Figure 2: Breakdown of HIV-1 subtypes around the world

The HIV/AIDS virus is specifically found within human body fluids, and the transmission of HIV/AIDS can occur in a number of different ways. It is important to note that while the HIV virus can be found in small amounts within human tissue and fluids, there are only certain fluids that can actually transmit the disease (CDC). These fluids are blood, semen, vaginal secretions, and breast milk. One of these specific fluids must come in contact with a mucous membrane of the damaged tissue from another person or be directly injected into the bloodstream via syringe (CDC).

## Research Problem

The key to mitigating this spread of HIV/AIDS is the ability to understand just what factors are combining within a population to perpetuate the disease. The Governmental leaders and policy makers of a country must be aware of the issues that need to be addressed, in order to implement nationwide campaigns and programs to combat HIV. One success story that researchers can look to, a country that was once heavily infected by the disease, but was then



able to rebound, is the East African country of Uganda. In the mid 1980's, Uganda was considered the worst HIV/AIDS affected country in the world (AVERT). It was found that large simultaneous campaigns to educate Ugandans on the disease as well as the promotional campaign for the use of condoms within the country were contributing factors for lowering the HIV/AIDS prevalence rates within the country (Allen and Heald, 2004). Now, HIV/AIDS prevalence rates have declined to 4.3 and 6.6% among men and women respectively (PRB, Uganda, 2010). Although Uganda is a country where the disease first seemed to explode, and decline may be due to the disease simply running its course within a population, it can still be seen as a success story for a proactive approach taken towards educating citizens on the HIV/AIDS virus and promoting the use of contraceptives such as condoms.

The West African country of Ghana serves as another example of how to effectively combat HIV/AIDS. Through the use of strong governmental commitment to fight the disease, Ghana currently experiences stable HIV/AIDS prevalence rates of 1.5 and 2.3% among men and women respectively (PRB, Ghana, 2010). Since the first reported case of HIV in the country in 1986, the disease has remained stable throughout all areas of the Ghanaian population (USAID, Ghana, 2010). One of the major reasons Ghana has been so successful in stabilizing the disease is the Government's dedication to providing affordable and easily accessible antiretroviral therapy for people living with HIV/AIDS (USAID, Ghana, 2010). Along with providing therapy, high rates of male circumcision throughout the whole country have also helped contribute to the success of programs for prevention and treatment of HIV (USAID, Ghana, 2010).

While the rates of prevalence of HIV/AIDS may be low for particular countries such as Ghana and Uganda, rates for countries such as Zimbabwe, with current adult prevalence rates of 12.2 and 18.7% respectively for men and women (PRB, Zimbabwe, 2010). These low rates are

still comparatively much higher than any other region of the world (AVERT). Overall, the current HIV/AIDS adult prevalence for all of Sub-Saharan Africa is 5.0%, while the next highest rate for a global region, the Caribbean, is five times lower with an adult prevalence rate of just 1.0% (AVERT). For comparison, the current adult prevalence rate in the United States is 0.5% with roughly 1.5 million children and adults living with the disease (AVERT). In all of Sub-Saharan Africa, there are now roughly 22.5 million adults and children living with the disease (AVERT). Clearly Sub-Saharan Africa is at the forefront of battling this disease and this is where scientific research can produce the most about how the disease enters and spreads among large populations. Scientific researchers must work hand-in hand with African governments to develop and implement HIV/AIDS prevention practices, not only to increase the quality of life, but more importantly to save the lives of millions of Sub-Saharan Africans.

## **Materials and Methods**

My thesis project consists mainly of a literature review and in beginning this thesis, I had little knowledge of the HIV/AIDS virus; however my personal interests in the medical field and in particular the profession of nursing gave me motivation to learn more about the disease. Therefore, the first thing I researched was the overall HIV/AIDS profile of the African continent in comparison to the rest of the world. This lead me to the conclusion that yes, Africa is currently the continent that is most affected by HIV/AIDS. From there, it became very evident that the largest populations affected by the disease were located within Sub-Saharan Africa (AVERT). It is for this reason that the region of North Africa was excluded from my thesis. In my research, I then noticed that within Sub-Saharan Africa, the region of South Africa contained many of the countries currently experiencing the highest rates of the disease. At the same time, certain countries within the regions of East and West Africa appeared to have slightly lower to

significantly lower rates of HIV/AIDS disease prevalence. It then became my intention to choose specific countries from each particular region. At this point I chose individual countries Kenya in East Africa, Zimbabwe in Southern Africa, along with Ghana in West Africa. In my research, I identified a few of the more commonly mentioned and studied risk factors for HIV/AIDS. It was then my intention to compare these factors against the countries I previously chose to focus on. Ideally, I would be able to come up with a conclusion as to what may be one major factor may be causing one particular country to have either a high or low rate of HIV/AIDS prevalence. In order to identify relevant literature pertaining to my thesis, I used a wide combination of keyword searches with Google scholar and EBSCO. For example, one keyword search I used would be, "HIV/AIDS, Sub-Saharan Africa, male circumcision." Another example of a search I used would be, "Kenya, HIV/AIDS, risk factors." These searches were done in order to first familiarize myself with the current literature pertaining to HIV/AIDS in Africa, and then later to identify common factors within the countries I chose to focus on.

## Literature Review

Allen T, and Heald S. 2004. HIV/AIDS Policy in Africa: What has worked in Uganda and what has failed in Botswana. *Journal of International Development*, 1141-1154.

This article compares government policies in Uganda and Botswana in light of decreasing HIV/AIDS prevalence in Uganda as well as increasing HIV/AIDS prevalence in Botswana. This article was particularly helpful in highlighting some of the steps a government can take in order to educate and promote AIDS awareness to its citizens. Uganda has gone to great measures to do this, and Subsequently has seen a steady decline in their prevalence of HIV/AIDS. Botswana, which shares borders with Zimbabwe and Zambia, lies in the heart of the South African region. This country has been experiencing an increase in HIV/AIDS prevalence. This article highlights some of the reasons why this may be happening.

"AIDS and HIV Statistics for Sub-Saharan Africa." *AIDS & HIV Information from the AIDS Charity AVERT*. Avert.org. Web. 03 May 2011. <<http://www.avert.org/africa-hiv-aids-statistics.htm>>.

AVERT is an international HIV and AIDS charity, based in the UK, working to avert HIV and AIDS worldwide, through education, treatment and care. These publications by this organization provide background on HIV/AIDS throughout the world as well as Sub-Saharan Africa.

Boerma J, Gregson S, Nyamukapa C, Urassa M. 2003. Understanding the Uneven Spread of HIV within Africa: Comparative Study of Biologic, Behavioral and Contextual Factors in Rural Populations in Tanzania and Zimbabwe. *Journal of the American Sexually Transmitted Disease Association* 30: 779-787

This journal article shows a comparison of population based surveys that took place in 2003 in Zimbabwe. The study looked at populations in both relatively high and low areas of HIV prevalence within Zimbabwe. This article allowed me to see what some of the common risk factors are for this South African country. Mentioned as risk factors contributing to increased HIV /AID prevalence include the following: marital status, greater education, formal sector employment, urban residence, spatial mobility, the gap between age at first sexual intercourse and marriage, and lack of male circumcision.

Gray H, Kigozi G, Serwadda D, Makumbi F, Watya S, Nalugoda F, Kiwanuka N, Moulton L, Chaudhary M, Chen M, Sewankambo N, Wabwire-Mangen F, Bacon M, Williams C, Opendi P, Reynolds S, Laeyendecker O, Quinn T, Wawer M. 2000. Male circumcision and HIV acquisition and transmission: cohort studies in Rakai, Uganda. Johns Hopkins University, School of Hygiene and Public Health.

This study gives me a better idea of male circumcision within Uganda, a country that has a lower percentage of men who are circumcised . The prevalence of circumcision reported in this study was 16.5% for all men, 99.1% in Muslims, and 3.7% in non-Muslims. The study shows that circumcision was significantly associated with reduced HIV acquisition but not in those who reported to be non-Muslim. More specifically, pre-pubertal circumcision shows the strongest association with a decrease in HIV/AIDS prevalence.

Kawango EA, Jeckoniah O, Ndinya A, Kreiss J, Weiss N. 2004 Risk of HIV-1 in Rural Kenya: A Comparison of Circumcised and Uncircumcised men. *Epidemiology* 15: 157-163

This is a report on a study done among men within a single ethnic community in which male circumcision was dictated by religious domination. This report provides evidence that yet again circumcision is associated with a reduced risk of HIV-1 infections.

Neeguaye AR, Neeguaye JE, Biggar RJ. Factors that could influence the spread of AIDS in Ghana, West Africa: knowledge of AIDS, sexual behavior, prostitution, and traditional medicine practices.

This article states that Ghana is a country in the early stages of the HIV epidemic. Knowledge of HIV/AIDS was analyzed along with sexual habits, use of prostitutes, traditional healer practices and skin piercing customs. Most men in this study showed to be married to one wife. Knowledge of AIDS was seemingly widespread. However, use of condoms was very limited. This article shows that although Ghana has a low prevalence of HIV/AIDS, the disease may spread and grow. Nationwide education about the disease and its consequences along with the beneficial uses of condoms in disease prevention may be a way to keep the disease stable in Ghana.

Ntozi JPM, Ahimbisibwe FE. Some factors in the decline of AIDS in Uganda. *The Continuing African HIV/AIDS Epidemic* 93-107

This study confirms that the HIV/AIDS trend in Uganda is steady and continuous due to a few factors. In particular, there is shown to be a very high level of AIDS awareness and fear among those who took part in the study, showing that the efforts of the Ugandan government and other groups on educating and promoting condom use have truly paid off. Of note, although Uganda has a very low rate of male circumcision, this may be offset by governmental efforts to increase HIV/AIDS awareness and education, leading to a decrease in HIV prevalence.

Population Reference Bureau 2010

The population reference bureau reports for 2010 provides demographic highlights, the environmental factors, indicators on Women, family planning as well as health & poverty statistics of each country I will focus on. This report allows me to gather up to date statistics on each country that can be consistent across the board to allow for statistical analysis of various factors. Statistics from this report can be seen in figure 12. These resources are extremely useful in giving a quick breakdown of population demographics for each country.

USAID. 2010. HIV/AIDS Health Profile: Zimbabwe. Towards Universal Access.

USAID. 2010. HIV/AIDS Health Profile: Kenya. Towards Universal Access.

USAID. 2010. HIV/AIDS Health Profile: Uganda. Towards Universal Access

USAID. 2010. HIV/AIDS Health Profile: Zambia. Toward Universal Access.

These health profiles provided by USAID will give a simple way to analyze each country by looking at new data compiled by the organization. They provide statistics and estimations on population, Adult HIV prevalence, the prevalence among those most at risk for the disease, and the percentage of HIV-infected people receiving therapy. Through these profiles, I also get a bit of brief history on each country and what each country may be doing nationally to fight against the disease, broadening my knowledge of the current situation.

## **Results**

After reading research on the current trends of the HIV/AIDS epidemic in the regions of Southern, East, and West Africa, it quickly became very apparent just how complex each region is when it comes to pinpointing what the important risk factors truly are. This is the reason why many countries all over Africa are struggling with the disease and mitigating its impacts on their citizens. The fact of the matter is that what may work for one country will not necessarily work for another due to just how multi-dimensional the HIV virus really is. By this I mean researchers have to take into account many dimensions of each population in order to truly figure out what is going on.

With an understanding of how complex the traits contributing to HIV/AIDS prevalence in one country can be in comparison to not only a neighboring country but also a different region of Africa, the original aim of this thesis remains; to draw a conclusion to what may be some of the significant risk factors among the regions of Sub-Saharan Africa. Through analysis of current statistics provided by the World Health Organization, the Population Reference Bureau, and UNAIDS, I have found a few commonalities as well as differences between these regions that may be possible underlying factors that have contributed to high or low HIV/AIDS prevalence.

### **Southern Africa**

Within Southern Africa, Zimbabwe is a landlocked country surrounded by Mozambique, South Africa, Botswana, and Zambia (Fig. 3).



**Figure 3: Geographic region of Southern Africa**

Zimbabwe, with a relatively young, unstable Government led by the controversial President Mugabe, gained independence from Great Britain in 1980 (AVERT Zimbabwe). The leadership of President Mugabe has proven to drive the country into a tailspin. In May of 2005, under President Mugabe's direction, "Operation Murambatsvina," was initiated to redistribute people from urban to rural areas. The Zimbabwean Government claims this was a response to the increase in illegal housing, crime and the spread of sexually transmitted diseases in urban areas throughout the country. However, the United Nations claims this campaign was simply a direct attack on the poorest sections of Zimbabwean society that represent the main opposition to President Mugabe (AVERT Zimbabwe). July 2005 estimates say that the operation displaced more than 700,000 people including over 79,500 adults living with HIV (AVERT Zimbabwe). Many of these people had previously been receiving antiretroviral drugs to delay the onset of AIDS but now had no access to them as treatment centers and clinics had been demolished. Under President Mugabe's leadership, access to education and information about HIV has decreased and nationwide sales of condoms has fallen (AVERT Zimbabwe). Between May and



June of 2005, sales of male and female condoms dropped by over 20% and 40% respectively (Kajumulo, 2005). Zimbabwe currently has adult HIV/AIDS prevalence rates for males and females aged 15-49 of 12.2% and 18.7% respectively (PRB, Zimbabwe, 2010). This HIV/AIDS prevalence rates rank only behind Botswana (24.8%), Lesotho (23.6%), Swaziland (25.9%), and South Africa (17.8%) (AVERT). The country of Zimbabwe has a population of about 13 million citizens, with 37% of the total population living in urban areas (PRB, Zimbabwe, 2010). This is of concern due to the link that has been shown between higher rates of HIV/AIDS prevalence and urban populations (Boerma J, Gregson S, Nyamukapa C, Urassa M. 2003). The population of Zimbabwe is also extremely youthful, with nearly 50% of citizens being under the age of 15 years old (PRB, Zimbabwe, 2010). This youthful population is a possible consequence of the devastating effect that HIV/AIDS has on a population, with many adults dying from AIDS, resulting in a population with an uneven distribution of ages across the board that can be seen through the population pyramid for Zimbabwe (Fig. 4).

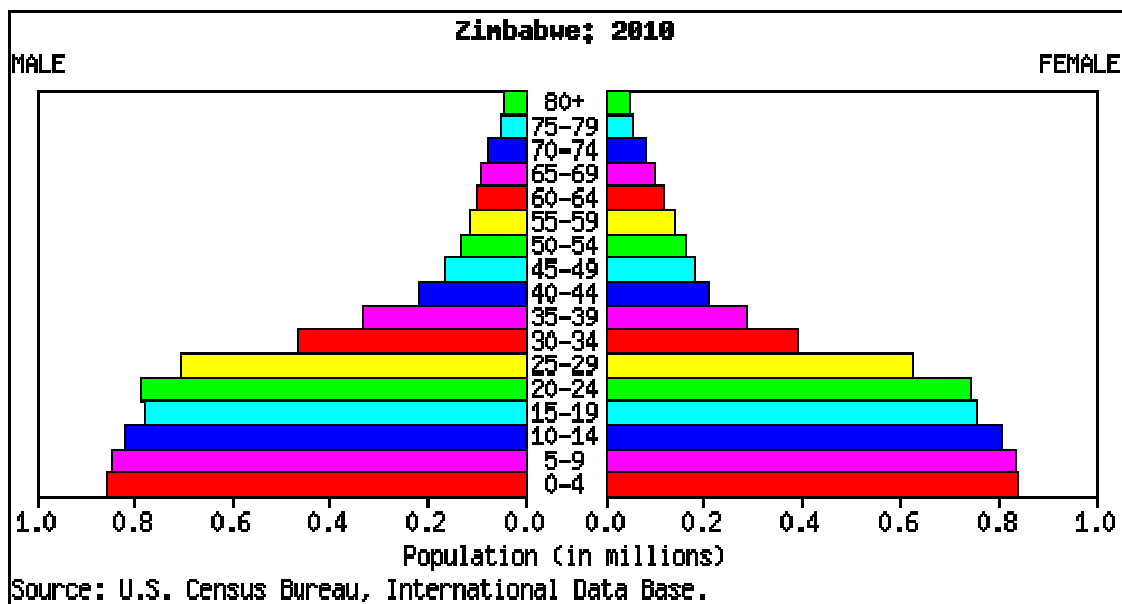


Figure 4: Population pyramid for Zimbabwe in 2010

For quick comparison, in the United States only 20% of the population is under the age of 15, showing more of an even distribution of ages rather than a bottom heavy age pyramid (Fig. 5).

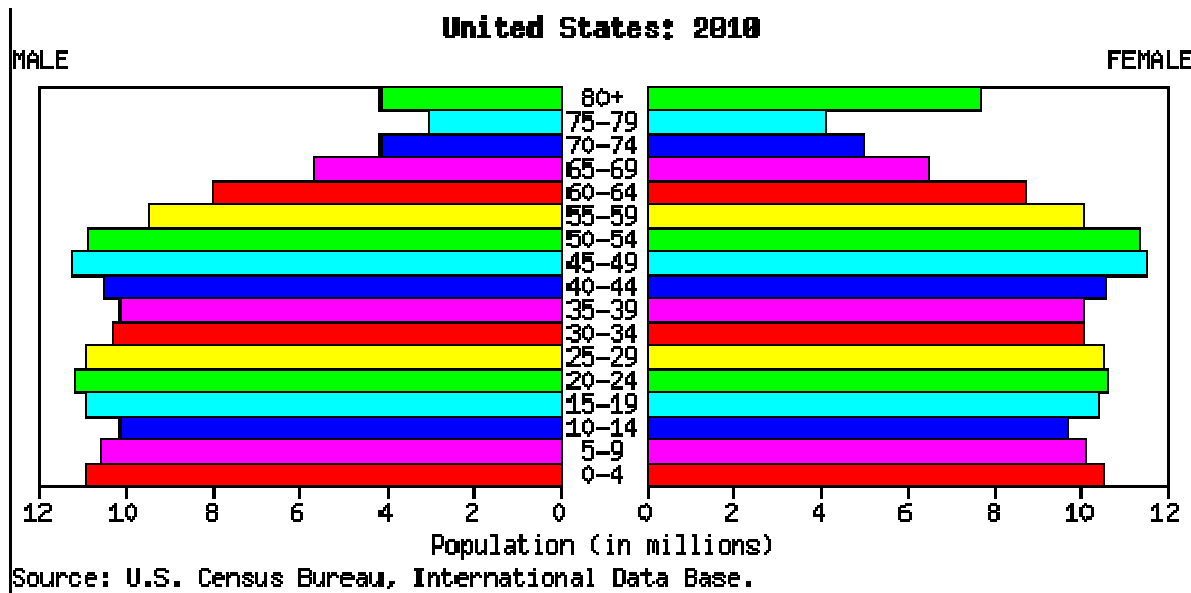


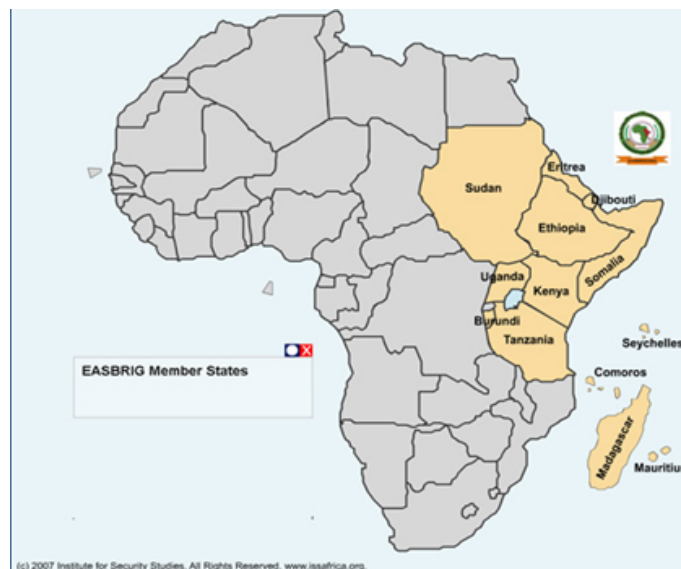
Figure 5: Population for The United States in 2010

In the coming years, this youthful population will be entering adulthood which contains the years, 15-24, in which someone is most at risk to contract HIV/AIDS (Global Health Council). Along with having a very youthful, urban population, Zimbabwe does not commonly practice male circumcision, a factor that has shown to decrease the likelihood of HIV/AIDS contraction (Gray R, Kigozi G, Serwadda D, Makumbi F, Watya S, Nalugoda F, Kiwanuka N, Moulton L, Chaudhary M, Chen M, Sewankambo N, Wabwire-Mangen F, Bacon M, Williams C, Opendi P, Reynolds S, Laeyendecker O, Quinn T, Wawer M. 2000). The percentage of the total male population that are circumcised for Zimbabwe is 10% (Williams B, Lloyd-Smith J, Gouws E, Hankins C, Getz W, Hargrove J, Zoysa I, Dye C, Auvert B. 2006). The combination of

all of these factors working together within Zimbabwe could be reasons why HIV/AIDS is currently devastating the country.

## East Africa

Within the geographic region of East Africa, I focused on Kenya, which is bordered by Tanzania, Somalia, Ethiopia, Uganda, and Sudan (Fig. 6).

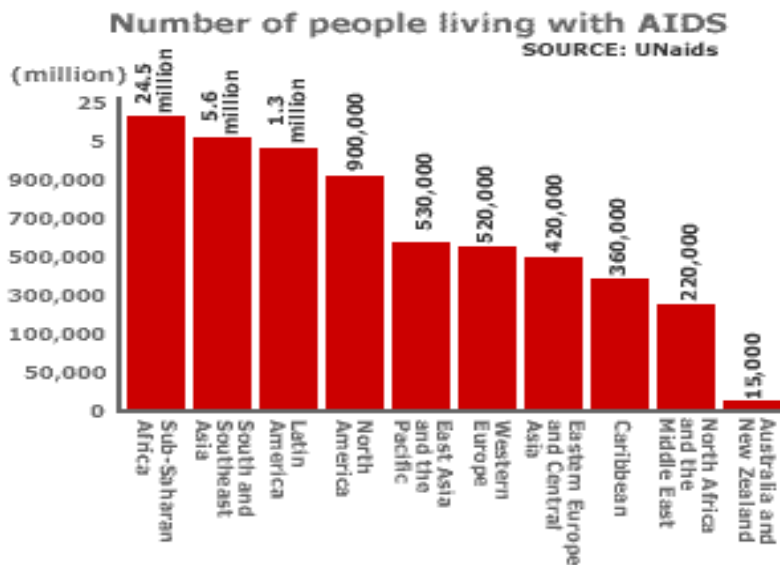


**Figure 6: Geographic region of East Africa**

Also once a British colony, Kenya gained independence on December 12, 1963 (“Kenya”). Kenya experienced a peak in HIV/AIDS prevalence rates in 2000 of 13.4%, and in 1999, Kenyan President Daniel Arap Moi declared in a speech that the AIDS epidemic was a national disaster and that a National Aids Control Council would immediately be established (“HIV and AIDS in Kenya”). While knowledge of HIV/AIDS among the

Kenyan population is high, peak HIV/AIDS prevalence rates for Kenya are often attributed to little access to anti-retroviral treatment, particularly within the urban populations of

Kenya (“HIV/AIDS Policy, Kenya”). Kenya has recently focused its HIV/AIDS prevention efforts on new, evidence based approaches to HIV prevention. From 2005 to 2010, the Kenyan National HIV and AIDS Strategic Plan aimed to focus on increasing the availability and access to counseling and HIV testing, condom promotion, strengthening sexually transmitted disease and HIV program links, expanding services for mother-to-child transmission, ensuring more effective and targeted behavior change communication, promoting abstinence, safe sex and delayed sex debut among young people, improving the ability of safe blood supplies, ensuring injection safety and ensuring mutually supporting prevention and treatment efforts (AVERT Kenya). Along with these Governmental goals, Kenya has made AIDS education part of school curriculum for primary and secondary schools (United Nations, Kenya). It is believed that due to the combination of Governmental dedication and the increase in education and awareness, along with financial aid from the Governments of The United States, The United Kingdom, and Japan, HIV/AIDS prevalence rates have significantly declined (AVERT Kenya). As well as donor governments, Kenya also received funding to combat HIV/AIDS from organizations such as The World Bank, which approved \$100 million in funding in 2005(AVERT Kenya). Kenya has current HIV/AIDS prevalence rates for males and females of 4.3% and 8.0% respectively (PRB, Kenya, 2010). It should be noted that these HIV/AIDS prevalence rates, as well as numbers for the total amount of people living with AIDS, are still well above other regions of the world (Fig. 7). However, the rates of HIV/AIDS prevalence within Kenya are significantly lower than many other countries within Southern Africa.

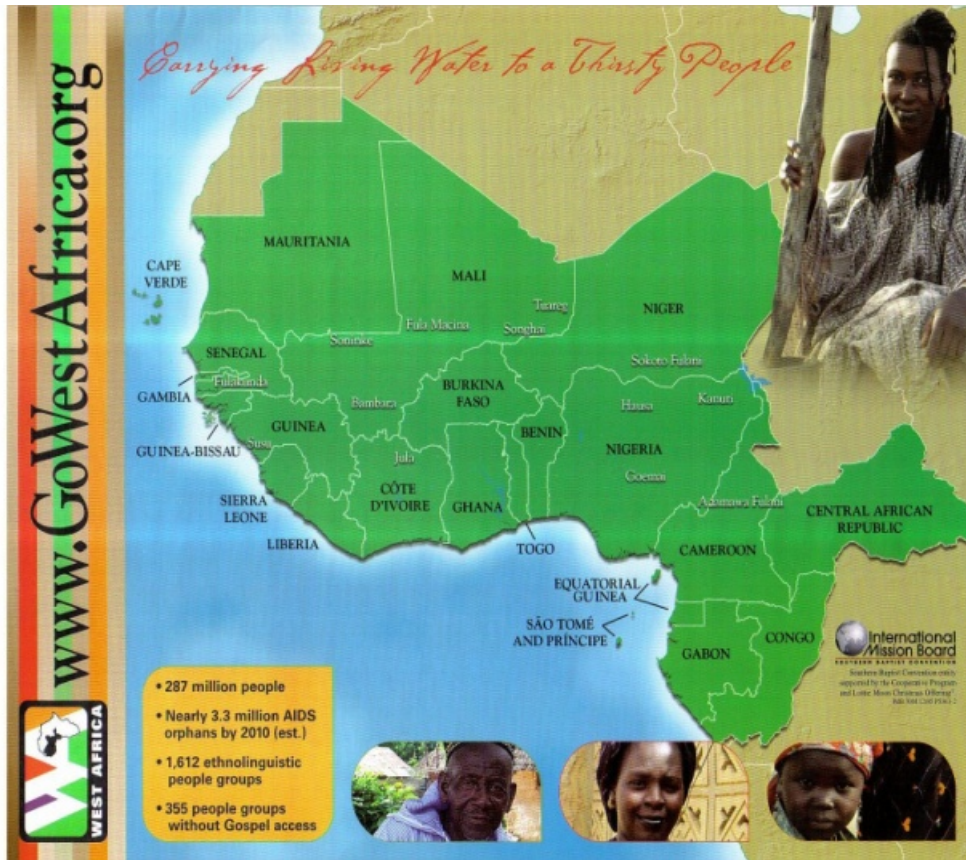


**Figure 7: Number of people and locations of people living with AIDS around the world**

Kenya has a mid-2010 population projection of 40 million with 42% of their population under the age of 15. In contrast to Zimbabwe, Kenya has experienced much less urbanization, with only 18% of their total population living in urban areas (PRB, Kenya, 2010). Also, the percentage of males that are circumcised within the Kenyan population is 84%, which is high in comparison to countries in Southern Africa (Williams, et al).

## **West Africa**

Within the geographic region of West Africa, I focused on the country of Ghana, which is bordered by the Ivory Coast, Togo, and Burkina Faso (Fig. 8).



**Figure 8: Geographic region of West Africa**

Ghana, like Zimbabwe and Kenya, was also at one time a British colony and in 1957 became the first African state to achieve independence (Ikoh, 2004). The first case of HIV in Ghana was reported in 1986 but the disease spread slowly throughout the country and has continued to spread slowly today (USAID, Ghana, 2010). Some of the most heavily affected by HIV/AIDS within the Ghanaian population include married women, who are three times as likely to be HIV-infected, sex workers, as well as those with access to transportation and mobility (USAID, Ghana, 2010). In fact, HIV/AIDS prevalence rates among stationary and mobile sex workers were found to be 52% and 37% respectively (USAID, Ghana, 2010). Increased affordability and accessibility of antiretroviral therapy for people living with HIV/AIDS as well as high rates of male circumcision seem to be factors that are contributing to

the prevention of HIV within the country (“Ghana Demographic”). Also helping to prevent the spread of HIV/AIDS within Ghana is the widespread knowledge of HIV and its modes of transmission (USAID, Ghana, 2010). This is through programs that the Government of Ghana has chosen to implement to combat HIV/AIDS. The Ghana AIDS Commission, also known as GAC, is the coordinating body for all HIV/AIDS-related activities in the country and they oversee the response to the disease. They have aimed to take a comprehensive approach to HIV prevention and treatment based on key intervention areas such as promoting HIV/AIDS policy, advocacy, and an enabling environment, coordinating and managing a decentralized response, mitigating the social, cultural, legal, and economic impacts of HIV/AIDS within the country, communicating prevention and behavior change messages, providing treatment, care, and support to HIV-infected and –affected individuals, conducting HIV/AIDS research, surveillance, and monitoring, as well as mobilizing resources and funding to respond to the epidemic (USAID, Ghana, 2010). Along with these nationwide plans to fight HIV/AIDS, the Ghanaian Government has dedicated 15% of its annual health budget for HIV/AIDS activities (USAID, Ghana, 2010). Ghana has also received monetary funds to fight HIV/AIDS from the U.S. Agency for International Development, and in 2009, Ghana received \$14.3 million HIV/AIDS programs and services (USAID, Ghana, 2010). The Ghanaian Government, in partnership with The United States Government, is committed to fighting HIV/AIDS and continuing the development of HIV interventions. A five year joint strategic partnership framework was developed between the two countries in 2008 to include plans for service delivery, HIV/AIDS policy reforms, and shared financial commitments. Specifically, this partnership aims to reduce the number of new infections throughout Ghana by 30 percent by 2013 by increasing anti-retroviral treatment coverage to 60% of those in need (USAID, Ghana, 2010).

This combination of governmental dedication to fighting HIV through many prevention strategies could be the reason that in spite of particular populations within Ghana experiencing elevated risk for HIV/AIDS, the general population of Ghana is experiencing HIV/AIDS prevalence rates for males and females aged 15-49 of 1.5% and 2.3% respectively (PRB, Ghana, 2010).

The mid-2010 population projection for Ghana's population is 24 million citizens, with nearly half of that population, 48%, living in an urban setting (PRB, Ghana, 2010). Nearly 39% of Ghana's total population is below the age of 15 years old (PRB, Ghana, 2010). Of any country analyzed, male circumcision is most commonly practiced in Ghana, with 95% of the male population being circumcised (Williams, et al).

## **Recommendations**

I believe that to understand why a particular population is experiencing high rates of HIV/AIDS disease prevalence, it is important first to thoroughly understand the type of people that make up the population, as opposed to applying a blanket solution to every population. HIV/AIDS may be the most multi-dimensional disease on the planet, thus proving to be one of the most difficult diseases to really understand. Looking at each particular country, on a case by case basis, is highly important when a country hopes to slow down or prevent the disease. Each country analyzed is currently experiencing highly variable rates of HIV/AIDS prevalence, and experiencing those rates for different reasons. Zimbabwe has been subject to poor leadership since it was first declared independent from Great Britain. President Mugabe has not shown the leadership abilities needed for Government leaders who looking to fight HIV/AIDS. As a result, Zimbabweans have had difficulty receiving affordable access to both education and testing for the disease as well anti-retroviral treatment (AVERT Zimbabwe). The affordability of anti-



retroviral drugs is particularly important for not only all three of these countries, but in particular Zimbabwe which had a 2010 per capita GDP of only \$314 US. Kenya and Ghana have per capita GDP's that more than double Zimbabwe, at \$788 and \$708 respectively. (UNSTATS, 2010).

Low incomes and poverty can prevent access to expensive treatment that can delay the effects of AIDS. Both Kenya and Ghana have dedicated large national organizations to address many of the issues associated with the HIV/AIDS epidemic, and it should be no surprise that the current HIV/AIDS prevalence rates of these two countries are significantly lower than those in Zimbabwe. Other notable differences between these three countries found through examination of literature exist (Fig. 9).

Factor/Characteristic	Ghana	Zimbabwe	Kenya
HIV/AIDS prevalence rate (male and female)	1.5% and 2.3%	12.2% and 18.7%	4.3% and 8.0%
Access to counseling /testing	High	Low	High
Knowledge and awareness of HIV/AIDS virus	High	High	High
Access to antiretroviral treatment	Low	Low	Low
Languages spoken	79	19	61
Literacy Rate	79%	49%-76%	61%
Male circumcision	High	Low	High
Condom use	Low	Low	Low
Women (% of total infected population)	56%	58%	65%
Per Capita GDP (US \$)	\$709	\$314	\$788

**Figure 9: Comparison of HIV/AIDS risk factors between Zimbabwe, Ghana, and Kenya**

Of these three countries, Zimbabwe is currently unable to provide significant access to HIV/AIDS counseling and testing (AVERT Zimbabwe). As a result, this can lead to low awareness and education of HIV/AIDS as well as individuals being unaware of their infection. Another difference between the three countries is that Zimbabwe does not commonly practice male circumcision, which has proven to decrease HIV/AIDS prevalence rates (Gray, et al). Proper leadership, strong governmental dedication to fighting HIV such as that seen in Ghana and Kenya, allowing access to multiple media forms of education and testing for HIV, providing male circumcisions at an affordable price, providing condoms and educating the population on their benefits, as well as giving access to affordable anti-retroviral drugs are all ways a country such as Zimbabwe could combat the HIV/AIDS virus and ultimately decrease HIV/AIDS prevalence rates.

## **Conclusions**

If anything, I believe this project allowed me to become more educated on the most deadly disease facing our planet today. Medical and cultural scholars will continue to search for a cure as well as attempt to make sense and predict what HIV/AIDS risk factors may be important to focus on. Before this project, I understood little about the correlation between some of the previously mentioned risk factors and their connection to increased HIV/AIDS prevalence rates. After completing this project, I have an understanding of just how multi-dimensional the HIV/AIDS virus truly is. To fight HIV/AIDS not just in African countries, but around the world, it is important to first fully understand the disease within the context of each population, begin addressing what needs to be done in order to protect those most at risk for contracting the disease, and then develop a way to provide proper the proper education and treatment for HIV/AIDS to those

infected.

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