- Group Paper Assignment

A major assignment was given to the students at each of the collaborating institutions during the Fall semester of 2007. A group paper was assigned that was to be researched and written by a team made up of at least one student from each institution. The team also had Kenyan consultants with whom they could email correspond with to help with data collection.

- Topics: HIV Paper Assignment

  Children and AIDS in US

  Children and AIDS in Kenya

  Children and AIDS globally

  College age people and AIDS in US

  College age people and AIDS in Africa

College age people and AIDS globally

Women and AIDS in US

Women and AIDS in Kenya

Women and AIDS globally

African-American Women and AIDS in US

African-American Men and AIDS in US

HIV drugs in the US

Drugs in Kenya

HIV and AIDS trends in US

HIV and AIDS trends globally

HIV and nutrition in US

HIV and nutrition in Africa

AIDS and parasitic diseases

- **Example of Group Paper**

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Parasitic Diseases and HIV/AIDS

Human Immunodeficiency Virus was given the name HIV after about 10 years of scientific study (Weeks & Alcamo, 2006). Within the first few years that the virus was discovered, it was referred to as HTLV-III/LAV: T-cell lymphotropic virus type III/lymphadenopathy-associated virus; two names were given because America and France were arguing over who isolated the virus first (Weeks & Alcamo, 2006). Regardless of who receives the credit, the discovery of HIV was a major breakthrough in the scientific community. Weeks and Alcamo (2006) compare the initial research of what later would have been identified as HIV in *AIDS: The Biological Basis* to six blind men examining an elephant. Each man, examining a different part of the elephant, believes the elephant to be a different object than the rest of the men. This analogy pertains to the difficulty in identifying HIV. By 1985-1986, HIV had successfully been identified, isolated, and further studied. (Weeks and Alcamo, 2006)

HIV is a retrovirus. It consists of a surrounding layer of protein and a core of nucleic acid, specifically RNA. HIV is known as a retrovirus because it must first convert its genetic material into DNA before inserting the genetic material into the host cell's DNA, which eventually results in new virions. On the envelope of the virus are spikes of proteins, specifically gp120 and gp41; see Figure 1 below. The sponge like protein gp120, binds to a specific receptor protein on the surface of the target cell. After the binding takes place, the receptor protein bends over, allowing the HIV virus to get closer to the target cell. The virus then injects its genetic material into the host cell through the gp41 protein (notes 11-13-07, Kosal). Some general symptoms of HIV are: fatigue, mild fever, sore muscles, occasional diarrhea, and swollen lymph nodes (Weeks and Alcamo, 2006).

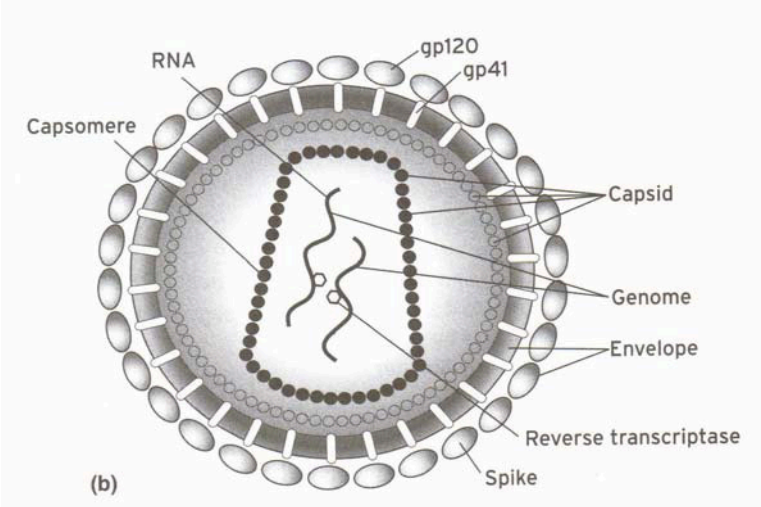

Figure 1. A diagram of the HIV virus from *Aids: The Biological Basis* (2006), pg. 35. Pay special attention to gp120 and gp41.

After extensive research in the mid 1980s, Max Essex of Harvard's School of Public Health discovered that a virus almost identical to HIV was in some African primates; this virus is called simian immunodeficiency virus, SIV (Weeks & Alcamo, 2006). With this discovery, and other evidence, the current accepted origin of HIV in humans is credited to a transmission from African primates, specifically chimpanzees (Weeks & Alcamo, 2006). Scientists continue to believe that this transmission was probably due to a primate bite or scratch or from infected bush meat blood through an open wound on a human (Weeks & Alcamo, 2006). After the virus was successfully adapted to humans, it spread throughout the population through various vectors, which will be discussed later. (Weeks and Alcamo, 2006)

Acquired immune deficiency syndrome, AIDS, has been an issue in the medical community long before scientists discovered the virus HIV. There are many misconceptions about AIDS and HIV. Many people are unaware of the difference, since HIV is usually coupled with AIDS as HIV/AIDS whenever the two are discussed. AIDS is actually the final stage of HIV infection. A person infected with HIV only develops AIDS when certain criteria are met according to the definition. The definition of AIDS has been changed over the years as new information has been revealed. However, it is accepted to say that a person has AIDS when the count of helper T cells drops below 100 cells per microliter of blood (Weeks & Alcamo, 2006), thus crippling the immune system. Breaking the words apart and taking each word for it's separate definition may help remember its meaning: acquired means that you are infected with HIV; immune deficiency is a weakness in the body's natural defense system against diseases; and syndrome is a group of health problems that make up a disease (What is AIDS?, 2007). Helper T cells are cells that help in the action of destroying foreign things in the body, such as viruses (notes 11-13-07, Kosal). When the count of helper T cells drops, the immune system is weakened because those cells are no longer available to help fight disease. Even though this general definition is accepted, according to certain criteria, such as certain diseases being present due to HIV infection, a person can be diagnosed with AIDS even if his or her helper T cells have not dropped below 100 per microliter of blood. A few examples of other criteria are the presence of opportunistic diseases present

such as Toxoplasmosis and Cryptococcosis, or the presence of a secondary cancer such as Kaposi's Sarcoma (Weeks & Alcamo, 2006). There are numerous diseases that qualify for a person to be diagnosed with AIDS. Continually, it is possible that a person be diagnosed HIV positive and yet never develops AIDS. This is possible for both natural reasons as well as medication. (Weeks and Alcamo, 2006)

Based on its definition, a person does not become infected with AIDS, a person becomes infected with HIV; HIV suppresses the immune system making the body susceptible to illnesses that together form the syndrome of symptoms known as AIDS. There are several different modes of transmission of HIV: sexual intercourse, intravenous drug use (sharing needles), placental transmission, breast-feeding, blood transfusion (not as common today) (U.S. Department of Health and Human Services, October 5,2007). A study from 1996-2004 (2006, June HIV/AIDS among Youth) showed that young people diagnosed with AIDS lived longer than people with AIDS from any other age group—except those younger than 13 years of age. 76% of infected people between the ages of 13 and 24 were still alive nine years after being diagnosed, compared with statistics of those from various age groups who did not survive after the nine year period: 81% younger than age 13; 74% aged 25-34; 70% aged 35-44; 63% aged 45-54; 53% aged 55 and older.

An estimated 40,059 young people in the U.S. had been diagnosed with AIDS in the beginning of the epidemic, and an estimated 10,129 of them have died. The young people accounted for 4% of the total 944,306 AIDS diagnoses, and 2% of the 529,113 deaths of those infected with AIDS (HIV/AIDS among Youth, Center for disease control and prevention).

There are no specific symptoms for AIDS. These are some symptoms that occur when HIV may be progressing to AIDS (early AIDS symptoms): fatigue, weight loss, night sweats, frequent yeast infections, persistent skin rashes, etc. Later AIDS symptoms might include: Opportunistic infections, fevers, painful swallowing, nausea, abdominal cramps, vision loss, coma, cervical cancer, and Lymphoma (. Because there are no symptoms specific to AIDS the only sure way to know if someone is infected is to be tested. Young people between the ages of 13 and 24 are the most susceptible group to be infected with HIV (2006, June, HIV/AIDS among Youth). To avoid infection, individuals should abstain from sexual intercourse, and intravenous drug use. There is no cure for those who are infected with HIV, but there are medications that can slow the effects of HIV and its concurrent opportunistic infections (What is AIDS?, 2007).

Because of the rapid spread of HIV/AIDS, scientists and doctors are working as hard as they can to find a cure for the disease. The development of medications has been a great concern for the medical community. There are four basic types of medications available today. The first is called nucleoside analog reverse transcriptase inhibitors—also known as "nukes" (Kelly, 2006). These "nukes" act as a blockade so the HIV can not make copies of a healthy cell's DNA. Without the healthy cell's DNA the virus can not make copies of itself. The medications in the "nuke" category are Zidovudine, Didanosine, Zalcitabine, Lamivudine, Stavudine, and Abacavir. The second class of medications is known as non-nucleoside reverse transcriptase inhibitors. These medications act in a similar manner to the "nukes." They do not allow HIV to make copies of the healthy cell's DNA, but they accomplish this in a different way by "[interfering] with HIV-1 reverse transcriptase by noncompetitively binding directly to

the enzyme downstream from the active catalytic site" (Murphy, 1997). The medications in this class are Delavirdine, Nevirapine, and Efavirenz. The third class of medication is protease inhibitors. These medications thwart the infected cells from discharging HIV into the body (Kelly, 2006). The medications include Saquinavir, Indinavir, Nelfinavir, Ritonavir, and Amprenavir. The last type of medication is fusion inhibitor. This medicine stops HIV from entering into the healthy cells of the body. The only medication in this class is enfuvirtide. Along with these medications many people affected with HIV go to local herbalists for remedies. The primary use of the herbs is to recondition a person's overall immune balance. There is a focus on overall health and balance instead of trying to separate and cure the illness alone (Hanna, 1998).

Many African people choose to go to an herbalist because they can not afford the prescription medications or because they are nowhere near a distribution site. The distribution sites are usually state hospitals, crisis centers, and community health clinics. Most of these sites are found in the more urban parts of Africa which makes getting the medications difficult for the people of rural Africa who have no transportation other than walking. The government in South Africa was reserved to help provide medications for people affected with HIV, but did not begin this until 2004 (Pembrey, 2007). This is mostly due to the high price of prescription drugs.

There are three drug companies that are making an effort to provide drugs for lower prices. Merck, a US drug manufacturer, has offered to provide Crixivan, and the protease inhibitor Indinavir, for about $600 a year. This is about 10% of the cost in the United States. Cipla is a generic drug manufacturer in India willing to offer a triple drug regimen for about $600 a year. This is about 40% of the cost that most discount prices of major drug manufacturers. Hetero Drugs Limited is another Indian drug manufacturer willing to offer the same triple drug regimen for $347 a year. The competition between the two Indian companies has some worried that the continued cost cutting will decrease the quality of the drugs. The generic drugs offer the same quality of brand name manufactured drugs for fraction of the cost (Cichocki, 2007). There is also funding for the drugs from charities. One such charity is *Doctors Without Borders*. This charity helps re-establish supply lines that have been broken by fighting, bad conditions, destruction of roads, and lack of transport vehicles or funds.

While there is a worldwide effort to help slow the spread of HIV/AIDS, with a special focus on Africa, the world seems to have forgotten about other afflictions in Africa that need attention. Parasitic diseases are often referred to as neglected diseases because they often fall under the shadow of more well known afflictions like Malaria (and other virulent killers) or AIDS (Silberner 2007). A parasitic disease is defined as a disease caused by the presence and vital activity of a parasite, or as a reaction to a parasite (Centre for Cancer Education 2007). Approximately one billion people worldwide are infected with a parasitic disease. Most of these diseases are very easily preventable, and many are not effectively treated (Silberner 2007).

Schistosomiasis is a parasitic disease that can stunt growth and immunity opening doors to other infections and diseases such as AIDS. Parasitic diseases such as schistosomiasis, guinea worm, lymphatic filariasis, river blindness, and leishmaniasis are typically non-life threatening, but can cause death after years of infection. Not only do parasitic diseases affect a person's physical health, they can also have an effect financially, socially, and emotionally. Parasitic diseases can keep people from work or

school for months due to the effects of the disease. This then brings on an extra financial burden on the individual. If the person inflicted with a parasitic disease is also inflicted with AIDS, he or she may not be able to afford medication for both. Often there are families with multiple infected members (Silberner 2007).

Parasitic diseases may be an explanation why AIDS develop in Africa and other tropical regions in men and women alike, whereas in other, non-tropical areas of the world, AIDS is more prevalent in men. In non-tropical areas of the world, men are more likely to have parasitic diseases than women because homosexual men are more likely to have exposure to parasites due to fecal contact (Pearce 1997).

Parasitic disease may be an essential factor for the development of AIDS. Most of the populations that have a high prevalence of AIDS have shown evidence for pan-immunosuppression prior to having evidence HIV/AIDS. The epidemic of parasites in homosexuals preceded AIDS by several years, and this is a common factor in African and Haitians as well. If parasites were not somehow connected to the transmission of AIDS, heterosexual transmission would hypothetically be at an equally high rate in parasite free regions such as the United States, Europe, and Australia. The spread of AIDS in groups without parasitic diseases is much slower than in those with parasitic diseases. Parasites exert immunosuppressive, antigenic and mitogenic effects on T-cells which are directly affected by HIV/AIDS (Pearce 1997).

When Benson Njoroge, an herbalist in Kenya, was asked various questions about parasitic diseases and AIDS, he had some very interesting points to share. He agreed with the research that parasitic diseases increase the cost of living and the risk of exposure to an HIV infection. He says that people infected with parasitic diseases spend so much money on the treatment of their disease, that they lack the resources necessary to address the basic needs of life. Mr. Njoroge says that this impoverished condition, and this desperation for basic necessities of life makes the idea of commercialized sex and other undesirable behavior a viable option for the generation of income. These circumstances ultimately expose the individuals in this position to an HIV infection. "A hungry man has low bargaining power for safer sex." Mr. Njoroge says that he knows more people with parasitic diseases then he does with HIV, and sees a link between the two.

In conclusion, there seems to be a link between HIV/AIDS and parasitic diseases. Both are major issues in Africa, but parasitic diseases are being pushed under the rug so a focus can be placed on HIV/AIDS (and Malaria). The efforts to slow or stop the spread of HIV/AIDS in Africa are ongoing, but has anyone considered a focus on the parasitic diseases that predispose an individual to an HIV infection. If those making the efforts to slow the progression and spread of AIDS want to hit the problem from all angles, they should definitely consider the prevention and treatment of parasitic diseases in their efforts.

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