MONTGOMERY COLLEGE STUDENT JOURNAL OF SCIENCE & MATHEMATICS
Volume 3 June 2005

The Global Aids Epidemic and the HAART Treatment Program

by

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A Global and Deadly Epidemic

At the end of 2002 an estimated 42 Million men, women, and children worldwide were infected with Human Immunodeficiency Virus known as HIV (Avert.org "World HIV"). This virus, which causes the disease called AIDS (Acquired Immune Deficiency Syndrome), "was first reported in 1981 and has since become a major worldwide epidemic." When infected with HIV the immune system is broken down, and the body loses its ability to fight infections and certain cancers (NIAID "Basic").

Individuals diagnosed with full-blown AIDS become vulnerable to life-threatening infections, as well as certain forms of cancers called opportunistic infections, which are caused by organisms and/or cancer cells that usually do not cause illness in healthy people (NIAID "Basic").

The total number of AIDS deaths from 1981 until the end of 2003 was approximately 21.8 million. In spite of antiretroviral therapies, such as Highly Active Antiretroviral Therapy (HAART--introduced in 1996-97) which proves to have extended survival in AIDS patients, the year 2002 alone estimated 3.1 Million people dying of AIDS; projecting a higher global total in any year since the beginning of the epidemic. Out of those, 610,000 were children less than 15 years of age and 2.1 million of the deaths occurred in Sub-Saharan Africa (Avert.org "Worldwide").

As demonstrated in table I, the HIV positive population in poorer and underdeveloped countries is rapidly increasing in contrast to that of the developed world; and even if prevention programs manage to eliminate new infections, the death rate amongst those

already infected will keep increasing for years before peaking, unless effective treatment, such as HAART, is made available.

Table I: People Living with AIDS 1997-2002

Year	Sub-Saharan	USA	Western Europe
1997	20.8 million	860000	530000
1998	22.5 million	890000	500000
1999	23.3 million	920000	520000
2000	25.3 million	920000	540000
2001	28.5 million	950000	550000
2002	29.4 million	980000	570000

As a result, this virus and its associated diseases now affect countries worldwide as well as dominate national and international affairs. In addition, the epidemic is acknowledged to be causing major changes to countries' economies.

Economic Impact of HIV/AIDS: We are all affected!

As HIV is spreading among young adults, the disease will show long-term economic interferences related to lost productivity. According to The International Labor Organization AIDS will, by the year 2020, have reduced the workforce in 15 countries by 24 million people. Even more "workforce costs are expected to increase due to health related absences, higher payments for insurance and medical care, and hiring along with retraining costs" (American). In addition, the agricultural know-how of the youth is declining as parents die of AIDS before they get a chance to pass on knowledge to the new generation. In Kenya only 7% of households headed by AIDS orphans have adequate knowledge of agricultural production. Overall, AIDS has killed 7 million agricultural workers, but the numbers are estimated to reach 23 million in 2020 (Focus).

In countries worst hit by HIV/AIDS Gross Domestic Product (GDP) will decrease significantly as the number of people with HIV and AIDS increases. In South Africa, for example, the GDP is projected to be 17% lower by 2010 (American). Furthermore,

considering that more than a third of the hardest hit countries' GDP comes from agriculture, their GDP can expect to decrease even more as the number of deaths within agricultural workers start to increase (Focus).

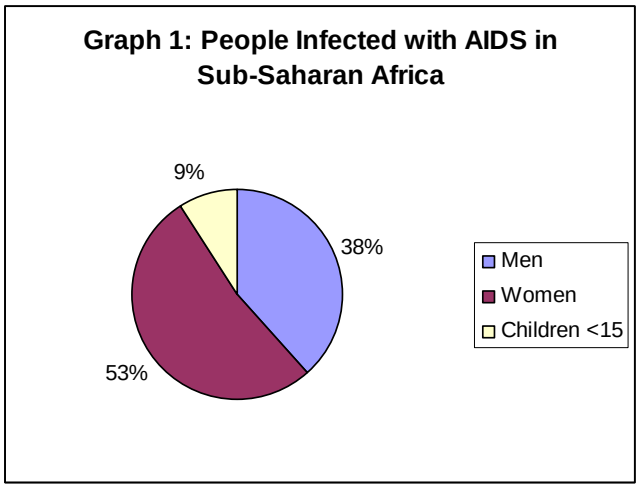
A decade of increasing gains in developmental achievements and life expectancy in underdeveloped countries has been reversed due to the strong impact of AIDS. The current decrease in life expectancy, because of the illness, is having a direct impact on the economy in all of those countries. According to the American Association for World Health, "every five year decrease in life expectancy shows that the annual economic growth of a country may be reduced by 0.05%."

HIV and AIDS threaten to reduce the economic potential of developing and under-developed countries alike. On a macroeconomic scale, HIV/AIDS can cause direct foreign investment in underdeveloped countries to decrease, which in turn will cause both developed and underdeveloped countries to experience a decreased share of world trade. Consequently, fewer developed and developing countries will benefit from integrated world trade, limiting the sharing of knowledge and resources, which forms the core basis of today's global economy (American).

Global Demographic Distribution: Who is most affected?
HIV and AIDS vary significantly according to different demographic and geographic population groups. As a result of the epidemic, children are especially highly impacted. AVERT estimated that as of 2003, there was a cumulative total of 13.44 Million AIDS orphans, "defined as those having lost one or both of their parents before reaching the age of 15" (Avert.com "World HIV").

Approximately 570,000 children are infected with HIV each year. Out of these, over 90% acquire the disease at birth or through their mother's breast milk.
It is estimated that 82.1% of all AIDS Orphans are living in Sub-Saharan Africa, a very high number in comparison to other developing and underdeveloped regions (Avert.com "Worldwide").

As noted, the transmission of HIV in women has a direct impact on the total number of HIV infections because it also leads to further transmission of HIV to children. Overall, almost 50% of adults living with HIV/AIDS are women, and it is estimated that between 12 and 13 African women are currently infected with HIV for every 10 African men (Page-Shafer). Shown in Graph I, this amounts to more than 50% of the AIDS infected population in Sub-Saharan Africa.



When not taking regions such as Sub-Saharan Africa as well as North Africa and the Middle East into account, the male population dominates the numbers of HIV/AIDS. In 2002, an estimated 2.2 million men aged 15-49 became infected with HIV, which brought the overall number of adult males living with the infection up to 19.4 million (Avert.org "Worldwide").

Geographic Distribution and Contrasting Trends of the Epidemic

The majority of people currently living with HIV/AIDS, about 95%, live in the under-developed and developing world. This amount is predicted to increase alongside the rise in infections because of poverty; limited resources and poor public health systems continue to exist in these regions (Masci). In both Western Europe and North America the overall HIV prevalence has risen slightly, mainly due to anti – retroviral therapy keeping HIV positive people alive longer.

According to HIV Insite, located at University of California in San Francisco, the highest percentage of HIV/AIDS incidences in North America are to be found amongst small ethnic minorities such African/American and Hispanic groups. In 2001, 62% of men and

82% of women diagnosed with AIDS were black or Hispanic (HIV Insite “North America”). Furthermore, in 2002 it was reported that AIDS related illnesses remained the leading cause of death for African-American men in the age of 25-44 (Ripnroll.com). In a sexual context, male-to-male sexual relations remain the most common mode of HIV transmission, rising from 32% to 38% in the time period 1999 to 2001; this is believed to be due to a rise in unprotected sex between men (Avert.com “The United States”).

The development of HIV/AIDS in Western Europe has taken the same shape as in the United States. The most common transmission of AIDS is recognized as Heterosexual transmission; from 1997 to 2001 an estimated 59% of newly infected were infected through male-to-female sexual contact. However, the Southern countries, such as Spain, have shown a higher rate of transmission between injection drug users. In 2000 Spain reported that HIV prevalence amongst injection drug users had reached 20-30% (HIV Insite “Western Europe”).

The death rates in Western Europe and in the US might have fallen significantly in the past five years as a result of effective treatment program as later described, but due to especially young adults lacking the use of protection, the infection rate has stayed somewhat the same; this shows the clear need for new prevention programs aimed at young adults, specifically homosexual men.

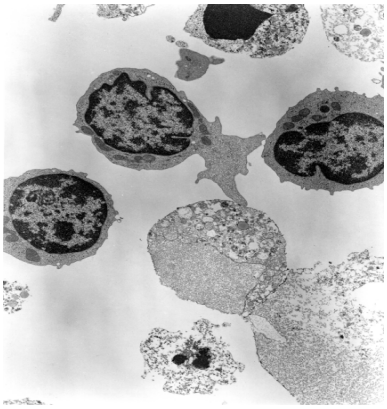
Sub-Saharan Africa is home to most of the HIV/AIDS infected population. In 2002 approximately 29.4 million people were estimated to be living with AIDS. HIV prevalence in some countries is over three times higher than the overall Sub-Saharan HIV prevalence: in Botswana it has reached a high of 38.8%, in Swaziland it is 33.4% and in Zimbabwe 33.7%. The most common transmission mode of HIV/AIDS in Sub-Saharan Africa is heterosexual transmission, out of which women are most affected; of the 28.2 million people living with HIV/AIDS in 2003, about 15 million were women between the ages of 14-49 (HIV Insite “Sub-Saharan Africa”). – See Graph I.

Especially women living in rural areas feel the impact of AIDS. According to the Food and Agricultural Organization of the UN, women whose husbands have to migrate to the city for work are one of the highest target groups because they are subject to their men having several sexual partners. Moreover, traditional culture exposes women to the spread of AIDS; e.g. access to land and food are only secured through a husband, if he should die, an African woman is obliged to marry her husband's brother to secure her own living. If she cannot re-marry, she is often forced to engage in commercial sex, and thereby further contribute to the spread of AIDS (Focus).

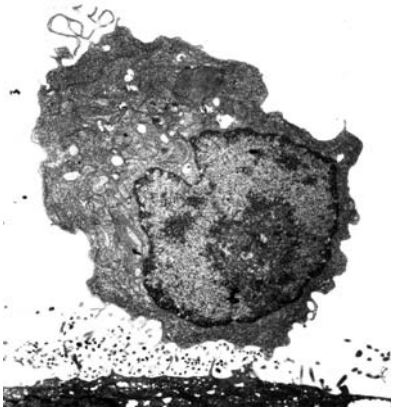
Countries in the Sub-Saharan region have recognized the need for strategic AIDS planning, but poor knowledge of the disease in addition to minimized access to effective treatments, have made it tough for African Governments to complete the programs and make them available to the public. National HIV/AIDS councils and or commissions have been established in 19 countries, and 40 countries have set up strategic plans of how to reach the hardest hit population groups (HIV Insite "Sub-Saharan Africa").

HAART: Effective AIDS Treatment Now Available

According to the National Institutes of Health, current theories hold that intensive treatment with anti-HIV drugs substantially blocks the virus from infecting healthy CD4+ T cells (Bowersox). CD4+T cells are immune cells that carry a marker on its surface known as cluster of differential 4 or CD4. These cells are the primary targets of HIV, also known as "helper" T cells. CD4+T cells help orchestrate the immune response, including antibody responses (NIAID "HIV Vaccine").



Healthy Lymphocyte
(CD4 T-Cell)

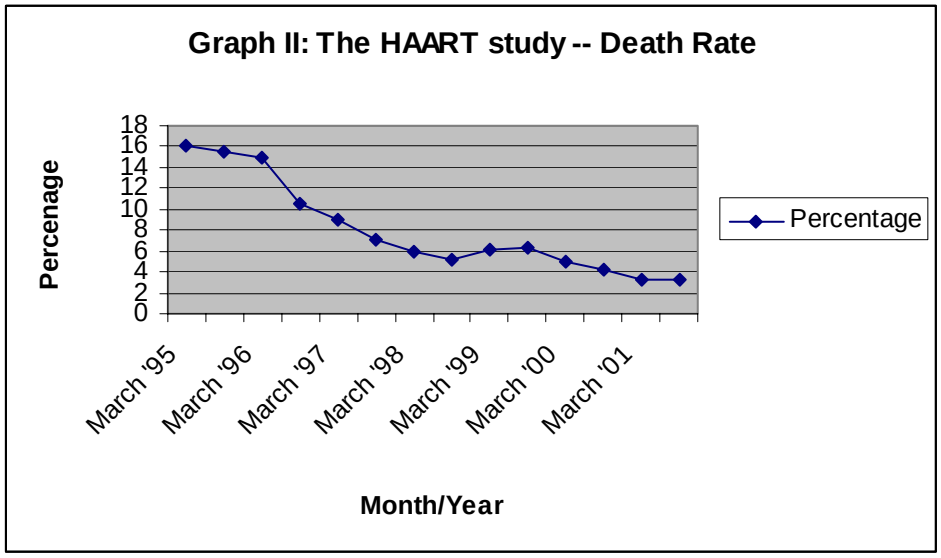


HIV-Infected Lymphocyte
(CD4 T-Cell)

In 1996-97, researchers and clinicians presented a particularly effective triple drug combination therapy of anti-viral agents in the treatment of HIV/AIDS patients. This combination of drugs, namely Zevit (Stavudine), Epivir (Lamivudine) and last, Sustiva (Efavirenz), is known as Highly Active Anti Retroviral Therapy, and commonly referred to as HAART (Baker). The introduction of this drug combination in 1997 has proven to slash death rates by more than 80 percent, and most patients treated with HAART can expect to survive more than a decade, sometimes even longer. "Age no longer seems to be an issue because older people as well as young people on HAART do not have a reduced life expectancy" ("New Drugs").

The biggest and longest evaluation of the effectiveness of HAART was conducted by the EUROSIDA and published in The Lancet (the British medical weekly) in July 2003. The Study was conducted in three stages: (1) in 1994-1995, before HAART; (2) in 1996-1997, when HAART first was available; and (3) in 1998-2002, when new drugs joined the HAART treatment.

The study demonstrated that the HAART treatment program minimized the progression of HIV infection to full-blown AIDS between the pre-HAART and late HAART era. This was reflected by a statistically significant reduction in mortality from AIDS during that time period, as shown in Graph II (Baker).



Overall, the average CD4 count, which represents and is used as the indicator for the overall immune level, among volunteers doubled in the eight years between the no-HAART periods, and when the enhanced HAART regime became available, effectively showing the benefits of the triple combination drug regimen. However, there are a few controversies to be considered regarding the usage of the HAART program. These controversies are not related to its use as the most effective clinical drug treatment against AIDS, but are caused by its extremely expensive costs of treatment, and consequent lack of availability in countries where AIDS is most prevalent, i.e. underdeveloped low income countries ("HIV Cocktail").

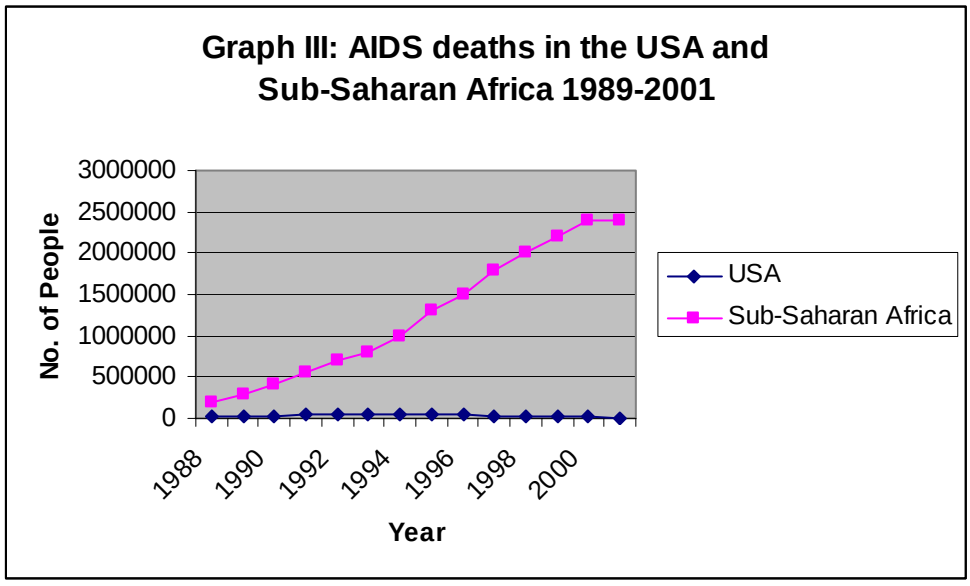
Objective: Reversing Death Rate

In North America, Western Europe, and other developed countries, availability of antiretroviral therapies, such as the HAART program, and quality health care have slowed the progression from HIV to AIDS. In the US alone, the number of deaths from AIDS between 1996 to 1999 decreased by more than 40%, largely due to HAART.

In contrast, in many developing and underdeveloped countries such as those in Sub-Saharan Africa, the lack of antiretroviral treatments and access to quality health care allows for the unrestrained progression of the HIV/AIDS epidemic ("HIV Cocktail"). Additionally, antiretroviral treatments are only available to a very small part of the Sub-Saharan population. The prices of the drugs are simply too expensive for the average

African individual to be able to afford it. By 2001 Botswana, as the first country, had made the antiretroviral drug available to its population. But considering the cost, only 2000 people out of 328,000 infected were being treated with it (HIV Insite "Sub-Saharan Africa").

As noted above, Sub-Saharan Africa has in recent years witnessed the largest number of new infections. This will add to the increasing number of AIDS death rates that has been rising exponentially since 1988 as compared to the AIDS death rates in the US. (See Graph III):



If antiretroviral therapies such as HAART are not provided for HIV positive individuals in those regions, there will be continuous and devastating increases in the death rates from AIDS in both the near and far future. The rising AIDS deaths will cause deleterious and severe negative impact on the population and economy of the world's poorest continent, which in turn will result in a destabilizing effect in the world global economy. It is therefore critical that the governments of underdeveloped, as well as developing, countries take steps towards providing the powerful HIV/AIDS treatment regimen that has changed AIDS from an automatic death sentence to a form of chronic disease in wealthier countries ("New Drugs").

Similarly, international aid institutions along with governments from developed countries must do more to offer the drugs for free, or reduce the cost significantly to the poorest and most affected countries. It took five years after HAART was introduced in the developed countries before pharmaceutical companies in the developed world were willing to make big cuts in the drugs' pricing regimen for poorer countries. Those reductions are driven by intense pressure from lobbying and charities worldwide (HIV Cocktail). In September 2003, drug companies said they had doubled the supply of AIDS drugs to Africa, and reported that more than 76,500 Africans were receiving cut-price drugs from six pharmaceutical firms at the end of June 2003, compared with 35,500 in March 2002 ("New Drugs"). These numbers paled and are completely insignificant in comparison with the current number of individuals living with HIV/AIDS in Sub-Saharan Africa today – 29.4 million.

Conclusion: More Must, and Can Be Done to Stop AIDS Deaths

HIV/AIDS is clearly one of the most dangerous epidemics affecting our world today. It is globally impacting almost every country, and has become both a national and international crisis meriting serious actions from every single governmental and non-governmental organization. The impact of HIV/AIDS on local economies has been particularly devastating in the poorest and hardest hit countries, such as those in Sub-Saharan Africa.

As a result of intense research, effective drug treatment regimens, such as the highly active anti retroviral therapy (HAART), have shown to effectively reduce the conversion of HIV positive individuals into full-blown AIDS patients. Unfortunately, due to the exorbitant costs of these drugs, they are only available to the wealthiest countries in the world. It is therefore important that these regions are compared and contrasted to show in what direction these trends are heading, and at what cause? This information will allow worldwide health organizations, such as UNAIDS, WHO, CDC and EUROSIDA, to evaluate and take appropriate steps to stop and reverse these divergent trends.

In order to make a significant impact, governments from these AIDS ravaged countries must work closely together with the international community as well as with business, labor and civic groups to wage a coordinated war on HIV/AIDS. Similarly, international health organizations must work closely with pharmaceutical companies to provide the HAART treatment at a significant price reduction to the poorest nations while assuring and protecting the intellectual properties and patents of these drugs.

Recent news and activities indicate that both governments and non-governmental entities worldwide, to address this deadly epidemic are allocating significant efforts and funds. However, these efforts appear to be too little and too late to make any lasting impact on the continuing rise in AIDS deaths worldwide. Lastly, the HIV/AIDS epidemic must be regarded as a worldwide problem and not as a regional local problem associated with the poorest nations. More must be done by all to make HAART available to reverse AIDS deaths worldwide.

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Pictures and Graphs:

1. Data for Graph I and Graph III is collected from the Joint United Nations Program (http://www.unaids.org/en/default.asp), the World Bank (http://www.worldbank.org/), and Avert (http://www.avert.org/) .
2. Data for Graph II is collected from the HAART study by Amanda Mocroft et al. "Decline in the AIDS death rates in the EUROsida study: an Observational Study." The Lancet. 5 July 2003: 22-29.
3. The pictures of infected and non-infected CD4 T-Cells are obtained from Technopark Zuric, Space biology group. 2004. http://www.spacebiol.ethz.ch/research/lymphocytes.htm