The Co-infection of HIV/AIDS and Hepatitis B and C: The Socio-Economic Impact on the State of Florida

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EXECUTIVE SUMMARY

Because of the unique nature of HIV/AIDS and hepatitis B and C, the community must be cognizant of the impact and implications they will have economically, socially, and ethically.

This paper seeks to ascertain the rate of co-infection that exists in Florida, gaps in treatment, a projection of future costs for how this is effecting HIV prevention and care activities throughout Florida, and a projection of future financial impact. A short history, epidemiological information, treatment theories, and associated costs are presented for HIV/AIDS, hepatitis B and C, and co-infections between them. A survey was administered to providers from both the public and private sector to achieve a realistic perspective on hepatitis outreach, testing, and treatment. Recommendations based on this research are then given to address prevention, education, and treatment.
HIV/AIDS

DEFINITION AND EPIDEMIOLOGICAL DATA-HIV/AIDS

HIV is the acronym for Human Immunodeficiency Virus, a virus transmitted from one person to another by exchanging body fluids through sex, sharing needles, and from mother to infant. There is currently no cure or vaccine for the HIV virus, although several research companies are currently working toward a vaccine. AIDS stands for Acquired Immunodeficiency Syndrome, and is a medical condition that occurs when HIV destroys the immune system. Specifically, AIDS is diagnosed when a certain number of specific illnesses, referred to as AIDS defining illnesses, occur, and/or when the T 4 helper cells drop below a given limit (less than 200 cells/mm$^3$). T 4 helper cells, or CD 4+ cells, are components of white blood cells. White blood cells are immune cells, and a lower amount indicates the weakening of the immune system. The onset of AIDS is different for specific individuals living with HIV, and depends on a number of factors.

Throughout the world, AIDS is the cause of death for entire generations of people. As the number of infections and deaths reach untold heights, children are left orphans and the elderly are left without care. Some nations face the potential collapse of their society and economy as their people are decimated.

It is easy to conceive of HIV and AIDS as a foreign epidemic or as one that has passed. It sometimes appears that the AIDS crisis in the U.S. came and went. That notion is false and potentially deadly. AIDS in the U.S. is not over, and new problems arise as old ones continue to plague all people affected and infected by AIDS. Every hurdle cleared is relative to the rest that lie ahead. As the following numbers attest, AIDS is not something of the past. In order to understand the future of AIDS, AIDS must be understood as an ever-changing disease.

The Centers for Disease Control and Prevention (CDC) estimates that approximately 900,000 (between 850,000 and 950,000) people in the U.S. are currently living with HIV/AIDS. Another 40,000 people are infected each year (NORA, 2002). Of the 900,000, one-third know their HIV serostatus (whether or not they have HIV) and are in treatment, one-third know they are positive and do not receive treatment, and a full one-third, or 300,000 individuals, do not know that they are infected (NORA, 2002).
Statistics reveal that Florida ranks third in total AIDS cases reported through 2000 (78,830). As for people currently living with AIDS, Florida ranks second with 36,387 persons diagnosed (from the 2000 data). The CDC HIV/AIDS Surveillance Report states that up to and including 2002, 28,299 cumulative HIV and 90,438 cumulative AIDS cases have been reported (HIV reporting began July 1, 1997) (CDC, 2002). Using the reported 10-11% of the national AIDS morbidity and current count of 11% of all persons living with AIDS in the U.S., approximately 95,000 people are estimated to be HIV+ in Florida (Florida Department of Health, Bureau of HIV/AIDS, 2003).

Two common types of tests currently being used for HIV detection are the enzyme immune assay (EIA) and the enzyme-linked immunosorbent assay (ELISA). If initial EIA test results show a reaction, the same blood is tested again. If reactive twice, a confirmation test such as the Western Blot is used and an HIV+ result is returned. All HIV screening tests must be confirmed by another, more specific test. Other tests include: the Radioimmunoprecipitation assay (RIPA), which is another follow-up test used when antibody levels are very low or difficult to detect; the Dot-blot immunobinding assay, which is a rapid-screening blood test; and Polymerase chain reaction (PCR), a blood test capable of detecting the virus in a recently infected person by scanning the genetic information of HIV (hivtest.org).

Easily confused are the laboratory tests and the devices (sometimes called kits) used to collect specimens, which can involve blood, urine, saliva, and vaginal secretions. Examples of testing kits include the Confide HIV Home test, the OraSure saliva/cheek swab test, and the recent FDA approved, 20-minute OraQuick “rapid test.” There are advantages and disadvantages associated with each test relating to confidentiality, ease of collection, required personnel, and reporting time. The most recent testing guidelines can be reviewed from the CDC’s Morbidity and Mortality Weekly Report (CDC, 1999).

While the first AIDS cases were reported in the United States in June 1981, the first HIV test, ELISA, was approved in 1985 and was immediately used to test the U.S. blood supply (aids101.com). Since that time, detection methods have improved and their associated costs have lessened. As the majority of HIV tests detect antibodies, the major factor impacting the ability for any test to detect infection is time. Due to the window between infection and the development of detectable antibodies, recently infected
individuals are often missed by even the most advanced testing methods, which can impact projections. According to the CDC, it takes at least 3 months for the detection of antibodies, and they recommend testing every 6 months. In addition to the time that it takes for antibodies to reach detectable levels, there is also a problem of the time between testing and results. Many people who are tested often fail to retrieve results. This is the problem that the rapid test was developed to counter.

Most medical textbooks from the beginning of the AIDS epidemic to the early ‘90s considered AIDS to be a disease that affected many untold populations, and was invariably quickly fatal. Evidence today, however, shows that HIV and AIDS are managed more as chronic diseases. With the advent of highly active antiretroviral therapy (HAART), many people with HIV are living greatly increased life spans. People with AIDS historically have died from immune failure and the onset of opportunistic diseases, but today die of many of the life threatening chronic diseases found in HIV negative people, such as diabetes, heart disease, and more common forms of cancer.

TREATMENT THEORIES AND BEST PRACTICES-HIV/AIDS

As previously mentioned, the progression from HIV to AIDS is marked by a lower than 200 CD4+ T cells/mm³ threshold and/or the development of an AIDS-defining condition, such as Kaposi’s Sarcoma or Pneumocystis Pneumonia. CD4+ T cells are a type of white blood cell that fights infections. The viral load of HIV in the blood is correlated with disease progression, since people with a high viral load usually develop AIDS faster than those with a low viral load. Antiretroviral drug treatment seeks to reduce viral loads to an “undetectable” level, < 50 copies of HIV per milliliter of blood. Decisions concerning treatment aggressiveness are dependent on the levels of both the viral load and CD4+ T cells.

Side effects, drug resistance, and the ability to preserve future drug options are factors associated with the benefits and risks of early versus delayed drug therapy (aids.org). A detailed side effects chart can be found on Project Inform’s web site (projinf.org). The negative consequences of drug treatment are considerable, ranging from abdominal pains to vomiting, and are a major reason patients discontinue taking
their medications, or fail to take them on a consistent basis. Discontinuing treatment is sometimes favored over adherence because the alternative is physically and psychologically worse.

HIV virus resistance to HAART also impacts the course of treatment. Many people become resistant to one or more classes of anti-retrovirals. The need to keep future drug options open is cited as a reason to follow the CDC’s *Guidelines for Antiretroviral Therapy in Adults and Adolescents with Human Immunodeficiency Virus (HIV) Infection*. The use of class-sparing regimens preserves one or more classes of drugs for later use, possibly extending the overall long-term effectiveness of available antiretroviral therapy (CDC, 1999).

HIV anti-retroviral therapy is comprised of four classes of drugs. The first class of HIV drugs is comprised of Nucleoside (or nucleotide) Reverse Transcriptase Inhibitors (NRTIs), which includes abacavir (Ziagen), abacavir/lamivudine/zidovudine (Trizivir), didanosine, ddl (Videx, Videx EC), lamivudine, 3TC (Epivir), lamivudine/zidovudine (Combivir), ddC (HIVID), tenofovir (Viread), stavudine, d4T (Zerit), and zidovudine, AZT (Retrovir). Nucleoside analogs mimic nucleotides, the basic building blocks of genetic material. The reverse transcriptase enzyme converts HIV RNA into DNA by building new chains of nucleotides. If a nucleoside analog is added to the chain instead of a real nucleotide, the chain cannot be continued.

The second class, Non-nucleoside Reverse Transcriptase Inhibitors (NnRTIs), includes delavirdine (Rescriptor), efavirenz (Sustiva), and nevirapine (Viramune). NnRTIs interfere with the action of the HIV reverse transcriptase enzyme. However, they work by binding to the enzyme and preventing it from working.

The third, Protease Inhibitors (PIs), contains amprenavir (Agenerase), indinavir (Crixivan), lopinavir/ritonavir (Kaletra), nelfinavir (Viracept), ritonavir (Norvir), saquinavir (Fortavase), and saquinavir (Invirase). Protease inhibitor drugs interfere with the action of the protease enzyme, which cuts newly formed HIV polyproteins (long protein chains) into usable pieces (NCSL, 2003).

With the recent inclusion of the fusion inhibitor Fuzeon, or T-20, there are four main classes of HIV drugs. Fusion inhibitors prevent HIV from attaching or fusing with a host cell. If HIV cannot get into the cell, it cannot replicate and cause disease.
COSTS: Treatment-HIV/AIDS

The annual cost of HIV pharmaceuticals alone amounts to $10,000-12,000 per person, which rises to an estimated $20,000 with the addition of doctor’s visits, laboratory tests, and drugs to prevent or treat opportunistic infections (KFF, 2000). The variation in cost per patient is substantial when considering the various stages of the disease. A study conducted by the University of Alabama at Birmingham found that there is an average cost difference of more than $20,000 a year to treat patients with advanced-stage disease versus well patients with HIV. The average annual cost of HIV patient care for those with advanced-stage disease (having CD4 cell counts less than 50) is about $34,000, and for well patients (having CD4 cell counts more than 350) about $14,000. After antiretroviral medications, the cost of hospital care accounts for the second-largest expenditure, averaging between $1,700 and $7,800 per year (Saag, 2002).

Another study showed that average expenditures per HIV patient declined approximately 10% from $20,300 per year in 1996 to $18,300 18 months later, again due to protease inhibitors decreasing expensive hospital inpatient care (Bozzette et al., 2001). The greatest variability in total cost remains due to hospitalization (Roberts et al., 1999).

Factoring increased work productivity as a cost offset, a study supported by the Agency for Healthcare Research and Quality supports the initiation of early HIV treatment (Goldman et al., 2001). The Department of Health and Human Services, in association with the Kaiser Family Foundation, developed recommended treatment guidelines with this belief (JAMA Newsline, 1998). They believe that earlier treatment will amount to a higher probability of success in health and social outcomes for persons living with HIV/AIDS.

The transformation of HIV into a chronic, manageable illness, with the advent of successful medication and treatments, has significantly decreased mortality. This is evidenced by the stabilization of HIV deaths from all causes and a fall in AIDS deaths.

At the same time, lifetime pharmaceutical costs have extended into an uncertain, open-ended timeline. New drug therapy regimen costs are expected to increase significantly. The newest drug to win FDA approval is the aforementioned T-20, developed by Roche and Trimeris Inc. Many public programs that provide
pharmaceutical assistance are putting prescription prohibitions on T-20, due to its current projected expense, and highly recommend its use be limited to salvage therapy. There are 16 drugs currently approved by the FDA, and there are at least a half dozen promising drugs in human testing, with 10 or 12 more in the pipeline (Haney, 2003).

COSTS: Human Resources and Peripheral-HIV/AIDS

These figures detail the physical components of treatment. Sociological and psychological costs and consequences, such as stigmatization (Herek et al., 2002), lack of health insurance (Southern State AIDS Directors Work Group, 2003), affordable housing (Florida Department of Health, Bureau of HIV/AIDS, 2002) and education (Falvo, 1994), racial disparity (Cohen, 1999), depression, and adherence (Miller and Hays, 2000) will not be discussed within the framework of this analysis. However, it is important to note that systemic factors such as these contribute to direct treatment costs. With over 80% of HIV infected patients suffering from depressive symptoms (IAPAC, 2002), tricyclics, SSRIs and other anti-depressants can range from $100-300 per month.

The true “costs” of any disease are more accurately viewed as encompassing significantly more than direct treatment (i.e. health care costs) alone. Considerations must be made for cost of illness measures, which include economic, social, and psychological losses to the patient, family, and community. Absenteeism, productivity, response to treatment, peace of mind, and quality of life are examples of the intangible effects that elude quantification, but contribute to its impact and implications. Forever hidden still are the opportunity costs related to each of these. Co-infection costs compound these factors.
HBV AND HCV MONOINFECTION

DEFINITION AND EPIDEMIOLOGICAL DATA-HBV and HCV

Hepatitis B (HBV) and C (HCV) are disease-causing viruses that attack the liver. The viruses can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death (CDC, 2002). However, most who are infected have no symptoms and are unaware that they carry the virus and can pass it on to others. Modes of transmission are via direct contact with the blood or body fluids of an infected person. Evidence indicates that HBV can be completely cleared from the body, that is, a person can be “cured” of HBV, in upwards of 90% of all cases (American Liver Foundation, 2000). Fortunately, there is a vaccine available for HBV, though unfortunately, this is not the case for HCV.

Serologic markers are used to detect acute and chronic HBV and HCV. RNA is evaluated to detect hepatitis C, while DNA is evaluated to detect hepatitis B. There are six antigens associated with hepatitis B and four corresponding antibodies (antibodies are produced as a result of antigens). Hepatitis C testing is similar to HIV testing, where EIA and ELISA tests are performed to detect a reaction, followed by a confirmation RIPA or PCR test. Mounting scientific evidence for HBV antigen detection began in the early 1960’s until laws were passed requiring donated blood be tested for HBV in 1972 (Patlack, 2003). Hepatitis C was referred to as “non A, non B hepatitis” before the identification of its causative agent in 1989 (World Health Organization, 2000). Testing methods are constantly being improved to narrow the time between infection and antibody detection, known as the “window period.” A specific discussion of each type of antibody, antigen, and testing procedure characteristic will not be provided here. Further information can be gained from the World Health Reports *Hepatitis C Assays: Operational Characteristics* (2001) and *Serologic Test Findings at Different Stages of HBV Infection and in Convalescence* (2002).

Overall prevalence figures for HBV and HCV are based on modeling studies, data extrapolation from county surveillance projects, and studies such as the National Health and Nutrition Examination Survey (NHANES). The NHANES was conducted by
Smith and Averhoff (1999) argue that the NHANES studies that serve as a basis for epidemiological projections fail to account for sample size limitations and the timing of surveys. They also state that serologic surveys are less valuable for monitoring disease trends than for estimating past and present experience with an infection and its consequences.

In addition to the critiques proposed by Smith and Averhoff, it should be noted that the NHANES study was not originally devised for the analysis of HBV and HCV, and there is missing data on a number of potentially significant confounders such as injection drug use. Antibody tests are often wrong for severely immunosuppressed individuals because of the inability of the human body to mount an immune response that would yield hepatitis antibodies. These critiques should be taken into consideration in order to better understand the statistical significance of the rates of infection presented. Studies such as the NHANES are attempts to determine actual prevalence rates in the general population, not just among people who present at a clinic or hospital.

Other state-wide infection rates come from state health departments, as hepatitis viruses are reportable diseases. This means that providers are required to report to their local health department if an individual is diagnosed with hepatitis A, B or C. The reported (surveillance) numbers generally under-represent the actual rates, as they only account for those people who are diagnosed, often after presenting with symptoms. For example, Florida’s surveillance data system, which tracks acute hepatic infections, contains “very incomplete” information reflecting chronicity (HIV/AIDS Reporting System, 2003).

Public health departments are not required to provide testing services for hepatitis, although there is funding available through the Department of Health. As a result, those that have the desire to be tested (i.e. know to ask for it specifically) as part of their screening for sexually transmitted diseases, may not be able to know their serostatus. Without this access, they may never know their status. Additionally, without prompting from health department staff or private physician/medical staff and a history risk assessment, those without the knowledge about risk will not request testing.
An estimated 1.25 million people in the U.S. are chronically infected with HBV. In 1998 alone, as is similar to other years, 181,000 persons were infected (NHANES). Despite the availability of the hepatitis B vaccine, McQuillan et al. (1999) found no significant difference in nation-wide, age-adjusted prevalence of hepatitis B infection between NHANES II (5.5% from 1976-1980) and NHANES III (4.9% from 1988-1994). In addition, nearly 5,000 to 6,000 people die from HBV each year (American Liver Foundation, 2001).

Sexual transmission among adults accounts for most HBV infections (CDC, 2002). The three main risk factors include ethnicity/race, number of lifetime sexual partners, and foreign birth. The authors state that the inclusion of other risk factors for hepatitis B in the survey, such as injection drug use or transfusion, might reduce the effect of race. Though sexual transmission accounts for most of the HBV infections, hepatitis B is much more easily transmissible than either HIV or HCV, and can be transmitted through non-penetrative sex and saliva. Upwards of 30% of all transmissions are of unknown origin. Mother to child, or vertical, transmission is also extremely common. Slightly less common, though still significant, is infection from long-term hemodialysis. Intravenous drug users are also at an increased risk for HBV.

HCV rates are also based on NHANES data, and a CDC study released in 1999 estimates a cumulative 3.9 million having been infected and current prevalence for HCV to be “at least” 2.7 million. Harold Margolis of the CDC stated, “This is everyday Mr. and Mrs. American who live in a household. This doesn’t include the homeless and the prison population. The number could be higher” (focusonhepc.com). Unfortunately, chronic hepatitis C develops in up to 85% of the 36,000 newly infected people each year, and it is suggested that 8,000 to 10,00 people will die each year (American Liver Foundation, 2001). Therefore, only about 15-25% of acute cases will be cleared of the virus.

Furthermore, the 700,000 inmates in the United States with HCV and the homeless were not included in the NHANES study. Research indicates 155,000 inmates who are annually released from prison have hepatitis B and 1.3 million annually released inmates have hepatitis C. Twenty to thirty percent of the total inmate population have been infected with hepatitis B (American Correctional Association, 2003). Intravenous
drug users (IDUs) make up 60-80% of new HCV infections, and most are infected within 6 to 12 months of initial use (Martinez, 2001; Pratt et al., 2002). HCV is found in 70-90% of this population (All About Hepatitis C, 2002). It is estimated that 95% of IDUs using for five or more years become HCV+. HCV is also sexually transmissible, although data suggests that it is not as common unless there is direct contact with blood. Similar to hepatitis B, long term hemodialysis also increases a person’s risk of HCV transmission.

The national figures (and Florida figures based on them) of acute and chronic infections for hepatitis B and C are projections. When analyzing these numbers, considerations must be made for both the inclusion and exclusion of sub-populations. Alternately, clearance rates of HCV, in the absence of a vaccine, are dependent on varying definitions. Yawn et al. (2002), for example, states that the measures of cure are unclear, since clearing the virus from the bloodstream may not confirm clearing of the virus from the liver. The authors further state that the consensus (expert opinion-based) guidelines published by the National Institutes of Health (NIH) and CDC are continuously developed by ongoing updates and experience.

**TREATMENT THEORIES-HBV and HCV**

According to the CDC, each clinical form of hepatitis with HBV can also occur with HCV. The diseases “may lead to recovery, fulminant [i.e. rapid and severe] hepatitis, relapsing hepatitis with intervening periods of normal liver function, inapparent chronic infection, chronic active hepatitis, and cirrhosis” (Virology-online.com, 2003).

Treatment decisions are related to the stages of disease progression. A liver biopsy is “currently the only way to accurately assess the course of the disease,” especially if the liver is found to have advanced cirrhosis or is decompensated (indicating liver failure) (Health on the Net Foundation, 2002).

Two products are FDA-approved for HBV prevention: hepatitis B immune globulin (HBIG) and hepatitis B vaccine. HBIG contains anti-bodies to the hepatitis B virus and is used for post-exposure prophylaxis (prevention). The vaccine provides
protection from HBV infection for both pre-exposure immunization and post-exposure prophylaxis. Three doses are needed for complete protection for adults (CDC, 2002).

The current standard treatment for HCV-related chronic liver disease is pegylated interferon alpha in combination with the oral agent ribavirin for a duration of 6-12 months and can be repeated as courses as needed. Standards of treatment are evolving as new studies are released.

Interferon alpha is used to treat chronic hepatitis B, but its use is limited because over half of all patients do not respond to treatment. Overall only 30-40% of persons with genotype 1a or 1b (the most common genotype in the U.S.) have a sustained response to interferon therapy. Antiviral agents such as second generation nucleoside analogues lamivudine (Epivir) and famciclovir were investigated as possible alternative treatment options (Zuckerman, 1999). Adefovir dipivoxil, originally developed to treat HIV, is a recent treatment approved by the FDA. While interferon alpha can cause side-effects such as flu-like symptoms and depression, and lamivudine can cause resistance, adefovir dipivoxil “appears to sidestep both problems” (Health on the Net Foundation, 2003). Long term studies will be needed to assess the drug’s effectiveness.

**COSTS : Treatment-HBV and HCV**

The current cost of the hepatitis B vaccine can be found on the CDC’s web site at: [http://www.cdc.gov/nip/vfc/cdc_vac_price_list.htm](http://www.cdc.gov/nip/vfc/cdc_vac_price_list.htm). Adult hepatitis B vaccine prices for the private sector range from approximately $40-60 per dosage. The vaccine is administered in three doses. The Florida Department of Health provides this vaccine either free of charge or at reduced prices at some health departments located throughout the state.

According to a study published by the American Journal of Public Health, it is predicted that direct U.S. medical costs to treat HCV-related disease will exceed $13 billion for the years 2010 through 2019. Roche pharmaceuticals, competitor to Schering-Plough for hepatitis drug sales, reduced the price of Ribavirin 43% to 1998 levels. The list price or wholesale acquisition cost of Copegus™Ribavirin, which is used in combination with Pegasys(R) (peginterferon alfa-2a), is $5.06 per 200mg tablet. These
prices may be different than those paid by public programs such as Medicaid, Medicare, or other government funded programs. According to a study undertaken by Roche, recommended dosing regimens for Pegasys and Copegus combination therapy are 180mg Pegasys weekly and 1000-1200mg of Copegus daily for a 48 week therapy duration.

In the New Jersey correctional system, inmates receiving HCV treatment are receiving therapy costing $10,000 to $15,000 each for up to 12 months of injections and pills.
HIV/AIDS HBV and HCV
CO-INFECTION

DEFINITION AND EPIDEMIOLOGICAL DATA-Co-infection

Co-infection estimates for HCV differ considerably. One study cites a wide range of 5 to 80% of HIV+ individuals having HCV (Martinez, 2001), while another cites one third of those with HIV suffering from both afflictions. The CDC’s official estimate is approximately 25%. The methodologies used to calculate rates of infection are easily underestimated due to detection methods and non-reporting individuals.

Co-infection data are inconsistently entered into Florida’s surveillance data system. Instead, this information has been gained via notations in the HIV/AIDS surveillance data regarding hepatic co-infections, said to be “sometimes noted.” The overall co-infection figure [which includes (5%) hepatitis A, (33%) B, (30%) C, (19%) multiple, and (13%) unknown types] resulting from these data amount to 4,920, or 4.2% of the 117,319 HIV/AIDS cases reported in Florida from 1981 to October 2002. However, these data are not as reliable as surveillance science would prefer because hepatitis and HIV/AIDS data in the state of Florida are collected via two different systems, which are not regularly cross-referenced. Evidence for this is found in published reports (HIV/AIDS Reporting System, 2003). Yet, Florida remains ahead of the curve compared to other states in terms of funding and efforts allocated to hepatitis surveillance and HIV/AIDS surveillance.

The nearly 1% actual reported HCV/HIV co-infection figure for Florida yielded from this methodology is clearly at odds with the CDC’s national prevalence estimate of 25%, gained from randomized sampling methodologies. This discrepancy between projected and actual prevalence rates in the general population makes projecting the cost impact on Florida programs difficult, to say the least.

Other problems exist that hamper efficient and adequate surveillance methods, which can be linked to more clinical rather than programmatic factors. Since detection methods for hepatitis C are dependent on the evaluation of RNA levels (as opposed to DNA testing for hepatitis B), it is not routine to test for HCV unless symptoms are
present. Additionally, asymptomatic hepatitis carriers may not routinely seek testing. IDUs, who are most at risk, are also the least likely group to do so. The transmission of HCV, as opposed to HBV, is less likely through sexual contact. Instead, HCV transmission is most likely through direct contact with blood (transfusion, needles, and vertical—mother to child—transmission). Ease of transmission is also dependent on the stage of HIV, since viral loads tend to be higher in people with more advanced HIV (Chung, Kim and Polsky, 2001). HIV impacts the viral load of HCV as the development of HIV antibodies (seroconversion) increases the amount of hepatitis C virus (viremia, measured by an increase in HCV-RNA) (Hubbard, 2001), as well as liver scarring (hepatic fibrosis) (Dore and Cooper, 2000). Conversely, the presence of HCV may increase HIV transmission (Hubbard, 2001).

Studies of viral clearance pertaining to HCV are conflicting. One study states that viral clearance is rare and that 50-80% of mono-infection leads to chronicity. HIV cannot be cleared from the body, as it remains in “sanctuary sites” even with undetectable (< 50 copies/mL) viral loads. The ability to clear HCV and not HIV supports the clinical practice of primary HCV treatment before beginning HIV treatment (Hubbard, 2001).

The natural history of disease progression is reflected in studies based on pre-HAART data. Piroth et al. (2000) found HCV to be a significant predictive sign for negative clinical changes (a rapid decline in CD4+ cell count) in HIV infected patients, especially for those in the early stages of HIV. They found that 30% of co-infected patients had a rapid decline in CD4+ levels, versus 17% of mono-HIV infected patients. An AIDS diagnosis or death resulted in 14% of co-infected versus 11.9% in those with mono-infected HIV. According to Karnofsky’s measurement (based on a standard 30% decrease), 15.7% of co-infected individuals experienced a rapid decrease of body weight compared with 5.1% of mono-HIV.

Chung, Kim and Polsky (2001) conducted several IDU and hemophiliac studies. Although some initial case studies demonstrated a rapid onset of liver disease, they argued that this phenomenon is limited to individual cases. However, Bica et al. (2001) demonstrate that in co-infected persons, excess mortality generally results due to liver failure.
Similar to the effect HBV has on the liver, restoration of an immune response leads to greater degrees of liver toxicity (hepatotoxicity). Although restored immune functions are beneficial in the long term, authors suggest that HIV appears to make liver fibrosis and cirrhosis occur more quickly. Evidence also suggests that immunosuppression may also worsen HCV (Vento et al., 1998). This relationship between the two viruses stresses the need to test for liver disease prior to the initiation of HAART.

After HAART, the natural progression of hepatitis B or C may have changed, but the results are contradictory. Authors assert that HIV impacts the progression of HCV and increases the likelihood of subsequent liver damage (e.g. Benhamou, Bochet and Di Martino et al., 1999; Greub et al., 2000), but the inverse relationship remains unclear. Rossi et al. (2002) note that recent data reveal a more rapid progression to cirrhosis in individuals with HCV/HIV co-infection who have not received protease inhibitor therapy, who have consumed excess alcohol, and who have a low CD4+ count. The main concerns regarding HAART treatment on co-infected persons are the effect a restored immune response has on the liver and delayed CD4+ recovery.

Concerning HCV’s impact on HIV, Greub et al. (2000) noted delayed CD4+ recovery and a more rapid HIV progression. Graham and Koziel (2000, cited in Dore and Cooper, 2001), state that HCV may alter either the production or cell disintegration (apoptosis) of T lymphocytes, thereby impairing the expected increase in CD4+ T cells in the setting of HAART (also Greub et al., 2000).

Their findings conflict with Sulkowski et al. (2000) who found that there was no difference in the risk of death or the development of an AIDS defining illness. Sulkowski et al. (2000) argue that an inverse relationship exists between the variables. They hold that it is not the natural progression of the disease that has the most effect. Rather, negative outcomes are the result of the delayed initiation of HAART. An earlier study by Haydon et al. (1998) also found no significant difference among co-infected (HIV and HCV) versus mono infected (HIV only).

TREATMENT THEORIES AND BEST PRACTICES-Co-infection
If the hepatitis B vaccine is given to people with HIV, it may temporarily impair the immune response to HBV, though it is still recommended that vaccines be used. Additionally, a carrier of HIV increases the risk of abnormal ALT elevation (an enzyme produced within the cells of the liver) and clinical illness. ALT levels indicate liver inflammation.

In an article that also discusses HIV/HBV prior to HAART, Dore and Cooper (2001) cite researchers who found higher HBV carriage and replicative disease but less immune (inflammatory) response in HIV/HBV co-infected persons. While they note that prior to HAART, HIV co-infection had a negative prognostic effect on HBV, the impact of HBV on HIV remains unclear.

The general opinion of the effect of HAART on HBV is conflicting. Dore and Cooper reviewed several studies which had shown either no change or no increase in viremia after three to six months of HAART, as well as an increased risk of hepatotoxicity. Both the viremia and hepatotoxicity are due to a combination of increased immune response as well as direct impact of HAART on the liver. They also noted that commencement of protease inhibitor therapy immediately after HBV seroconversion initiates an immune response that lowers HBV but may simultaneously cause immune restoration disease. The authors suggested that Epivir (lamivudine) works for both HIV and HBV, but studies have demonstrated a high degree of resistance and hepatic “flares” when removed (Dore and Cooper, 2001).

Brinker et al. (2000) found that 33% of HIV/HBV co-infected persons experienced HBV clearance within 12 months. In contrast, Manegold et al. (2001) saw reactivation of HBV in two previously cleared patients after initiation with HAART.

Chung, Kim and Polsky (2001) further discuss the pathogenesis of HBV and effects of immunosuppression with HIV. Immunosuppression with HIV is known to stimulate HBV replication (evidence of antibodies and HBV DNA). Most studies (e.g. Schecter et al., 1989; Solomon et al., 1990; Scharschmidt et al., 1992) that address the impact of HBV on HIV show no change in disease progression.

Alternately, treatment of HIV in co-infected individuals (i.e. removal of immunosuppression)reactivates HBV and plays a role in its clearance. Following a review of the evidence, Chung, Kim and Polsky (2001) demonstrated the need to
consider baseline ALT when beginning HAART, as HAART causes a flare up of HBV. While some treatment issues include the fact that interferon alpha is less successful in those with HIV, studies indicate that Epivir (lamivudine or 3TC) may be effective for treating dual HBV/HIV characteristics.

As the above discussion clearly demonstrates, hepatitis-related death is becoming a reality for people with AIDS. In fact, 50% of deaths among people with HIV and HCV are due to End Stage Liver Disease (ESLD) (ATDN, 2003). Increased life expectancy, then, comes with the burden of managing co-infection. HAART is notoriously brutal on the body, as are many hepatitis drugs. Dore and Cooper (2001) found that co-infection with HCV and HBV, as well as HAART, increases liver disease morbidity and mortality. Many people with HIV are suffering from hepatic failure or hepatocellular carcinoma (a malignant tumor on the liver). Similarly, co-treatment remains as a topic of debate in the medical community. Some researchers focus on treating one virus at a time, while others declare it safe to treat both simultaneously.

In addition to HAART, anti-retrovirals used for hepatitis C must also be considered. Hepatitis C is treated with both interferon alpha and ribavirin, which became available in the late ‘90s. Recent advances include the pegylation (coating) of the interferon, which allows it to remain in the body longer than non-pegylated versions. While sustained response levels occurred in about 40% (McHutchensen et al., 1998 and Poynard et al., 1998), the side effects of both, more so pegylated interferon, are severe and often result in the discontinuation of treatment or, at the very least, the need for concurrent treatment with anti-depressants or anti-psychotics. As recently noted, interferon based side effects are reported as “considerable.” In addition, efficacy for genotype 1 (which is the most common genotype found in the United States) is reported as “sub-optimal” (Dore and Cooper, 2001).

According to Chung, Kim and Polsky (2001), suggested treatment includes interferon alpha and ribavirin for 6 to 12 months, but there is a high rate of relapse. HCV genotype 1 usually requires 12 months of treatment. The authors say researchers must examine recombinant interleukin 2 as a treatment option. Finally, they stress the need to prevent occult infections by providing vaccines against both hepatitis A and B.
Other research shows multi-organ dysfunction for people on HAART who commenced HCV dual treatment (Lafeuillade et al., 2001). Zylberberg et al. (2000) observed increased lipoatrophy. Depression (as well as psychosis) is extremely common, and can present real treatment complications. Ribavirin often leads to bone marrow suppression and frequent blood count tests must be performed. Anemia is also a common side effect of treatment with ribavirin. Treatment with Protease Inhibitors has been demonstrated to be related to greater liver toxicity (Hubbard, 2000).

Concerning effects on the body, Landau et al. (2000) observed CD4+ cells drop significantly when interferon alpha initiated, then return to previous levels. Additionally, ribavirin can be used by patients receiving AZT (Retrovir Zidovudine) or D4T (Zerit) without switching reverse transcriptase inhibitors.

In terms of the impact of HAART on HCV viremia, Rutschmann et al. (1999) and Vento et al. (1998) observed occasional elevation, with levels evening out after a few months. In one study, Fialaire at al. (1999) detected possible HCV clearance in two hemophiliacs after HAART. Perez et al. (2000) found reduction in HCV in 44% of co-infected individuals and four people had undetectable HCV. Yokozaki et al. (2000) suggests two other cases of possible clearance of HCV after initiation of HAART.

According to several researchers, patients with extreme liver damage should not be treated, nor should people without any liver disease since treatment increased immune response and possible inflammation. As far as hepatotoxicity, the majority of cases occur within 2-6 months following commencement of HAART (some occurred within 2 weeks). In all, 10-15% of people commencing HAART experience hepatotoxicity (Dore and Cooper, 2001). Following such data, the researchers suggest that treatment for HCV may supercede treatment for HIV in co-infected patients. This follows two lines of thought. The first is that improvement of liver function remains important if HIV is controlled, and second, HIV treatment in chronic HCV+ patients makes hepatic function worse (i.e. increased immune response leads to increased liver inflammation).

Rossi et al. (2002), like Dore and Cooper (2001), suggest that people with early stages of HIV should be more concerned with the clearance of the HCV before initiating HAART. This is further complicated as HCV genotype 1 has been shown to be particularly resistant to clearance with interferon alpha and ribavirin. Uncontrolled
depression is also a consideration. In conclusion, Rossi et al. propose that co-infected patients require close monitoring for immunological suppression and liver function. Alcohol and drug cessation is a must.

**COSTS: Treatment Options-Co-infection**

HIV/AIDS co-infections, in the form of acute, opportunistic infections, have long since been major considerations affecting treatment decisions. Chronic co-infections, however, have not received the same attention. Due to funding streams, expertise, and research demands, conditions such as heart disease, diabetes, bronchitis, and arthritic conditions have not been studied widely as interrelated challenges.

Hepatitis C, in relation to HIV, is becoming more widely studied because of its transmission similarity and high prevalence. Up to 25% (CDC 2002) -33% (Martinez, 2001) (225,000-300,000) of HIV infected individuals are co-infected with hepatitis C and liver failure is their most common cause of death. HIV/AIDS patients with mild to moderate elevations of amino alanine transferase (ALT) and aspartate amino transferase (AST) [both indicators of liver function] have a death rate that is 1.73 times higher than that of patients with mid-range normal levels (Patient Care Capsules, 2002). Those with two or more times the normal levels are at a 5.06 times increased risk. Having been spared an early demise by protease inhibitors, HIV infected individuals are now facing another disease that requires more complicated treatment methods and a magnified cost structure. Following the enduring challenge of HIV, there has been a recent realization that HCV represents the next viral disease challenge (Youle, 2002).

From the clinical studies discussed earlier, findings regarding the impact of HCV on HIV, and vice versa, are evolving from a host of confounding factors associated with each separate disease: responsiveness and recurrence, drug interactions and side-effects, and widely cited depression. HCV research is nearly 10 years behind HIV research (NATAP, 2003).

However, in the majority of published studies, progression of hepatitis C to cirrhosis and end-stage liver disease was found to occur more frequently and rapidly in HIV/HCV co-infected persons. In the presence of HIV, the risk of progressive liver disease from HCV is estimated at 2.9-fold higher (95 percent CI, 1.7-5.0) than with
A 2002 study by the Journal of the American Medical Association indicated that for patients with early HIV infection, a case could be made to treat the HCV before treating the HIV (Rossi, 2002).

As scientific knowledge progresses for both HIV and HCV, changes in treatment decisions involving the types and timing of drug therapy, for example, will significantly impact treatment costs.

Current drug therapy regimens include pegylated interferon ($6,000-12,000 per year) and Ribavirin ($13,200 per year). Combination therapy for hepatitis C can carry a higher annual cost than does HIV therapy.

**COSTS: Model Projections for HIV/AIDS and HCV**

Since HIV infection can progress slowly or quickly, there are no studies that can accurately predict the percentage of all infected individuals that will enter into stratified, categorical stages and associated treatment costs that have been developed by researchers and economists. However, all studies conclude that HIV is a progressive infection, which leads to symptomatic illness in the majority of people over time (thebody.com).

The following model was created to estimate a basic cost expenditure range for treating HIV or AIDS infected individuals. Tangentially, it is known that advanced-stage HIV patient costs amount to about $34,000, while well HIV patient costs average about $14,000 (Saag, 2002). A $20,000 figure was used to calculate the between cost category, instead of a literal $24,000 between amount, because of the previously referenced information given from the Kaiser Family Foundation on the average cost of pharmaceuticals with the addition of routine lab costs, doctors visits, etc. (KFF, 2000).

Tier III represents the most conservative category, with 10% advanced-stage, 30% between-stage, and 60% well-stage HIV/AIDS infected individuals. Tier I represents the most liberal category with 10% advanced-stage, 30% between-stage, and 60% advanced-stage HIV/AIDS infected individuals. Tier II represents the most moderate category, with well-stage and advanced-stage individuals at an even 20% and between-stage individuals at 60%.
Again, the totals would result from all 900,000 infected individuals being treated, and would represent the highest expenditures possible. However, this would not reflect actual expenditures, due to many factors such as lack of serostatus knowledge, refusal of treatment, rate of mortality, rate of morbidity, etc. The 10/30/60 method is similar to the cost analysis produced for the HIV Waiver Model used for the Georgia Medicaid demonstration waiver. This method of stratifying costs is utilized to show that at any given time (a one year period in our model), individuals will be experiencing HIV or AIDS in different disease states and will therefore accrue costs in different levels. This range represents the highest possible expenditures (assuming very high rates of advanced stage AIDS patients) to the lowest possible expenditures (assuming very low rates of advanced stage AIDS patients). All of these calculations are based on the assumption that all 900,000 of the CDC's projected infected individuals receive some level of treatment. Using these figures, a simplistic range can be calculated solely for illustrative purposes.
**HIV/AIDS: The United States**

**Tier I**

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>60</td>
<td>540,000</td>
<td>$34,000</td>
<td>$18,360</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>270,000</td>
<td>$20,000</td>
<td>$5,400</td>
</tr>
<tr>
<td>Well</td>
<td>10</td>
<td>90,000</td>
<td>$14,000</td>
<td>$1,260</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>900,000</td>
<td>N/A</td>
<td><strong>$25,020</strong></td>
</tr>
</tbody>
</table>

**Tier II**

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>20</td>
<td>180,000</td>
<td>$34,000</td>
<td>$6,120</td>
</tr>
<tr>
<td>Between</td>
<td>60</td>
<td>540,000</td>
<td>$20,000</td>
<td>$10,800</td>
</tr>
<tr>
<td>Well</td>
<td>20</td>
<td>180,000</td>
<td>$14,000</td>
<td>$2,520</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>900,000</td>
<td>N/A</td>
<td><strong>$19,440</strong></td>
</tr>
</tbody>
</table>

**Tier III**

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>10</td>
<td>90,000</td>
<td>$34,000</td>
<td>$3,060</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>270,000</td>
<td>$20,000</td>
<td>$5,400</td>
</tr>
<tr>
<td>Well</td>
<td>60</td>
<td>540,000</td>
<td>$14,000</td>
<td>$7,560</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>900,000</td>
<td>N/A</td>
<td><strong>$16,020</strong></td>
</tr>
</tbody>
</table>

*Assumes treatment for 900,000 individuals.*

*Calculations based on costs reported by (Kaiser Family Foundation, 2000 and Saag, 2002)*

While this model was created for purely illustrative methods and remains simplistic, it encompasses a "blue sky" theory in assumptions. The one very striking calculation, however, is the obvious difference in cost for a "healthier" population, as opposed to a "weaker" or at a more advanced disease state population. These calculations argue for more early intervention and early treatment. By providing that more individuals are kept healthy, almost 36% or $9,000,000,000 can be saved in expenditures.

Florida’s costs could be projected in a similar manner to the national figures, but would be based on a smaller subset of 95,000 infected individuals estimated by the Florida Department of Health. Other costs not included in the calculations for both include the indirect costs discussed previously.
HIV/AIDS: Florida

Tier I

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>60</td>
<td>57,000</td>
<td>$34,000</td>
<td>$1,938</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>28,500</td>
<td>$20,000</td>
<td>$570</td>
</tr>
<tr>
<td>Well</td>
<td>10</td>
<td>9,500</td>
<td>$14,000</td>
<td>$133</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td><strong>95,000</strong></td>
<td>N/A</td>
<td><strong>$2,641</strong></td>
</tr>
</tbody>
</table>

Tier II

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>20</td>
<td>19,000</td>
<td>$34,000</td>
<td>$646</td>
</tr>
<tr>
<td>Between</td>
<td>60</td>
<td>57,000</td>
<td>$20,000</td>
<td>$1,140</td>
</tr>
<tr>
<td>Well</td>
<td>20</td>
<td>19,000</td>
<td>$14,000</td>
<td>$266</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td><strong>95,000</strong></td>
<td>N/A</td>
<td><strong>$2,052</strong></td>
</tr>
</tbody>
</table>

Tier III

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>10</td>
<td>9,500</td>
<td>$34,000</td>
<td>$323</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>28,500</td>
<td>$20,000</td>
<td>$570</td>
</tr>
<tr>
<td>Well</td>
<td>60</td>
<td>57,000</td>
<td>$14,000</td>
<td>$798</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td><strong>95,000</strong></td>
<td>N/A</td>
<td><strong>$1,691</strong></td>
</tr>
</tbody>
</table>

**Assumes treatment for 95,000 individuals.**

*Calculations based on costs reported by (Kaiser Family Foundation, 2000 and Saag, 2002)*

Based on the previous calculations related to HIV/AIDS mono-infection, the following tables represent the additional cost of treatment for HCV. The CDC estimates a 25% co-infection rate between HIV/AIDS and HCV (CDC, 2002). However, the model used previously can be repeated, adding the HCV treatment cost estimate of $15,000 into the cost per patient per year (PPPY) for HIV/AIDS along the disease state estimates to calculate the impact of HCV treatment costs on HIV/AIDS costs. Again, this model is merely illustrative and must be considered a snapshot, especially when taking into consideration the inherent differences between the ongoing and eventually finite (until death) HIV/AIDS treatment and the HCV treatment (6 months to 12 months for one course). It is for this reason that HCV treatments cannot be annualized.
**HIV/HCV Co-infection: The United States**

### Tier I

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>60</td>
<td>135,000</td>
<td>$49,000</td>
<td>$6,615</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>67,500</td>
<td>$35,000</td>
<td>$2,362.5</td>
</tr>
<tr>
<td>Well</td>
<td>10</td>
<td>22,500</td>
<td>$29,000</td>
<td>$652.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>225,000</td>
<td><strong>N/A</strong></td>
<td><strong>$9,630</strong></td>
</tr>
</tbody>
</table>

### Tier II

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>20</td>
<td>45,000</td>
<td>$49,000</td>
<td>$2,205</td>
</tr>
<tr>
<td>Between</td>
<td>60</td>
<td>135,000</td>
<td>$35,000</td>
<td>$4,725</td>
</tr>
<tr>
<td>Well</td>
<td>20</td>
<td>45,000</td>
<td>$29,000</td>
<td>$1,305</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>225,000</td>
<td><strong>N/A</strong></td>
<td><strong>$8,235</strong></td>
</tr>
</tbody>
</table>

### Tier III

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>10</td>
<td>22,500</td>
<td>$49,000</td>
<td>$1,102.5</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>67,500</td>
<td>$35,000</td>
<td>$2,362.5</td>
</tr>
<tr>
<td>Well</td>
<td>60</td>
<td>135,000</td>
<td>$29,000</td>
<td>$3,915</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>225,000</td>
<td><strong>N/A</strong></td>
<td><strong>$7,380</strong></td>
</tr>
</tbody>
</table>

*Assumes treatment for 225,000 individuals.

*Calculations based on costs reported by (Kaiser Family Foundation, 2000 and Saag, 2002)*

Similarly, Florida’s costs could be projected using a smaller subset of the 95,000 infected individuals estimated by the Florida Department of Health, multiplied by 25% to obtain the estimated co-infection rate. This total would then become 23,750 HIV/AIDS/HCV co-infected individuals. Other costs not included in the calculations for both include the indirect costs discussed previously.
**HIV/HCV Co-infection: Florida**

### Tier I

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>60</td>
<td>14,250</td>
<td>$49,000</td>
<td>$698.25</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>7,125</td>
<td>$35,000</td>
<td>$249.375</td>
</tr>
<tr>
<td>Well</td>
<td>10</td>
<td>2,375</td>
<td>$29,000</td>
<td>$68.875</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>23,750</td>
<td>N/A</td>
<td><strong>$1,016.5</strong></td>
</tr>
</tbody>
</table>

### Tier II

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>20</td>
<td>4,750</td>
<td>$49,000</td>
<td>$232.75</td>
</tr>
<tr>
<td>Between</td>
<td>60</td>
<td>14,250</td>
<td>$35,000</td>
<td>$498.75</td>
</tr>
<tr>
<td>Well</td>
<td>20</td>
<td>4,750</td>
<td>$29,000</td>
<td>$137.75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>23,750</td>
<td>N/A</td>
<td><strong>$869.25</strong></td>
</tr>
</tbody>
</table>

### Tier III

<table>
<thead>
<tr>
<th>Disease State</th>
<th>%</th>
<th># of People</th>
<th>Cost PPPY</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>10</td>
<td>2,375</td>
<td>$49,000</td>
<td>$116.375</td>
</tr>
<tr>
<td>Between</td>
<td>30</td>
<td>7,125</td>
<td>$35,000</td>
<td>$249.375</td>
</tr>
<tr>
<td>Well</td>
<td>60</td>
<td>14,250</td>
<td>$29,000</td>
<td>$413.25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>23,750</td>
<td>N/A</td>
<td><strong>$779</strong></td>
</tr>
</tbody>
</table>

*Assumes treatment for 23,750 individuals.

*Calculations based on costs reported by (Kaiser Family Foundation, 2000 and Saag, 2002)

Assuming this co-infection rate and estimating the annual treatment costs for HCV at $15,000, then a base $3.375 billion can be added to the national HIV/AIDS subtotals to gain a general understanding of the impact of HCV treatment on HIV/AIDS costs, while $356.25 million can be added to the HIV/AIDS subtotals. One major gap in this model is the lack of estimates for possible cost duplication of services, such as doctor visits and other services which may not be mutually exclusive between the two disease states. The estimate of $15,000 for the treatment of HCV mono-infection from the New Jersey Correctional System and Florida's Medicaid system includes such visits, which may or may not be duplicative. However, the disease state of HCV (i.e. well vs. advanced) of these distinct populations is unknown. A higher proportion of individuals in advanced stage (i.e. liver failure up to and including liver transplantation), for example, can greatly inflate the estimate.
The “take home” message of these illustrative models is the argument for early intervention. Using a model purported by Wong involving a high degree (27.2%) of HCV clearance, 4.1% progression to moderate hepatic status, 7.3% progression to compensated cirrhosis (no signs of liver failure), and 1.5% progression to hepatocellular cirrhosis and decompensated cirrhosis (liver failure), 3.1% of patients with either compensated or decompensated cirrhosis would receive a liver transplant (Wong, 1999). Calculating the impact of this cost could be shown as follows. The average cost of a liver transplant, according to Walensky et.al., is $200,000. If the previous population estimates (25% of HIV/AIDS estimated population) are used to create a co-infection population, and using Wong's 3.1% rate of liver transplantation, a model can be created to estimate the need-based cost of transplants nationally and in the State of Florida.

<table>
<thead>
<tr>
<th>N Parameters</th>
<th>N Size</th>
<th>Transplant Rate</th>
<th>Transplant N</th>
<th>Transplant Cost</th>
<th>Total Cost (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>225,000</td>
<td>3.10%</td>
<td>6,975</td>
<td>$200,000</td>
<td>$1,395</td>
</tr>
<tr>
<td>Florida</td>
<td>23,750</td>
<td>3.10%</td>
<td>736</td>
<td>$200,000</td>
<td>$147.2</td>
</tr>
</tbody>
</table>

\*

N=population

*Calculations using (Walensky et.al., 2002 and Wong, 1999)

As with similar findings above, Wong concludes that, “economic savings derived from preventing future cases of cirrhosis and hepatocellular carcinoma more than offset the initial treatment cost” (Wong, 1999).

However, the actual cost would be far less for liver transplants because of the reality of the low availability of transplant livers, coupled with the fact that HIV/HCV co-infected individuals are less likely to receive them due to their co-morbidity and low predicted long-term success rate.

**CURRENT SERVICES AVAILABLE-Co-infection**

**Primary Care:**

Primary care doctors for hepatitis B and C, attained through private insurance, can be located either by the consumer or by several local and national groups that attempt to pair consumers with providers to best suit their needs. Two examples of such resources include the American Liver Foundation and Hep C-Alert. Both organizations have
information on doctors that either specialize in hepatitis treatment or have been known to treat people with hepatitis.

The route to treatment for people without health insurance or with public insurance is through a national database provided by the U.S. Department of Health and Human Services’ Bureau of Primary Health Care (BPHC) (http://bphc.hrsa.gov). Via the Bureau, people can locate community health services or “look-alikes,” i.e. doctors with sliding fee scales or pharmaceutical programs, such as Roche’s “Peg-Assist” and Schering-Plough’s “Commitment to Care” or “Patient Assistance programs.” All of the pharmaceutical programs offer people with both medical and financial need access to either free or reduced price medications, usually for a limited time if they meet eligibility criteria established by the program. It should be noted that the pharmaceutical assistance programs are regarded as a “last resort” and do not ensure continuous treatment.

In a one year period in Florida alone, 4,503 individuals applied for Commitment to Care (Schering-Plough's patient assistance program). Because they had no other means of reimbursement identified by either the State or Schering Plough, 1,392 individuals were approved and supplied with Schering Plough's product. As part of the established program, Schering-Plough employs reimbursement staff to work with applying clients to identify eligibility possibilities such as the Veteran's Association or Medicare Part B for therapy.

Additionally, the BPHC can locate Veteran’s Assistance (V.A.) treatment centers. Groups such as Hep-C Alert also link uninsured persons with pharmaceutical representatives and/or their physicians for reduced cost medications.

The only instance in which hepatitis will be treated at a hospital is in the case of an extremely acute case, and hospitals cannot serve as primary health care providers. Once treated for an acute infection, patients will have to return to their primary health care providers, community health centers, or county health departments.
Support Groups:

There are several support groups for people living with hepatitis in the state of Florida. Support groups are located in Ft. Lauderdale, Tampa, St. Petersburg, Broward County, Miami, Boca Raton, Gainesville, Orlando, Palm and West Palm Beach and Plantation. Many of these groups are led by local hospitals, hepatitis organizations, and national organizations such as the American Liver Foundation. Locations of support groups are found on the Internet, through local hepatitis or liver foundations, or through hospitals. It is important to note that the majority of the times listed for meetings are in the evening.

Programs Specific to Florida:

In 1999, Florida instituted its state-funded Florida Department of Health, Hepatitis and Liver Failure Prevention and Control Program, administered through county health departments. Initial appropriations were $2.5 million for the first year and $3.5 million the subsequent year. The program began by serving six counties (Broward, Collier, Miami-Dade, Monroe, Pinellas, and Polk) and their adult residents at an increased risk for hepatitis A, B or C. Services include: a) enhanced surveillance; b) education of public health providers; c) immunization against viruses A and B; d) targeted intervention; e) screening and testing for chronic hepatitis B and C and; f) epidemiologic investigations. In 2001, the program was extended to include hepatitis A and B vaccine availability for the entire state, specifically for people at increased risk for infection. The expansion also included chronicity testing for adults with hepatitis B and C. Currently, the original six counties receive continued funding, with limited funding for three new counties, including Escambia, Lee and Seminole.

Links and Additional Resources:

The Department of Health, through the My Florida (myflorida.com) website, offers a web-based clearinghouse containing 24 links to websites and phone numbers for information regarding most aspects of hepatitis. These sites include information from the CDC concerning facts on the cause and spread of the disease and most common
treatments; groups dedicated to advocacy work; information about HIV and hepatitis co-infection; information about screening, education and prevention; Medicaid referral services, and locations of support groups. In addition to the web resources, the Florida DOH also offers a toll-free hepatitis C Hotline, 1-866-FLA-HEPC. Additional resources, some of which assisted in the research development of this work, include www.all-about-hepatitisc.com, www.hepnet.com, www.who.int/inf-fs/en/fact164.html, www.hcop.org, and www.hepcassoc.org.

RESULTS – PROVIDER SURVEYS

To achieve a realistic perspective on hepatitis outreach, testing, and treatment, a survey was developed to target providers from both the public and private sector. Developed in collaboration between The AIDS Institute and the Florida Department of Health, Hepatitis and Liver Failure Prevention and Control Program, the survey included many data gathering methodologies. These techniques included open and close-ended questions, Likert and ordinal scales, and ranking. The surveys were mailed to a randomly selected number of private physicians, garnered from a BPHC list, who identified themselves as hepatitis treatment providers, as well as to all county health department hepatitis contacts identified by the Hepatitis and Liver Failure Prevention and Control Program. In addition to an introductory letter and a copy of the survey, the The AIDS Institute packet included a self-addressed, stamped envelope to help with return rates. In order to increase anonymity, no program specific or contact information was required. Given a finite amount of time to complete the survey, respondents mailed them to The AIDS Institute. Research staff colored and numerically coded each survey, and then entered the quantitative data into a statistical computer package for analysis. Qualitative data were entered into a coding system. Each data set was then cleaned and analyzed. The following results summarize the responses of the survey respondents.

The respondents consisted of a blend of community health department/public programs and private physicians, with a slightly larger percentage (10%) of community health departments reporting. Despite not providing incentives, having a randomized listing of private providers, and some incorrect contact information gained from the
hepatitis section within the Florida Bureau of HIV/AIDS for county health department hepatitis programs, the survey response rate was 24%. This percentage is higher than what is routinely achieved when using written surveys.

Respondents tested an average of 495 individuals for HBV ranging from 3-2,500 reported tests per provider. A majority of respondents (60%) do not actively treat HBV. Of those that do provide treatment, they do so to an average of 10 individuals ranging from 1-12. When asked why they believe individuals seek testing for hepatitis B, 54.2% of respondents indicated physician referral, 75% friend/spouse/partner/relative, 58.3% blood bank, and 41.7% other. Interestingly, 100% and 70.8% indicated they believed individuals do not seek testing because of Internet research or public prevention education, respectively.

The majority (87%) of respondents who answered why they believe individuals do not seek testing for hepatitis B included either a lack of knowledge or education, while over 20% indicated fear of the unknown. When asked why they believe individuals seek hepatitis vaccines, 30.4% indicated knowledge or education, 60.8% school, work, or travel requirements, and 26% indicated perceived risk, a prior exposure, or a hepatitis diagnosis.

Most respondents (60.8%) indicated a risk assessment tool when asked how they determine an individual should be tested for hepatitis B, while 73% indicated either a risk assessment tool or other risk categories when asked how they determine an individual should be vaccinated.

Concerning HCV, respondents reportedly tested an average of 535 individuals ranging from no tests to over 2,500 individuals. A very high percentage (68%) of providers reported that they do not treat HCV. Of those that perform treatment, they do so to an average of 16 individuals ranging from 0-200.

When asked why they believe individuals seek testing for hepatitis C, 2/3 (66.7%) of respondents indicated physician referral, friend/spouse/partner/relative, and blood bank. 45.8% indicated public prevention education, 41.7% other, and only 4.2% because of Internet research.

The same majority (87%) of respondents who answered why they believe individuals do not seek testing for hepatitis C, as was the case with hepatitis B, included
either a lack of knowledge or education, while over 20% indicated fear of the unknown. When asked whom they consider to be “at risk” for contracting hepatitis C, nearly 70% of respondents cited IDU/drug use.

Most respondents (52%) indicated a risk assessment tool when asked how they determine that an individual should be tested for hepatitis C, while 65% indicated a risk assessment tool combined with other risk categories.

When asked how effective given modes of prevention education are, respondents rarely tended to indicate “slightly ineffective” or “highly ineffective.” This indicated that the majority of responders marked positive rather than negative answers with regard to prevention outreach modes. Therefore, it can be concluded that a non-answer may also be a negative answer. The “unable to determine” percentage remained large for each response. For television commercials, combined “slightly effective” and “highly effective” responses yielded 54.2%, with 37.5% “unable to determine.” For radio commercials, 50% and 37.5%, respectively; materials and/or pamphlets 62.5% and 20.8%; peer educators 66.7% and 25%; and focus groups 54.2% and 33.3%.

Respondents were asked where they would prioritize hepatitis services for hepatitis C infected individuals or those at risk, given unlimited resources (e.g. funding, time, staff). Ordinal response options were one (1) through nine (9), with (1) representing “most important” and (9) representing “least important.”

Weighted tendencies were used to analyze the responses, where (1) through (3), (4) through (6), and (7) through (9) were grouped together. Of the scales that weighed toward “most important,” testing totaled a combined 79.1%; prevention education 62.5%; 54.2% treatment; 49.9% vaccines; and 25% surveillance. Of those that weighed toward “least important,” other social services (e.g. transportation, housing, etc.) was given 87.5%; mental health 79.2%; substance abuse treatments 37.5%; and case management 29.1%.

When asked if they thought physicians and other medical staff require any additional training and/or education with regard to hepatitis C infection, testing, and treatment, an overwhelming majority of respondents (91%) indicated “yes.” A follow-up question was then given, which asked what kind of training and/or education they would
suggest. The majority of common responses included updates regarding treatment, testing, and surveillance changes.

Regarding the treatment of HIV co-infected individuals, both past and present, 34.8% indicated a positive response. For respondents who treat or have treated those who are co-infected, the final question asked was what they thought were special issues to be considered when treatment, prevention education, and the provision of social services occur. Responses varied among prevention education, medication interactions, depression, holistic health strategies, and hope.

The survey and its results were found to be very useful in creating recommendations for current practices in viral hepatitis outreach, prevention, treatment, and other cost projection activities. The AIDS Institute views the answers of current employees dealing with related issues from both public and private sectors to be paramount to policy making and policy altering decisions.

**SERVICE COSTS**

**PROJECTIONS**

Following investigations into disease manifestations, their treatment theories, and how they are, in fact, impacting the community, it is most beneficial to investigate how this impact will be felt economically. Given the uneasy reliance on surveillance projections and the complicated science of drug pricing, projecting costs remains a difficult endeavor.

Projection models for service costs are dependent on the interaction of two other projections: the estimated “burden” of disease (prevalence) and the future costs of treatment. Further complicating the model are methodological data collection problems, changing treatment standards, differing response levels, recurrence, and unknown weights or factors that can significantly undermine the quality of the data.

The value of each model is dependent on the combination of epidemiological, demographic, and behavioral trends. Different methods are used to determine differing
rates of interest. It should be noted that HIV incidence, HIV infection prevalence, AIDS incidence, and AIDS prevalence and mortality are interrelated, yet separate concepts. Each are associated with time.

From a prevention perspective, HIV incidence is of particular interest. The infection prevalence, or pool of those currently infected, represents the potential for future incidence and the effect of past incidence. Although current rates of transmission can be calculated from prevalence rates, reflecting the experience with the disease among those that have already acquired it, future incidence is still dependent on personal behaviors.

AIDS incidence can also be used to calculate HIV prevalence by subtracting cumulative AIDS deaths from cumulative incidence. Using a standard rate of progression from HIV to AIDS, the figures are worked backwards to estimate past HIV incidence. The standard rate of progression has been 10 years, and is commonly employed for this type of analysis. Adjustments that take into consideration the impact of HAART are constantly needing revision.

Serologic surveys, such as NHANES, are used to find the status of participants. Because the participants are selected at “random,” their status is extrapolated to others of the same category within the population. Census numbers are used to determine the population figures. The problems with this method are the issues of “random” and representation.

Many countries have employed active surveillance systems. Instead of relying on individuals to come into the system, current levels of HIV infection are determined by testing samples of blood and other bodily fluids obtained for other routine screening purposes. Since the specimens are anonymous, the tests capture specimens of those that refuse to be tested for HIV.

**IMPACT ANALYSIS: Medicaid**

According to the Florida Agency for Health Care Administration (AHCA), total spending for all hepatitis C patients enrolled in the MediPASS program for fiscal year 2000-2001 totaled $76,824,541. This sum, divided by 62,174 total case months, yields a
$1,236 per member per month (PMPM). A person undergoing annual hepatitis C treatment will incur a cost of approximately $15,000, which is consistent with findings in the New Jersey prison system cited previously.

Of those patients with AIDS who are treated for hepatitis C under the MediPASS program, overall costs amounted to $23,162,195, representing 30.1% of all patients treated for hepatitis C. Divided by 10,319 case months, PMPM rises 81.6% to $2,245. The cost for a person with AIDS undergoing annual hepatitis C treatment is approximately $26,940.

**IMPACT ANALYSIS: The AIDS Drug Assistance Program (ADAP)**

Sixteen state ADAP programs have already been forced to cut back on HIV services due to budget problems, increased enrollment, longer duration periods, and rising healthcare costs, with more expected to follow. Current reports on the status of ADAPs are maintained by the National Alliance of State and Territorial AIDS Directors (NASTAD) *ADAP Funding Watch Report*.

Eligibility and drug formulary restrictions, as well as waiting lists, are commonly used to limit expenditures. Effects include treatment gaps and patient migration. Without consistent access to medications, which help to keep viral loads down, time becomes a very real threat. While some patients are forced to wait-and-see, others will actively migrate to locations that can provide treatment, blurring the historical trend lines capturing geographic need and making them incongruous to “estimated” demand.

Even with these problems involving the treatment of HIV alone, there is a sustained need for those that are HCV co-infected. New Jersey and Massachusetts were surveyed in order to assess the possible impact of HCV services on the Florida ADAP, which does not currently provide them. In New Jersey, out of 3,000 ADAP clients, in one month, 29 clients accessed Ribavirin and 35 accessed Peg-Interferon. This was at a cost of approximately $86,000 for the month to provide treatment to all of these clients (personal communication with Ronald Weinstein, New Jersey ADAP Director, April 23, 2003). Using these figures, out of a total ADAP budget of $55 million per year, the
projected cost, given a somewhat consistent need, would be $1 million spent on hepatitis C treatments. This would account for less than 2% of their total budget.

When the Massachusetts ADAP was surveyed, it was found that out of the 1,106 ADAP clients served in one month, five (5) clients accessed HCV medications. A combined total of $2,635.26 was spent on Ribavirin and Peg-Interferon for the month of December 2002. For the 2002 fiscal year, the total ADAP budget for the state of Massachusetts consisted of $14 million, $8 million of which was spent on pharmaceuticals and $6 million on insurance continuation and other programs (personal communication with Annette Rockwell, Massachusetts HDAP Coordinator, April 29, 2003). If the December total for New Jersey is generalized to each month, without making exceptions for treatment failure and other confounding factors leading to shortened length of treatment, Massachusetts would spend around $32,000 a year for HCV treatments. This sum would account for less than 1% (.2%) of the total ADAP budget and less than 1% (.4%) spent on pharmaceuticals.

Using the HCV treatment costs and usage figures from New Jersey ($2,866 per person; one percent) and Massachusetts ($2,635; less than one percent), the approximately 13,000 ADAP clients in Florida would yield roughly $350,000 per month. This figure assumes that treatment usage for Florida will be similar to the experiences of New Jersey and Massachusetts, where a percentage (1%) from the ADAP total is multiplied by drug costs.

If 25% of the 13,000 ADAP clients estimated to be co-infected with HCV would receive treatment, this figure increases to nearly $8.8 million. Although much higher than the experience cost, using a co-infection estimate more accurately predicts budgeted possible need within the ADAP program. This total, however, is less feasible than the experience cost, due to the more sporadic than consistent nature of HCV treatment.

Finally, if all 23,750 (25% of 95,000) estimated HIV-infected individuals in Florida were to receive treatment, over $64 million per month ($768 million annually) would be spent for HCV treatment. This figure provides a high-end estimate to illustrate a total approximate “need” for the state of Florida. Based on the experience of both New Jersey and Massachusetts, this total greatly exceeds an actual usage approximation of 1%, multiplied by 23,750 and by drug costs, or nearly $641,000. This, of course, is
unrealistic due to the mere fact of the eligibility requirements for Florida ADAP, and the improbability that many of the co-infected individuals would not qualify.

The approximate $2,700 per month figure used to calculate these totals makes the $1,250 ($15,000 annual) HCV treatment figure used to calculate the co-infection tables for Florida look like conservative estimates.

Given current surveillance testing and treatment rates, we would estimate total impact to the Florida ADAP to be between the $350,000 and $8.8 million figures. While the overall need is evidenced in the second calculation, variables such as lack of community health, professional education of hepatitis risks, testing, testing return rates, and availability/eligibility to treat force the “need” numbers lower and closer to the experience figures from New Jersey and Massachusetts. The experience number would have to be augmented to approximate Florida’s already expressed hepatitis characteristics.

SUMMARY

Because of the unique nature of HIV/AIDS and hepatitis B and C, the community must be cognizant of the impact and implications they will have economically, socially, and ethically.

AIDS in the U.S. is not gone, and new problems arise as old ones continue to plague all people affected and infected by AIDS. Every hurdle cleared is relative to those that lie ahead. Continued stigmatization, complacency, antiretroviral therapy resistance, dwindling public funding, stagnant infection rates, and chronic co-infection issues all confound the advances in HIV/AIDS treatment and care that have been made over the past twenty years. There is still no cure and no vaccine for HIV/AIDS. Therefore, until cures and vaccines are found, we are relegated to focusing on prevention, care, and treatment.

The less studied and less glamorized viral hepatitis strains are on track to exponentially impact publicly and privately funded medical care. These “silent killers” are causing large expenditures due to their chronicity, while acute stage expenditures may devastate the health infrastructure if left unattended. There is hope in the form of vaccines for hepatitis B, which are now required by many schools, work places, and
travel authorizations. Daily, this increases the pool of individuals that are vaccinated pre-exposure. Unfortunately, there is no vaccine for hepatitis C. Additionally, of those that are infected, very few will be able to access and tolerate the current treatments. This does not bode well for the community. Because of the estimated infection rates discussed earlier, it is understood that knowledge remains one of the largest barriers to ending hepatitis infection. Because testing rates seem to be inconsiderable compared to projected infection rates, one can surmise that there are millions of individuals that do not know that they are infected. This, in turn, increases the likelihood that they will not take precautions to prevent the spread of infection. This is coupled with the fact that much of the transmission of HCV is blamed on the use of unclean needles. Whether past or present, injection drug users are not a readily identifiable subpopulation.

Adding these circumstances together and taking into consideration the unique and labyrinthine collection of confounding variables, it remains unfathomable to attempt to create clear and concise guidelines, regulations, and cost projections. One aspect of this work is certain—it is in its infant stages. Experts predict that the true HCV impact will occur in another 10-20 years with needs as extensive and expensive as liver transplants.

From the hepatitis perspective, HIV is a very small problem. HIV is a minute co-infecter compared to many other confounding variables. However, from the HIV perspective, HCV poses a much larger threat. The HIV community can no longer ignore the impact that hepatitis will have on the community's members and resources. To ignore HCV at this point is similar to taking ten steps backward by not considering the holistic nature of the human body and disease states. The community would be remiss to not address HCV in prevention and treatment, especially given the large strides it has made in HIV/AIDS treatment and prevention. The HIV can be treated and controlled, but this treatment is of no use if the co-infected individual dies from HCV related complications; HCV still kills. The following recommendations hope to address several of the issues relevant to the health and well-being of Florida and its citizens, in the hope of creating a better system of prevention, education, and treatment.
RECOMMENDATIONS

The AIDS Institute encourages the Florida Department of Health, Hepatitis and Liver Failure Prevention and Control Program to:

1. Increase funding and attention paid to testing for HBV and HCV, with additional emphasis on HBV vaccination. Hepatitis, which has the ability to slowly degrade the liver without producing obvious symptoms, can be prevented with a vaccination for hepatitis B and treated early in the case of hepatitis C. The former is dependent on prevention awareness, while the latter is dependent on early detection. The cost differentials for hepatitis B vaccination versus chronic treatment (and associated personal and societal costs) make for a strong argument for wide-spread vaccination programs.

2. Utilize more peer-to-peer education and primary prevention, modeled after HIV successes for HBV and HCV, which should include culturally sensitive and appropriate employees and materials.

3. Strongly encourage and provide incentives for HBV and HCV testing in both private and public sector sites, especially public health departments. There is an opportunity to educate those who are seeking treatment for other STDs and make hepatitis testing standard. While funding is available through the Department of Health, hepatitis testing is not required. This is a lost opportunity. There is a need for incentives to be designed for both private and public sector sites.

4. Create and provide training modules for HBV and HCV education for non-specialized physicians and other medical staff to include late breaking treatment options, guidelines, and other research related outcomes. These modules can be created with both public and private partners, but should undoubtedly include hepatitis infected individuals. From the provider surveys, education was shown as being a consistent item. An overwhelming number of respondents indicated "yes" to whether they thought physicians and other medical staff require any additional training and/or education with regard to hepatitis C infection, testing and treatment. Hepatitis B information can be easily incorporated.

5. Create and provide training modules for HBV and HCV education for HIV related staff. This staff can be defined as state employees as well as community providers.
These modules can be created with both public and private partners, but should undoubtedly include hepatitis infected individuals.

6. Create and foster linkages with other programs to include, but not be limited to jails/prisons, substance abuse (long and short term facilities), domestic violence shelters, homeless shelters, and HIV related programs for testing, counseling and education.

7. Increase knowledge and awareness for our public officials concerning the impact of this disease, monetarily as well as socially.

8. Educate and encourage our elected officials to provide for the prevention, care, and treatment of the at-risk and those mono- and co-infected with hepatitis.

9. Encourage State of Florida-Department of Health, Bureau of HIV/AIDS to consider treating HIV/HCV co-infected individuals (given appropriate programmatic and monetary controls) with ADAP funds to assist in the overall coverage of hepatitis infected individuals.
REFERENCES


