The Syphilis and HIV Connection: A Model in defense of an Anthropology of Sexually TransmittedInfections

Jennifer L. Joss
Heather L. Pearcey
Tara V. Postnikoff
Department of Anthropology
McMaster University

Abstract:

This paper was initiated as an effort to improve our understanding of health-seeking behaviour in individuals with sexually transmitted infections. It quickly became apparent that the social, cultural, economic, biological and political issues that influence health-seeking behaviour in individuals with sexually transmitted infections greatly differed from those who have or had other diseases. Through a critique of the most current model describing sexually transmitted infection health-seeking behaviour developed by Aral and Wasserheit (1999), this paper presents a focused argument for an anthropology of sexually transmitted infections. The Aral and Wasserheit (1999) model fails to significantly describe the health-seeking behaviour of individuals infected with more than one sexually transmitted infection simultaneously. By examining aspects of pathocenosis and epidemiological synergy, it was found that the complex interactions between syphilis and HIV/AIDS changes the way we should study health-seeking behaviour for individuals with sexually transmitted infections in general. Therefore, while examining the syphilis/HIV paradigm, it became clear that an anthropology of sexually transmitted infections is in fact necessary.

Introduction:

"Until the appearance of AIDS there was no disease quite like syphilis" (Wills 1996: 188). Current research appears to support the idea that there is a connection(s) or 'hidden link' between the current AIDS epidemic and venereal syphilis. AIDS seems to be following a similar epidemiological pathway as syphilis has historically, "this syphilis too will pass away and die out, but later it will be born again and be seen again by our grandchildren, just as in bygone ages we must believe it was observed by our ancestors" (Giroloma Francastoro 1930:145-7).

Despite the efforts of researchers, health care workers and advances in diagnosis, treatment and prevention, sexually transmitted infections (STI's) are still on the rise worldwide. STI's are among the most common causes of illness in the world and have health, social and economic consequences (WHO 1995: 1). Estimates for the number of people contracting new STI's each year is in the millions. WHO estimated that in 1995 there would be 12 million new cases of syphilis, 62 million

cases of gonorrhea, 89 million cases of chlamydia and 170 million cases of trichomoniasis worldwide (WHO 1995).

In 1999, 5.4 million individuals were newly infected with HIV and the number of people living with HIV/AIDS totaled 34.3 million. The number of deaths attributed to AIDS presently stands at 18.8 million (Pisani et al. 2000:8). Due to the immense number of infections, the health care costs for treating the disease is considerably large. In the United States, the cyclical nature of syphilis provides a brief window of opportunity to accomplish elimination and save the $80 million annual health care cost of syphilis treatment alone (St. Louis and Wasserheit 1998:354). Although this endeavor is admirable, the complexities between syphilis and HIV/AIDS to be presented in this project question the motives for this perceived eradication, believing that such a goal does not reflect the reality of behavioural and sociocultural variables present within today's society that directly and indirectly influence the transmission of these infections.

The last 20 years have witnessed six striking changes in STI patterns: emergence of new STI organisms and etiologies, reemergence of old STI's, shifts in the population in which STI's are concentrated, shifts in the etiological spectra of STI syndromes, alterations in the incidence of STI complications and increases in antimicrobial resistance. HIV is clearly the archetype of a newly emerging STI pathogen, one that has devastated the world with a fatal pandemic involving an estimated 14 million people (Wasserheit 1994:2430).

For this paper we have chosen to use the term Sexually Transmitted Infection (STI) rather than the somewhat dated term, Sexually Transmitted Disease (STD). Any direct references made in this paper that cite STD we use interchangeably with STI, but the terminology used by the authors will be STI. We feel that this term is more appropriate as it encompasses some infections that the term disease otherwise excludes from its scope. As expressed by the World Health Organization (WHO):

> "The term diseases is considered not appropriate for asymptomatic infections (like Trichomoniasis in men) and another new generation of professionals attached to the new reproductive health concepts would like to see STD in the context of reproductive tract infections (that includes endogenous and exogenous-sexual and non-sexual transmitted-microorganisms). As well STI denomination also encompasses better the necessity to provide care to asymptomatic women. Another new public health approach, linked to HIV/AIDS prevention as well as management of reproductive health issues has driven the change" (WHO 1999: 1).

Objectives

> "The anthropology of infectious disease must be a holistic one, in which traditional sub-disciplinary boundaries are irrelevant. Infectious disease problems are both biological and cultural, historic and contemporary, theoretical and practical" (Inhorn and Brown 1997:32).

Inhorn and Brown (1997) describe five overarching recommendations for future research in the anthropology of infectious disease: an undertaking of the anthropologies of neglected infectious diseases, a reconstruction of infectious disease histories, employment of methodological triangulation, enrichment of infectious disease ethnography and provision for a political and economic context. Within this project we include a reconstruction of the history and epidemiology of syphilis and HIV/AIDS; provide a sociocultural description of how these infections have been perceived by the media and public; and suggest further recommendations to improve our current knowledge of STI health-seeking behaviour.

The specific argument made in this project is the need for an anthropology of sexually transmitted infections. Four primary points of discussion define the need for such a discipline. First, as discussed by the WHO (1999) the linguistic change from sexually transmitted disease to sexually transmitted infection has broadened the focus of research in this area. Additionally, as is discussed by Brandt (1988) the connotations associated with the word 'disease' and 'sex' incorporate varying historical reactions and social stigmas unique to STI's. The epidemiology of STI's also provides a point of divergence from a more general anthropology of infectious diseases.

Although the details of the epidemiology of syphilis and HIV/AIDS will be discussed further in this paper, it is important to note that unlike other infectious diseases, humans are the only hosts within the transmission cycle. With this in mind, the transmission of STI's provides a unique social dimension in addition to the biological one. Health-seeking behaviours of individuals infected with STI's are also an important component to this specialized discipline of anthropology. Of all the infectious diseases inflicted upon the human population, the testing, treatment, and prevention of STI's has been widely published and communicated within the public sphere. Due to the already mentioned stigma associated with these diseases, specialized testing and counseling options have been developed through guidelines, hotlines, and anonymous testing facilities and clinics (Chesney and Folkman 1999; Health Canada 1999; CDC 1994). Finally, an argument made by Fee and Fox (1992) expresses the need to shift our understanding of HIV/AIDS from an infectious disease to a chronic one:

> "[Because] if we assume that the rate of HIV infection will continue for the 1990's much as it did for the 1980's; if we assume that, as with cancer, most treatments will prolong life rather than cure the disease; if we assume that scientific research will continue to expand our knowledge rather than soon provide a means of prevention or cure; and if we assume that we will continue to respond to AIDS through the provision of specialized hospital units, long term care, and other institutional services, we must also conclude that we are dealing not with a brief, time-limited epidemic but with a long, slow process more analogous to cancer than to cholera" (Fee and Fox 1992:5).

This perspective on STI health and illness is significant for the need of an anthropology of STI's because it transports the disease outside of its traditional

context. In this way we can come to understand the disease in a new light, moving the focus from cure, to management and prevention. Overall, what we see in these points, and in more detail throughout this paper is a common focus on how STI's can be considered a distinct subsection apart from a generalized study of the anthropology of infectious disease.

The goal of this paper is therefore to generate an anthropological assessment of the relationship between HIV/AIDS and syphilis. As such, we will explore the links between acquired syphilis (with the exception of congenital syphilis) and HIV/AIDS, including pathocenosis, epidemiological synergy and an examination of health-seeking behaviour and treatment options for HIV/AIDS patients and syphilis patients, or those who have both.

Background

Syphilis

Treponema pallidum subspecies *pallidum* is the agent of venereal syphilis and was identified in 1905 by Schaudinn and Hoffman (Stamm 1999:467). There are no animal reservoirs for syphilis and almost all cases of venereal syphilis are acquired by direct sexual contact with the lesions of an individual displaying active primary or disseminated secondary syphilis (Stamm 1999:467). Syphilis can also be transmitted congenitally from mother to fetus and less commonly through the blood by transfusions or sharing needles, nonsexual personal contact and accidental direct inoculation (Stamm 1999:467). *T. pallidum* is very sensitive to environmental conditions, physical and chemical agents and is one of the few human pathogens that have not been cultivated *in vitro* for extended time periods making research on it difficult (Stamm 1999:468).

The laboratory diagnosis of syphilis can be accomplished through a few different techniques that vary in their accuracy. VDRL (Venereal Disease Research Laboratory) and RPR (Rapid Plasma Reagin) are the most commonly used non-treponemal antibody tests that look for the presence of nonspecific reagin antibodies in the blood (Kahn and Washington 1995:1). These tests are sensitive, but not specific for syphilis and may consequently lead to many false negative or false positive results. Despite this fact these tests are commonly used to diagnose syphilis, particularly to determine the effectiveness of treatment (Birnbaum et al. 1999: 2235). More accurate and specific treponemal tests are the microhemagglutination assay for *Treponema pallidum* (MHA-TP) and the fluorescent treponemal antibody absorption (FTA-ABS) test that screen for the presence of the treponema (Birnbaum et al. 1999:2235). Another sensitive method of verifying primary syphilis is the finding of treponemes with characteristic corkscrew motility by dark field microscope examination of fluid obtained from the surface of a chancre (Musher and Knox 1983). By far the most specific test for the presence of *T.* pallidum in the cerebral spinal fluid of patients is the rabbit infectivity test (RIT). However, due to the lengthy laboratory process and expense, this test is an inefficient method for the detection of syphilis in clinical settings (Centurion-Lara et al. 1997). Alternately, since the decoding of syphilis' genetic sequence, PCR (polymerase chain reaction) has shown to be a more specific method of diagnosis (Centurion-Lara et al. 1997;

Wicher et al. 1998).

There are three characteristic stages of syphilis, which help to classify the infection. Accordingly, these are known as Primary, Secondary and Tertiary syphilis, as well as a period of latency (between the secondary and tertiary phases, occurring three to twelve weeks after exposure) (Musher and Knox 1983).

In 1909, Paul Erlich discovered Salvarsan to be a cure for syphilis and before this mercury had been used to treat its manifestations (Brant 1988). It was in 1917 that Wagner von Jauregg postulated that inoculation with malaria might be utilized as a treatment for syphilis. Following his lead, Paul O'Leary of the Mayo Clinic documented several successful trails using malarial therapy by 1927 (Sartin and Perry 1995). In 1943 it was discovered that penicillin cured syphilis and this antibiotic has been used as a treatment ever since (Brandt 1988). High dose intravenous penicillin can cure some manifestations of tertiary syphilis though the certainty of the treatment is less than that for primary and secondary syphilis (Swartz et al. 1999). Though penicillin generally works well, new vaccines need to be found.

HIV/AIDS

Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) is caused by a retrovirus that attacks the body's immune system, specifically T-cells, rendering it inoperable and thus leaving the body vulnerable to opportunistic infections. After more than a decade of research on HIV/AIDS, the precise mechanisms whereby HIV causes AIDS have not been adequately confirmed. HIV becomes AIDS when a blood test confirms HIV antibodies in conjunction with at least one of: an opportunistic infection such as *pneumocystis pneumonia*, an AIDS-related cancer, severe wasting, dementia, or a reduction in the amount of the helper T-cells, also called CD4 cells [which play a critical role in the proper functioning of the immune system] to a count of below 200 (healthy people usually have a helper T-cell count between 600 and 1,000) (Henkel 1999:14). HIV infection remains incurable though it is treatable.

HIV can be transmitted via sexual contact, contaminated blood or blood products and from mother to child *in utero* or during vaginal birth (Ambroziak and Levy 1999:251). A person with HIV/AIDS is always contagious. The virus is present in seminal and vaginal cells and fluids. Though it is thought that increased infectiveness is associated with acute infection and advanced disease, no precise correlations have been discovered (Ambroziak and Levy 1999:251). It has been shown that the presence of other STI's such as syphilis, gonorrhea, and chlamydia increase the likelihood of HIV transmission by the increased routes of transmission provided by lesions and chancres and by an already weakened immune system (Ambroziak and Levy 1999:252). The insertive partner has a lower risk of contracting the virus, though the lack of circumcision increases the risk of HIV infection several times due to a greater surface area and the potential for more trauma to the penis during vaginal and anal intercourse (Ambroziak and Levy 1999:252).

Blood containing infected cells and particles infused into a patient is a very efficient mode of transmission. This made hemophiliacs and blood transfusion recipients extremely vulnerable to infection before the mid-1980s when blood began to be screened for HIV (Ambroziak and Levy 1999:251). Due to improved donor screening techniques and treatment of blood products, the risk of contracting HIV in

this manner is now minimal. The risk of infection via shared needles depends on the incidence of needle sharing and the viral load of the needle-sharers and considering that most accidental needle sticks, such as those incurred by health care workers, do not transfer appreciable amounts of blood, this is not a major source of infection (Ambroziak and Levy 1999:251). The rate of transmission from infected mothers *to their babies ranges from 13-35% and about half of the infections occur in utero* and the other half during vaginal birth (Ambroziak and Levy 1999:252). Breast milk contains both HIV and antiviral components so breastfeeding by HIV positive mothers is discouraged in countries where it is not necessary for adequate nutrition (Ambroziak and Levy 1999:252).

HIV is fairly easy to detect by antibodies present in the blood. There now are kits available in the United States where a person can collect his own specimen, mail the card in for analysis and then call a toll free number for the results, in approximately one week (Chesney and Folkman 1999:987). This raises some questions as to the level of care these patients will receive as they are under no obligation to seek out a doctor for treatment.

Like syphilis, HIV/AIDS has three characteristic stages through which infected people pass. Unlike syphilis, the probability is greater that all infected persons will eventually pass through all of the stages, ending in mortality.

Treatments for HIV/AIDS are constantly changing and depend on which stage of the disease a person is in and what specific symptoms or opportunistic infections they exhibit. All treatments include some sort of drug cocktail. Antiretroviral drugs are currently being used to try to build up a patient's immune system and reverse some of the damage sustained by the patient by HIV/AIDS (Richman 1999:677). A triple cocktail treatment consisting of a protease inhibitor and two transcriptive inhibitors is called HAART (Highly Active Antiretroviral Therapy) (Henkel 1999: 12). This treatment has been working well in both newly infected patients and those with AIDS due to its ability to disrupt HIV at different stages of its replication (Henkel 1999:12).

Pathocenosis: Syphilis and HIV/AIDS

Pathocenosis is the concept that, once a pattern of morbidity disappears, another reappears, or in other words, "the equilibrium in the frequency of all the diseases affecting a given population" (Grmek 1990:156). Such a relationship is found between syphilis and HIV/AIDS. Looking at the history of syphilis provides an analogue to the current HIV/AIDS epidemic. Syphilis and HIV/AIDS have many obvious differences, but they also exhibit many similarities as they are primarily sexually transmitted, have severe pathological consequences, are greatly feared and the affected persons are highly stigmatized (Brandt 1988). Other similarities include denial and avoidance of early treatment due to the lack of severity of early symptoms (Weiner 1992).

Syphilitic lesions disappear over time, and as a result it was believed that chronic ailments resulting from syphilis were actually the work of different diseases, resulting in syphilis being given the nickname the Great Imitator (Brandt 1988). In the early 20th century syphilis was seen as, "...one dimension of a larger breakdown in values that emphasized the sanctity of the home, the domestic role of women, and

the principle of strictly marital sexuality" (Brandt 1988:376). In response to these feelings, doctors put forward theories of casual transmission via such things as pens, toilet seats and doorknobs reflecting deep cultural fears about disease and sexuality (Brandt 1988). The distinction between those who had contracted syphilis through sexual transgressions, and the syphilis passed on to unsuspecting wives and their unborn children, was eventually made. In this way, the victims of syphilis were divided into those who deserved it and those who did not (Brandt 1988).

The incidence of syphilis fell from 72/100,000 cases in 1943 to 4/100,000 in 1956 due in part to the introduction of penicillin as a cure (Brandt 1988:379). In the early 1960's the rates of syphilis increased again due to the three P's: permissiveness, promiscuity and the pill; as well there was a substantial cut in funding for venereal disease programs (Brandt 1988:379). The rates increased even more during the 1970's and the early 1980's with a disproportionate number of cases occurring among homosexual men (Hook and Marra 1992:1060). Due to behavioural changes adopted by homosexual men in the mid 1980's, syphilis incidence decreased while increasing among heterosexual men and women (Hook and Marra 1992:1060). In 1990, the incidence of syphilis rose to its highest level since 1949 and following this peak, these numbers have dropped dramatically (Williams et al. 1999: 1093). This decrease in syphilis cases has caused the Centers for Disease Control to call for the elimination of the disease (Williams et al. 1999:1093). The complete eradication of syphilis is unlikely because of the ease of its transmission, as evidenced by the outbreak of syphilis in King County, Washington in 1997-1998 (Williams et al. 1999:1093) and in Conyer's, Georgia among teenagers (Frontline 1999:1). Though syphilis has proven that it can withstand attempts of eradication, it no longer conjures up the fear it once did prior to the identification of antibiotics and specifically, penicillin as a cure.

The first identified cases of AIDS in North America were in Los Angeles where five homosexual men died of *Pneumocystis carinii* pneumonia; a normally harmless protozoon found in most healthy people that adversely affects immunosuppressed patients (Coulter 1987:ix). This same type of pneumonia also appeared in New York along with cases of Karposi's sarcoma, a very unusual type of skin cancer that also affects immunosuppressed patients (Coulter 1987:ix). The term Acquired Immunodeficiency Syndrome, (AIDS), was created in 1982 to encompass these infections (Hays 1998:219). By 1982, AIDS had been diagnosed in intravenous drug users, hemophiliacs and heterosexual women among others (Brandt 1987:184). The discovery that this was not just a 'gay plague' did little to stop the tide of discrimination and recrimination against homosexual men. What this did do was create a larger group of people to blame for the spread of HIV, the virus discovered to cause AIDS. Four groups of people, referred to as the Four-H Club, were seen to have the greatest risk of contracting HIV: homosexuals, Haitians, hemophiliacs and heroin users (Farmer 1992:211). Only hemophiliacs, who had contracted HIV through tainted blood, were seen as innocent victims. This idea of blame parallels that of syphilis. The most recent syphilis epidemic hit the United States in two distinct waves the first being from 1960-1980 and the second during the late 1980's. The first wave was concentrated among homosexual men while the second was concentrated among minority heterosexuals (Wasserheit 1994:2431). This is analogous to the initial spread of HIV in North America in the 1980's where

the disease struck the white male homosexual population most heavily, and led to a second wave of infection at the beginning of the 1990's that was concentrated among minority heterosexuals and especially women (Wasserheit 1994:2320-1).

HIV/AIDS brings up issues of personal security not unlike those present during the campaign on syphilis. In the 1930's legislation was passed in the United States which called for the mandatory testing of individuals getting married and having children (Brandt 1987:378). Many states withdrew these laws in the 1980's (Brandt 1987:378). When the Enzyme Linked Immunosorbant Assay (ELISA) test for HIV antibodies became available, people were afraid that they would be forced to submit to testing. New military recruits were tested for HIV beginning in 1985 and were rejected if they tested positive (Brandt 1987:195). Some people have called for the mandatory testing of groups at risk, though how this would be accomplished is unknown. These responses underscore the fear that pervades society about sexually transmitted infections in general and HIV/AIDS in particular.

More evidence of this fear is found in popular beliefs about modes of transmission of HIV. Though it has been consistently proven that HIV is not easily transmitted and is not transmitted via casual contact, there are those who still believe that HIV can be transmitted via a shared drinking glass, toilet seats and doorknobs (Brandt 1987:192). These ideas were especially prevalent during the 1980's. During this time many parents protested when HIV positive children were allowed in school, and caregivers refused to provide treatment to HIV/AIDS patients (Brandt 1987:192).

An important difference between syphilis and HIV in the new millennium is that there is no cure for HIV/AIDS. When HIV was discovered, many scientists and physicians were completely unprepared for it, which is reminiscent of the discovery of syphilis. They believed, after the age of the 'magic bullet' of antibiotics, that anything was curable (Coulter 1987:xi). Early research efforts were aimed at finding a vaccine for HIV. Scientists have as of yet been unable to discover a vaccine, and even if they do, it would not help those already infected with HIV. Within our broader understanding of this disease it also seems unlikely that a vaccine will ever be developed that could effectively work against HIV, as it is a quickly mutating virus and new strains are constantly being produced. This is also one of the reasons why finding a cure for HIV is so difficult. What is important to realize is that medicine alone will never be able to cure HIV. As with any other STI, behavioural changes must accompany biological advancements.

HIV/AIDS has joined syphilis in diseases prevalent within our societal consciousness. In fact, "AIDS makes explicit, as few diseases could, the complex interaction of social, cultural, and biological forces" (Brandt 1987:199). Around the turn of the century, syphilis was greatly feared for physical, social and moral reasons. Physically, syphilis can be a debilitating disease. Morally and socially, people who contracted syphilis were stigmatized because of the connotations of illicit sex which syphilis embodied. The idea of innocent victims and groups to blame, such as prostitutes, was prevalent. People were subjected to mandatory testing and were discriminated against if they were found to have syphilis. All of these elements have been illustrated since the outbreak of HIV/AIDS in the early 1980's. Once penicillin was discovered as a cure for syphilis and society's beliefs about sexuality became more tolerant, syphilis was not as feared as it had been historically. People's fears

were then displaced onto something new and HIV/AIDS helped to fill this role. AIDS is also a physically debilitating disease that causes death and HIV/AIDS patients face discrimination from many sectors of society (Weitz 1990:24). Groups of individuals such as homosexuals and intravenous drug users represent those who are blamed for the spread of the disease as their behaviours and practices are deemed unacceptable to many people in North American society. Some people are also subjected to mandatory testing, as discussed above, and are punished if their results are positive. All of these similarities point to the parallels between syphilis and HIV/AIDS. Understanding the relationship between syphilis and HIV/AIDS along with their biological connection will help us to understand the current HIV/AIDS epidemic and people's responses to it which lead to their choice of health seeking behaviours.

Epidemiological Synergy

Epidemiological synergy, or reciprocal relation, can be defined as the interrelationship or interrelatedness between two diseases whereby they are linked through common behaviours (Wasserheit 1992). Thus, in an attempt to understand disease, its natural history, diagnosis or response to therapy as well as transmission, this idea of interrelatedness is of much importance.

In the foreground, this idea of epidemiological synergy can be placed within the class of infections known as sexually transmitted infections. More specifically, the interrelationships between human immunodeficiency virus (HIV) infection and other sexually transmitted infections provide an excellent case study. Wasserheit (1992:61) writes:

> The interrelationships between human immunodeficiency virus infection and other sexually transmitted infections are unique, complex and intriguing. They probably explain in part the heterogeneous faces of the HIV epidemic around the globe and may provide insights into the pathogenesis of all STDs, including HIV.

Other authors, such as Mertens et al. (1990), have also put forth efforts to describe the epidemiological methods to study the interaction between HIV infection and other STI's. Mertens et al. (1990:57) state, "numerous studies performed over the past five years have indicated an association between HIV infection and other sexually transmitted diseases, particularly those involving genital ulceration." As well, it is suggested that "if co-infection with HIV prolongs or augments the infectiousness of individuals with STDs, and if the same STDs facilitate transmission of HIV, these infections may greatly amplify one another" (Wasserheit 1992:61). Thus it follows that epidemiological synergy may be responsible for the explosive growth of the HIV pandemic in some populations. It should be noted that in the epidemiological synergy between HIV infection and other STI's, each might alter the transmission or manifestations of the other, resulting in a "potentially explosive, mutually reinforcing spiral of infection" (Fleming and Wasserheit 1999:3).

What has fuelled the interest of researchers to focus on the interrelationships between HIV infection and other STI's specifically? HIV infection and other STI's share common dominant modes of transmission, common human reservoirs and common behavioural risk factors (Wasserheit 1992:61). Three relationships between

HIV infection and other STI's have been postulated: 1) increased transmission of HIV in the presence of other STI's; 2) accelerated progression of HIV disease in the presence of other STI's; and 3) alteration in the natural history, diagnosis, or response to therapy of other STI's in the presence of HIV infection (Wasserheit 1992:61). These are discussed briefly below.

1) The impact of sexually transmitted infections on HIV transmission: A majority of co-infections between various STI's are known to occur when an individual is infected with one STI. Current research has been unable to determine whether STI's facilitate HIV transmission or whether they are markers for HIV-related immunosuppression. It is also said that the importance of STI's in HIV transmission probably depends upon competing risk factors, the prevalence of which varies with gender and sexual preference (Wasserheit 1992:62).

2) The impact of sexually transmitted infections on HIV progression: It is difficult to differentiate between the onset of infection and the true duration of infection, especially in diseases with multiple stages such as syphilis and AIDS. The number of exposures to an STI pathogen, rather than categorical presence or absence of any exposure may be a risk factor to accelerated HIV progression (Wasserheit 1992:65).

3) The impact of HIV on other sexually transmitted infections: Because of its impact on other pathogens, or on the host response, HIV infection could theoretically, affect other STI's in a number of different ways. HIV infection might alter STI incidence or frequency of recurrences (Wasserheit 1992:66).

Sexual behaviours and co-infection with other STI's are potential confounders in the relationship between HIV infection and STI transmission, and prospective studies are necessary to establish whether STI's facilitate HIV transmission, HIV facilitates STI transmission or both (Wasserheit 1992:66). By increasing the duration of an STI, HIV infection could increase the incidence of the STI in a community without directly facilitating its transmission through altered susceptibility or altered infectiousness in individuals (Wasserheit 1992:66).

Syphilis and HIV as an Example:

Syphilis and HIV infections interact in several ways: previously having syphilis is a risk marker for HIV-infection; laboratory tests for syphilis may be modified in persons with HIV infection (sometimes making it undetectable); and the currently recommended therapy for syphilis may be less effective for persons with HIV infection. In addition, several small series and case reports suggest that the natural history and clinical manifestations of syphilis may be modified by concomitant HIV infection (Hutchinson 1994:94). As well, syphilis can manifest as a severe opportunistic infection with catastrophic neurological impact in HIV-infected immunosuppressed persons (St Louis and Wasserheit 1998:353). Therefore we feel that in examining the topic of epidemiological synergy, HIV and syphilis provide all the necessary characteristics for an excellent case study. The following three sections demonstrate that syphilis and HIV/AIDS are entwined in the notion of epidemiological synergy through a discussion of transmission, diagnosis, and treatment.

Transmission: The probability of HIV transmission during a single sexual encounter is influenced by the intrinsic properties of the transmitter, the virus and

the recipient. Persons with a more advanced clinical stage of disease or a more profound immunodeficiency are more infectious to their sex partners (Aral 1993:453-454). The emergence of the HIV epidemic has greatly amplified the importance of syphilis as a health problem in the United States. Since syphilis exhibits genital ulcers, this dramatically increases the likelihood of sexual transmission of HIV (Hook 1992:477; St Louis and Wasserheit 1998:353). Syphilis has thus helped to fuel the HIV epidemic.

A small number of studies have examined the role of syphilis in HIV infection. Some of these have revealed a significant association between syphilis and increased risk of HIV transmission upon multivariate analysis. Providing strong evidence suggesting that syphilis facilitates HIV transmission. Studies of the relationship between syphilis and HIV infection show a two-to-nine fold increase in HIV infection risk associated with syphilis. Even after controlling for the potential confounding variables of sexual behaviour in prospective studies, this relationship is statistically significant (Aral 1993:458). We are therefore left with a picture of HIV and syphilis which demonstrates that having one of these diseases significantly increases the chances of both transmitting and receiving the other disease.

Diagnosis: Some studies suggest that a major problem in the HIV/syphilis epidemic is the inability to diagnose syphilis in HIV positive patients and, "failure to diagnose STDs or HIV infection correctly will reduce the power of epidemiological studies to detect an association especially if this magnitude is small" (Mertens et al. 1990:58). In addition, failure of detection will result in a failure to start appropriate treatment and to take the necessary precautions involving progression and transmission. One reason for this stems from the "epidemiological evidence [that] exists for chemical immunosuppression resulting from antibiotics and other prescribed and recreational drugs prior to the AIDS crisis. Analysis and review of literature is given on the effects of subcurative doses of antibiotics masking and distorting the expression of secondary and tertiary syphilis" (McKenna et al. 1986:421). One study by Hutchinson (1994) reveals that the clinical presentation of syphilis in HIV positive patients differs from that of those who are HIV negative. It was found that patients with HIV infection presented more often with secondary syphilis were more likely to have a chancre during this phase (Hutchinson 1994:94). Thus, one consequence of the resurgence of early syphilis in the late 1980's is that clinicians are likely to begin to see increasing numbers of patients with latent syphilis, many of whom will be HIV-positive (Hook 1992:479).

Treatments: Patients with impaired cellular immune function, such as those with HIV, may require higher doses or more prolonged therapy with penicillin to treat syphilis infection. Several reports of syphilis complications in HIV-infected patients following standard therapy suggest that they are at increased risk for treatment failure from infections dependent on cell-mediated immunity (as opposed to humoral immunity). Serologically defined treatment failure was somewhat more common in HIV-infected than uninfected patients, especially those with primary syphilis (Handsfield 1999:718). This can be shown in Lukehart and co-workers (1988) findings that the conventional treatment of syphilis with benzathine penicillin fails to eradicate *T. pallidum* from the central nervous system of HIV-infected patients with primary or secondary syphilis. Also, it is suggested that the single dose of benzathine penicillin is inadequate to cure early syphilis in HIV-positive

subjects once the central nervous system is invaded (Lukehart et al. 1988; Hook 1992:477). The role of HIV infection and its associated immuno-compromised conditions in relapse of syphilis is unknown. Since cellular immunity is considered to play a leading part in the host response to syphilis infection, the immunologic abnormalities associated with HIV infection may permit more widespread treponemal infection than normally occurs in patients who are HIV-negative (Lukehart et al. 1988).

In summary, epidemiological synergy is the understanding that two or more infections are intrinsically interrelated, linked by common behaviours. As a consequence of this interrelatedness, the two infections have an effect on each other. These effects can be: increased susceptibility to other infections; enhanced infectivity; increased probability of transmission; alteration in the natural progression of the infection(s); accelerated progression to a clinical disease; change in the ability to diagnose infection accurately; and response to therapy. It has been shown that in the case of sexually transmitted infections this synergy is present. As in the case of HIV and syphilis, it has also been shown that the above listed effects are present, in that having HIV and syphilis can alter the course of infection.

The Person-Time of Infectiousness Model for Health-Seeking Behaviour:

> "As the interrelation between HIV infection and other sexually transmitted infections have become increasingly well understood, the need to translate these scientific findings into sustainable prevention programmes and policy has become increasingly urgent" (Fleming and Wasserheit 1999:2).

There is a greater need to understand how individuals assess and initiate health-seeking behaviour in response to possible STI exposure. Although awareness of STI's has grown with the onset of the HIV epidemic, it has become evident that little is known about health-seeking behaviour unique to STI's (Aral and Wasserheit 1999). Unlike other prevalent infections, STI's carry with them a particular social and moral discourse that can greatly influence individual responses to infection (Brandt 1988). Therefore we suggest a means to improve treatment success for individuals suffering from STI's by gaining a detailed understanding of how individuals suffering from STI's seek treatment, which can be most efficiently understood through the use of a theoretical model.

Although behavioural models have several limitations (oversimplification and overgeneralization of complex concepts, etc.) they are a starting point toward further detailed investigations within STI health-seeking behavior. Several perspectives exist in relation to the transmission of STI's. The 'STD Core' presented by Thomas and Tucker (1995:134) states that, "a disproportionately large number of STDs result directly or indirectly from a small subgroup of the people experiencing infections." Numerous paradigms contributing to this perspective include mathematical, clinical-epidemiological, and sociocultural models. Unfortunately, to compliment the vast information known about transmission, little is presently known about how individuals respond to becoming infected with an STI, in other words, their health-seeking behaviour. This is surprising, especially considering that STI's

rank within the top five diseases for which adults seek health care (WHO 2000:1). To present the basic principles of the Person-Time of Infectiousness (PTI) Model, the following comments are taken from Aral and Wasserheit's (1999) article, "STD-Related Health Care Seeking and Health Service Delivery," and readers are directed toward this article if they require further details. The PTI model is one inherently based on achieving treatment success through the, "timely and appropriate treatment of individuals infected with sexually transmitted pathogens to achieve the cure of bacterial and parasitic STD's and suppression of incurable STD's" (Aral and Wasserheit 1999:1296). Generally, this model is comprised of four treatment components and one prevention component. Each component is subsequently defined within a variable framework of time, which is directly influenced by various biological, structural and sociocultural "delays" that can occur as a result of STI infection, and the decision of the individual to seek medical help. The biological factors influencing health-seeking delays can be defined on the basis of biological manifestations and diagnostic assessments of a given STI. The other important contribution to delays for STI treatment includes structural features, namely the availability, accessibility, and appropriateness of treatment centres. Delays in STI treatment are also strongly associated with sociocultural and demographic influences, such as age, gender, education and cultural background. Considering these influences, below is a synthesis of the PTI model.

Component I: Loss to Detection and Resolution of Infectiousness

Although this is the first component of the model, it is perhaps one of the most significant in that it is at this level that individuals have not recognized the need for medical treatment (as they may be asymptomatic), or do not receive the treatment that they require. This component defines those individuals who will continue to be a part of the population contributing to STI infections in others. This component is a significant starting point to this model because individuals who do not complete the sequence of health-seeking components return to this stage, potentially contributing to further STI infections in others. Those also considered part of this first component include those not detected through testing, partners who have not been notified of the potential for infection, and those patients who do not return for follow-up visits, or to receive their test results. Treatment success is therefore contingent on completing all components of the model.

Component II: Health Care Seeking Delays

Essentially, five types of 'delays' have been defined within this component. The first delay begins at the time the individual becomes infected with an STI and progresses to the assessment of symptoms (if any) by the individual. In this delay period, the individual's own knowledge comes into play, where the potential for infection is recognized, and symptoms are identified. Immediately following the determination that symptoms are significant and warrant assessment by a health care professional, a location for treatment is decided upon.

Next, the individual must make an appointment by phone or by visiting a treatment facility, causing a third delay. From making the initial appointment (if the treatment centre chosen is not a drop-in clinic) another delay ensues, where the patient must wait until the time of the appointment (which can be a matter of hours

or days). The last delay period, is that in which the individual arrives for the appointment and waits for their initial contact with a physician.

Component III: Diagnostic Delays

Following initial contact with a physician or health care worker, an assessment (usually testing) must be completed in order to confirm a diagnosis. Within this time frame several delays can occur. Depending on the resources available at the treatment facility, tests may or may not be conducted at the treatment site, which can increase time to disease confirmation. Once the tests are completed, there is again a delay, which involves contacting individual patients, and having them return for their diagnosis.

Component IV: Treatment Delays

The treatment of STI's includes more then simply the administration of a prescription. Individuals infected with an STI have several responsibilities associated with the treatment of the infection, each representing a necessary step toward the infection's suppression or eradication. Included within this period of potential delays are the return of the patient to the treatment centre to be informed of the results or tests, meeting with the physician, and being assigned a treatment regime. The individual then has the responsibility to fill his/her prescriptions and ensure treatment instructions are followed.

Component V: Prevention Delays

Although the primary focus of this health-seeking model is specifically directed toward health outcomes, this final component encompasses some concerns related to behaviour change (namely post-test counseling). The other concern of this component is partner notification, and providing potential treatment for identified individuals.

Critique of Person-Time of Infectiousness Model:

As stated at the outset, it is not the goal of this paper to design an STI health-seeking model, but to work within the model proposed by Aral and Wasserheit (1999) and provide additional anthropological perspectives of health care assessment that have arisen throughout consideration of pathocenosis and epidemiologic synergy. Ultimately, we hope to convey a more comprehensive consideration of health-seeking behaviours within the lay population. In order to do this, the following section is devoted to an assessment of the Person-Time of Infectiousness Model.

From an anthropological perspective, the relationship between infections as described by the concepts of pathocenosis and epidemiological synergy are of particular significance to STI health-seeking behaviour. Although the PTI health-seeking model presents several influencing factors such as the biological, sociocultural, and etiological, the complex relationships between syphilis and HIV/AIDS make it difficult to describe behaviour within this framework.

The initial reason for this is the narrow interpretation by Aral and Wasserheit (1999) of how STI's are transmitted. Specifically, this model describes health-seeking behaviour based on the transmission of STI's as through sexual intercourse only. However, as we know with the HIV epidemic (and other STI's like Hepatitis),

STI's can be transmitted through several different pathways. With such a narrow focus, the PTI model does not consider a substantial segment of the population infected with STI's (i.e., IV drug users), and thus their health-seeking behaviour remain poorly understood. To improve the scope of this model it is necessary to broadly define routes of transmission. Although it is noted that knowing the route of transmission is helpful, individuals engaging in a variety of "risk" activities will perhaps seek treatment in a variety of ways. Therefore, a model that encompasses all possible avenues of infection will enhance the treatment success of individuals with multiple infections.

A second limitation within the PTI model is the authors' interpretation of 'delay'. Although Aral and Wasserheit (1999) are clear in their point that the timeframe in which an individual is infected with an STI is associated with various decisions and behaviours, the deconstructive nature of this model detracts from the fact that the individual is infectious. Masking this primary fact by treatment and diagnostic delays distances the reality and the capability of the infected individual to pass on the infection, particularly if they are unclear as to whether or not they indeed have an STI. More specifically because this model is described on an individual level, the delays are perceived as the responsibility of the individual, however, in some cases this is untrue. Although the decision to seek medical attention and follow through with treatment is within the domain of the individual, there are periods designated within the model that are out of the control of the individual. This is particularly true of the diagnostic component in which the individual remains infectious, but does not yet have a diagnosis.

Although briefly discussed in Component III of the PTI model, Aral and Wasserheit (1999) deal very little with the potential for misdiagnosis and co-infections. Within the PTI model individuals who are not diagnosed properly by a physician or health care worker are considered "lost to infection" (Component I). Even on the level of basic health care assessment Aral and Wasserhiet (1999: 1302) state, "[a] recent survey of health care providers conducted in the U.S. indicated that most providers do not actively assess patient's risk for STD's, but rely on patients to mention STD symptoms or concerns." Aral and Wasserheit (1999: 1303) also mention that medical schools instructing physicians on the clinical manifestations and epidemiology of STI's is approximately one to five hours, which is considerably small given the impact of these diseases worldwide. The potential probability of misdiagnosis is heightened when one considers the relationship between syphilis and HIV. Since syphilis is sometimes masked by HIV, failure to diagnose an infection (asymptomatic infection especially) could be considerably high. Although this is not a direct criticism of the PTI model, it is an observation made within the Aral and Wasserheit (1999) article that is a particular problem with the health care system that has potentially significant effects for the treatment success of STI infected individuals.

The final limitation to be discussed in reference to the PTI model is the issue of partner notification. Presented within component five of the model, Aral and Wasserheit (1999) describe the delays associated with partner notification. The problem is not the disclosure of health status to partners, but the point within the

model that this step is considered. In relation to the four previously outlined treatment components, the prevention component of the PTI model can be construed as an addition or afterthought to the initial model. Partner notification is a key issue that should be identified during the patient's initial contact with a physician or health care worker. This may appear to be a premature step because the physician does not yet have a confirmed diagnosis, but at the level of the individual we must realize that while one individual is going through a process of treatment delays, it is probable that their partner is going through the same delays, except that he/she is caught in a longer delay period within Component I, and possibly lost to infection. Added to this, the infection may have also traveled beyond the sphere of the partner relationship. The patient's delay period is also the partner's delay period, and within a model focused on the timely treatment of STI's, partner notification within the late stage of the model extends the period of infectiousness for the partner, and perhaps decreases his/her probability for treatment success. The majority of STI's are most infectious in their initial stage (syphilis and HIV being two examples), and as seen in syphilis, the progression of the infection can lead to further complications (e.g., neurosyphilis), thus influencing possibilities for treatment success.

> "The question is no longer *whether* STD detection and treatment should be an essential component of HIV prevention programmes, but rather *how* this component should be implemented to have maximal impact on HIV incidence in specific populations" (Fleming and Wasserheit 1999:15).

The ability of the public health sector to efficiently and appropriately test, treat, and educate the lay population is inevitably connected to understanding how individuals perceive risk, conceptualize infections, and negotiate treatment options. If we ever hope to be successful in suppressing the worldwide STI epidemic, health-seeking behaviour cannot be ignored. The development of the PTI model by Aral and Wasserheit (1999) has presented a unique synthesis of the epidemiology and the anthropology of STI transmission and treatment. What needs to be addressed, therefore, is a greater presence of anthropological concepts within the framework of the PTI model.

The relevance of the PTI model and our critique echoes the need to provide more sophisticated testing methods and increase physician awareness of both the currently fashionable and the neglected STI's. Throughout the discussion of the biology of syphilis and HIV, pathocenosis, epidemiological synergy and models of health-seeking behaviour, it has become evident that it is important to provide a comprehensive model of STI health-seeking behaviour. Receiving proper treatment is necessary to halt the infectivity (or suppress infectivity in the case of HIV/AIDS) of an individual, ultimately decreasing the number of individuals in the population affected by a particular disease. However, this is far from a simple task. At the base of this complexity are the demographics of any given population, and the relationships between differing etiologies of health and illness. Not only do common elements such as age, gender, and education come into play, but other variables such as how groups of people conceptualize and communicate their understanding of disease manifestations also influence various types of health-seeking behaviours. Additional

complications within this puzzle come from the biomedical community. Most STI's require testing to confirm a medical diagnosis, and it is through communication within this sector of the health care system that the medical establishment can have such an immediate effect on individual patients.

Conclusions:

As we enter the third decade of the HIV pandemic, many questions about the interrelationships between HIV infection and other STI's remain unanswered. The role of STI's in the progression of HIV disease is still unknown. Nevertheless, the information that is available suggests that HIV infection may have clinically significant effects on a number of STI's (Wasserheit 1992: 70-71). The story, both historically and epidemiologically of syphilis and HIV/AIDS provides a unique example of pathocenosis. How individuals with HIV and STI co-infections break the mold of traditional risk, transmission, and treatment of STI's in the current era is encompassed in the concept of epidemiological synergy. A step in the right direction involves greater research in areas of behavioural risk factors, health-seeking behaviours and the development of successful prevention and educational interventions.

As such, the primary goal of this paper was to present a multidisciplinary approach to the study of STI's in order to illuminate the need for further investigation into the historical and epidemiological relationships between syphilis and HIV/AIDS. In addition this paper has attempted to present a current understanding of how individuals negotiate treatment options for these two diseases through their health-seeking behaviours. In doing so, we have attempted to argue for the distinction of an anthropology of sexually transmitted infections. The reasons for this were fourfold. First, the broadening of the term sexually transmitted disease to sexually transmitted infection has allowed for a more detailed examination of issues associated with sexual and reproductive health. Second, STI's have a unique epidemiology given that they are transmittable only through human hosts, thus providing an interesting context in which to consider the biological and social complexities of syphilis and HIV/AIDS' dual infection. Third, through our discussion of the Aral and Wasserheit (1999) Person-Time of Infectiousness Model, it has also become apparent that the health-seeking decisions, treatments, and prevention methods utilized by individuals infected with STI's are distinct from those of other infectious diseases. Finally, though not a topic of discussion in this paper, Fee and Fox (1992) present an argument for the interpretation of AIDS as a chronic disease as opposed to an infectious one. As they state, it is not sufficient to consider an infection based only on its mode of transmission, but also on the symptoms that accompany it. Using AIDS as an example, symptom manifestations are analogous to a chronic infection and thereby incorporate an entirely new point of interest with regards to health-seeking behaviour (Fee and Fox 1992).

Although this paper has attempted to raise questions, outline concerns and provide informative solutions to the complications of defining health-seeking behaviours associated with STI's, more questions still remain unanswered. What of children who are born to HIV and syphilis infected mothers, and the ethical nature of partner notification? How, as anthropologists, do we provide interventions to accommodate such a diverse population of infected individuals that address both

conceptions of risk and risk negotiation? This paper does not claim to have all the answers to the many complex problems that come with the dual consideration of syphilis and HIV/AIDS, but it has attempted to create an enhanced scope of inquiry that will aid in the further understanding of health-seeking behaviour and treatment.

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