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Indian Medical Students' Knowledge  
and Attitudes About HIV/AIDS

by

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B.A. (University of California, Berkeley) 2002

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Spring 2005

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University of California, Berkeley

Spring 2005

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and Attitudes about HIV/AIDS**

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By Harkawal Singh Hundal

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## CHAPTER 1-

### INTRODUCTION

Currently there are 40 million people with HIV/AIDS (PWHAs) in the world, of which 37 million are adults and 2.5 million are children.<sup>1</sup> In 2003, a total of 5 million people were infected with HIV and 3 million people died as result of AIDS.<sup>1</sup> Sub-Saharan Africa is still the hardest hit area, with an estimated 25-28 million PWHA, 60% of all new HIV infections, and an adult prevalence between 7.5-8.5%.<sup>1</sup> In Asia and the Pacific, over 1 million new infections occurred in 2003, bringing the total to estimated 7.4 million PWHA.<sup>1</sup> A majority of these new cases in Asia are believed to be in India. At the end of 2002 in India, the estimate for PWHA was 3.82-4.58 million with at least 300,000 new infections.<sup>1</sup> As of October 2003, there are believed to be 5.1 million Indians infected with HIV.<sup>2</sup>

Over 70% of PWHA in India have indicated that they faced discrimination, mostly within families and in the health-care setting.<sup>1</sup> Discrimination, especially in the health-care setting, is counterproductive to stopping the spread of HIV because it prevents primary and secondary prevention. People who may be at risk of contracting the HIV virus will be less likely to seek testing and care. This is a missed opportunity to teach those who are seronegative about risk behavior and those who are seropositive about transmission to their significant others or sexual partners.

This paper will review literature from three areas. Section one will discuss why stigma and discrimination (S&D) occurs, the repercussions of S&D, especially in the health care setting, and a conceptual understanding of how S&D can be decreased. Section two will provide a review of literature about the knowledge, attitudes and beliefs

of medical students and other health care workers from many countries around the world. Section three will provide background information on India and its current epidemiology related to HIV/AIDS. The last part of this section will briefly describe my plans for assessment of knowledge, attitudes and beliefs of Indian medical students regarding HIV/AIDS.

## THEORIES OF STIGMA AND DISCRIMINATION AND THEIR HEALTH CARE IMPLICATIONS

This section provides an overview on factors associated with HIV/AIDS stigma and discrimination (S&D). Specifically, it will focus on the conceptual framework that describes reasons for S&D and the importance of improving attitudes to decrease S&D among medical students and health care professionals.

### **Understanding Stigma and Discrimination**

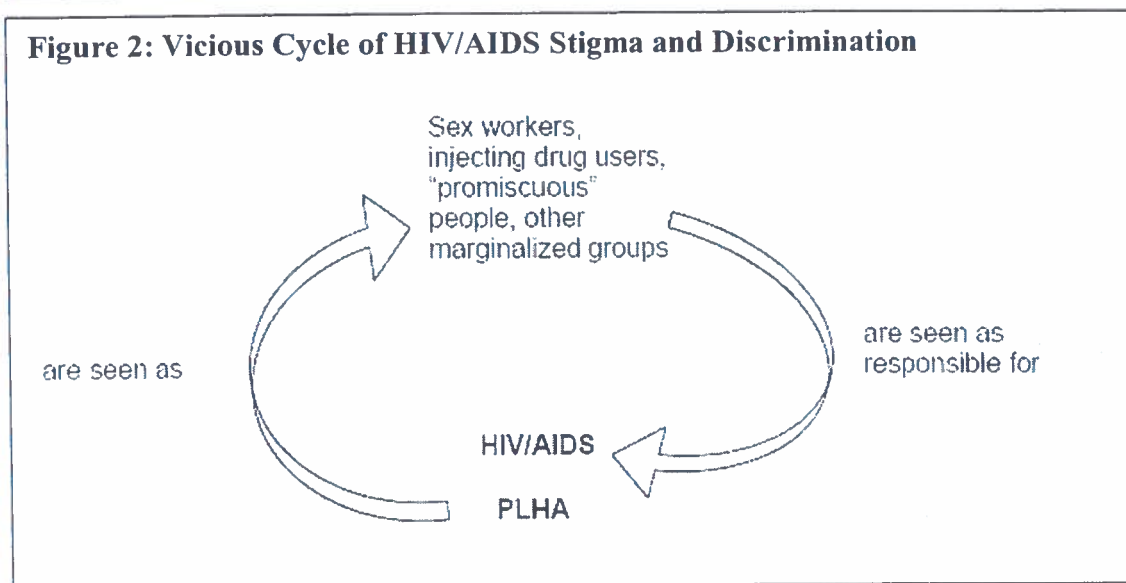
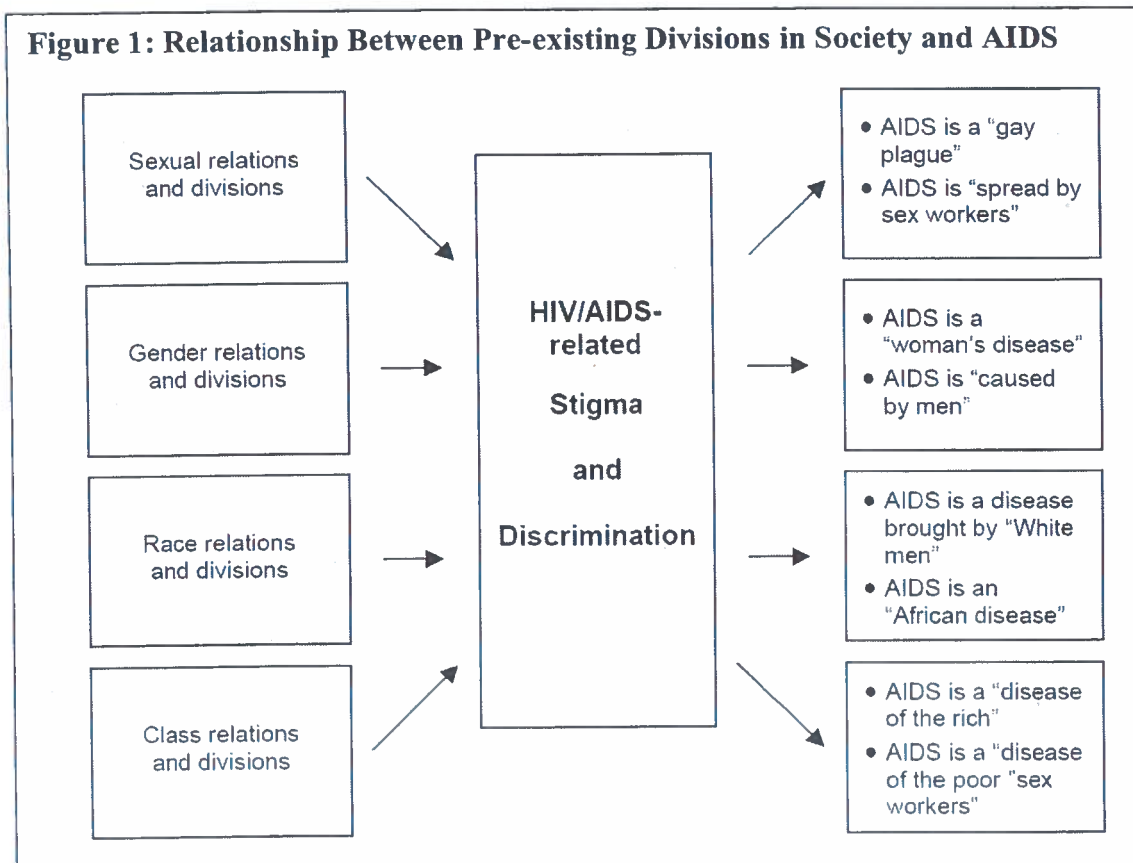
In 1987, Jonathan Mann, as the director of World Health Organization's Global Programme on AIDS, described three phases of the HIV/AIDS epidemic: the epidemic of HIV, the epidemic of AIDS, and the epidemic of stigma, discrimination, and denial."<sup>3</sup>

Gilmore and Somerville say something similar, "As well as an epidemic of HIV, we are experiencing epidemics of fear and of stigmatization, scapegoating and discrimination associated with AIDS."<sup>4</sup> They go on to define stigma as "a bad or negative characteristic, in a person or group of persons and treating them as not deserving of respect or less worthy than others on this basis."<sup>4</sup>

Stigma and discrimination in relation to HIV/AIDS rests on a vicious cycle that plays upon multiple divisions in society that already existed before the AIDS epidemic (Figure 1 and 2). It is most related to sexual stigma but also gender, race and ethnicity and class.<sup>5</sup> The pre-existing sources of S&D of marginalized groups, combined with a new disease that is more prevalent in those marginalized groups, further exacerbates the problems of fear, stigmatization, blame and discrimination. Furthermore, the characteristics of the disease, specifically related to its transmission through sexual intercourse and injection drug use, and its incurable and life-threatening nature, lead to

multiple layers of stigmatization.<sup>5</sup> S&D takes many forms including loss of family relations, lack of treatment and care and loss of employment.<sup>6</sup>

HIV/AIDS is a life-threatening illness, one that has been associated with the



“others”, especially those already stigmatized. As a result, HIV/AIDS S&D is a result of the interaction between diverse pre-existing sources and fear of contagion<sup>5</sup>. Since HIV/AIDS is associated with marginalized behaviors and groups, all individuals with this disease are assumed to share in the status of the marginalized. Fear of being labeled as marginalized for those not a part of those groups, along with fear of further oppression and marginalization for those already in these marginalized groups and who have this disease, increases the problem (figure 2). As a result, a vicious cycle is created in which vulnerability to HIV/AIDS is increased in both the marginalized groups and those that are not in these groups but who are afraid to be associated with the marginalized groups.<sup>5</sup>

Herek describes four characteristics of a stigma-evoking disease<sup>7</sup>:

1. Stigma is more often attached to diseases whose cause is perceived to be the bearer's responsibility
2. Greater stigma is associated with illnesses and conditions that are unalterable or degenerative
3. Greater stigma is associated with conditions that are perceived to be contagious or to place others in harm's way
4. A condition tends to be more stigmatized when it is readily apparent to others

AIDS manifests all of these qualities. Identifying a disease as potentially stigmatizing is the first step towards the process of stigmatization as described by Gilmore and Somerville. From here, three more steps are needed: the person or group to be stigmatized has to be identified, the stigma must be identified and recognized in or assigned to the particular persons who are to be stigmatized and finally there has to be a response to the stigmatized person such that the person, and therefore the problem, is

distanced, disempowered and excluded from the stigmatizer.<sup>4</sup> The latter can be in the form of fear and revulsion for HIV-positive person who shows signs and symptoms of the disease and can result in lack of support structure, loss of employment and denial of medical treatment.<sup>6</sup>

Stigmatization can serve multiple goals for the stigmatizer: self-protect, strengthening or homogenizing a community and social control. By removing oneself from the stigmatized group, one is “metaphorically removing or destroying its source.”<sup>4</sup>

Some of the most frequently documented contexts of S&D are:

- 1) Policy and legal contexts such as compulsory screening and testing, compulsory notification of AIDS cases, restrictions on employment for PWHA, and detention of people with AIDS.
- 2) Institutional contexts such as pre-employment screenings and employment denial in the work place, denial of care in the health care sector and teasing of HIV students in schools.
- 3) Community contexts such as blame on HIV-positive persons and bring shame on the community.
- 4) Family contexts especially women who are blamed for the disease and rejected from the family leading to loss of their children and their home.
- 5) Individual contexts where fear from discrimination may cause the individual to isolate him or herself.<sup>5,6</sup>

In the health care system, the most common reports of S&D include HIV testing without consent, breaches of confidentiality, and denial of treatment and care. In a project for UNAIDS, Shalini Bharat describes HIV and AIDS-related discrimination,

stigmatization and denial in all facets of Indian life including the health care arena.<sup>6</sup>

Using key informant interviews, in-depth individual interviews and focus group discussions, Bharat uses qualitative research methods to elucidate S&D in India. Some of the most overt forms she found were<sup>6</sup>:

- Refusal to provide treatment for HIV/AIDS-related illnesses
- Refusal to admit for hospital care, refusal to operate or assist in clinical procedures
- Restricted access to facilities like toilets and common eating and drinking utensils
- Physical isolation in wards or restriction of movement, cessation of ongoing treatment
- Early discharge from hospital, mandatory testing for HIV before surgery and during pregnancy
- Unnecessary use of protective gear
- Refusal to lift or touch the dead body of an HIV-positive person and reluctance to provide transport for the body.

Bharat reports that in both her study locations, Mumbai and Bangalore, S&D was most often encountered in the health care setting and to a lesser but significant extent in familial and community contexts.<sup>6</sup>

Devine *et al.* describe the mechanism for creating stigmatization in a social setting: “At the core of AIDS-related stigma is the perception that [PWHA] are members of an outgroup threatening one’s social identity as a member of the non-deviant ingroup.”<sup>8</sup> Therefore, stigmatization may not be described by the level of knowledge that may exist about AIDS but refers to the social context that creates stigmatization. In many



of the studies that will be described in detail later, often the negative attitudes towards PWHA range beyond a lack of knowledge about its transmission. Therefore, while some negative attitudes can be attributed to lack of knowledge or misconceptions about HIV transmission, there is another phenomenon that creates negative attitudes, a phenomenon called “us” versus “them.”<sup>4, 8</sup>

A second phenomenon will also be described later, specifically that while many health care professionals know the correct modes of transmission, some of them are still confused about misconceptions about its transmission. These misconceptions might be another mechanism for maintaining the “us” versus “them” categorization that exists with HIV/AIDS. Devine *et al.* describe this when they say, “the nature of reactions and stigma associated with AIDS extends beyond realistic fears about risk for infection and reflects instead the nature of AIDS-related stigma as a social phenomenon.”<sup>8</sup> Herek asserts that there are two sources of an individual’s attitudes, fear of contracting disease and symbolic associations between AIDS and groups identified with the disease.<sup>7</sup> Pryor *et al.* call this instrumental and symbolic basis for discrimination.<sup>9</sup>

In order to understand this phenomenon, it is important to look at social identity theory. The main premise of the theory is that important group memberships constitute a fundamental part of people’s identities and that people are motivated to establish and maintain their self-esteem. The means to do this is by categorization of oneself and others into groups leading to comparison processes as an attempt to differentiate between the in-group and the out-group.<sup>8</sup> As such, categorization allows uninfected people to “accentuate” differences between themselves and those PWHA. In the early years of

AIDS, this categorization made uninfected Americans believe that HIV/AIDS was safely contained among a homosexual subgroup of the population.<sup>4</sup>

AIDS stigmatization partly reflects the nature of HIV transmission and the association of negative emotions associated with transmission and PWHA. Because AIDS is acquired, the first speculation is the method by which someone acquires this disease and the general emotional response is blame because the typical person with AIDS did something to get it.<sup>8</sup> This is especially apparent in the terminology, when the term “innocent victim” is used for hemophiliacs and babies born to HIV-infected mothers.<sup>8</sup> The latter may also invoke stigma because the blame may be passed from mother to the child. Blame is a perfect method to place the risk outside the in-group and to the out-group. As a result, many see AIDS as deserved punishment for offensive and immoral behavior. Such beliefs are on the rise in the United States.<sup>10</sup>

In India, there is already a structure for stigma based upon the caste system. The new stigma towards PWHA fits nicely into this ancient structure. Primarily, large portions of PWHA are of the old “untouchables” (Dalit) class and therefore can easily fit into the existing structure and a slight reclassification can introduce PWHA who may not be of lower castes to be added into this existing structure.

The common phrase “what goes around comes around” is often used with PWHA as part of what is called the “just hypothesis” and reflects the moral culpability of AIDS to a higher power. According to Weiner, AIDS is considered by many a sin in addition to a sickness because of the personal responsibility of PWHA for their illnesses.<sup>11</sup> In his work on attitudes towards others who have been stigmatized by failures, Weiner proposes a model where one’s failure due to ability evokes less punishment than lack of effort.<sup>11</sup>

As a result, a person who has AIDS due to blood transfusion will receive less punishment than those through homosexual sexual contact or injection drug use. An extreme example of this resulted when I was speaking to an orthopedics doctor in India who said that AIDS in Punjab is only due to doctors of backward areas who use dirty needles. His in-group being all of Punjabi people made him only see controllable causality.

As a result of this conceptual framework, we can go further to look at how self and “the other” leads to specific emotions. The most obvious is self as healthy and PWHA as contagious causing fear. This leads to active avoidance or nonaltruistic help.<sup>8</sup> When self is thought of as moral heterosexual, PWHA violates the moral values. Such is the case as when the PWHA is homosexual, evoking the feeling disgust and leading to neglect or active discrimination. In cases where self is virtuous and conscientious, the PWHA is considered morally weak. An example of this is a drug user evoking contempt leading again to neglect and active discrimination. When self is careful and avoids danger, PWHA is thought to have acquired an avoidable illness, and anger ensues, leading to active discrimination.<sup>8</sup> These are not discrete scenarios but overlapping ones and as such explain why fear alone cannot be the reason for negative attitudes and therefore knowledge alone cannot improve attitudes. In many cases, all these emotions are evoked by an “invulnerable” in-group member against PWHA.

Devine *et al.* propose two types of methods for combating stigma, directly changing attitudes and indirectly changing behaviors leading to attitude changes.<sup>8</sup> One path to achieve the first proposed method is to allow the person to see an inconsistency between their other values and their prejudiced attitudes. For example, doctors have an oath to treat all people regardless of disease. By making them aware of their disconnect

with this value compared to their negative attitudes towards PWHA, one can allow them to be consistent with their deeply held values. The second method can be achieved by legislating change through government and strong organizations as well as by campaigning for change. The first of these has been done in some respects in the United States by incorporating PWHA as part of the Americans with Disabilities Act of 1992 and their exemption from tradition public health practices such as partner notification and contact tracing.<sup>7</sup> The overarching goal to “recognize that we are all living with AIDS, whether infected or affected by it” and “it is imperative that we overcome any divisions into ‘them’ and ‘us’.”<sup>4</sup>

It is important to note that stigma does not only exist between individuals but leads to policy decisions at higher levels. One example of this is the lack of needle exchange programs because of the stigma associated with IDUs, even though such programs have been shown to reduce HIV transmission without increase drug use.<sup>7</sup>

HIV/AIDS S&D does not only affect PWHA and those at high risk for infection but also the caregivers for PWHA. The caregivers including health care workers and family members of PWHA are prone to “courtesy stigma” because of their association with PWHA.<sup>7</sup> Social identity theory allows for marginalization of not only those affected by the disease but also the caregivers. In order to escape the courtesy stigma, many health care workers and family members are unwilling to care for PWHA.

### **Health care is an especially important setting for understanding S&D**

Yedidia *et al.* list the following core professional values that may be eroded by negativity towards treating PWHA: “a commitment to treat all patients regardless of self-interest or personal risk; to treat patients alike, guided by technical expertise and not by

irrelevant criteria outside of the illness context; and to treat complex conditions in the face of medical uncertainty.”<sup>12</sup> If these are the key values, then those attitudes and beliefs contrary to these values must be studied and understood, and methods should be designed to bring medical students, residents, physicians and other health care professionals in line with these core values. Furthermore, according to the Americans with Disabilities Act passed in January 1992, it is not only unethical but also unlawful for doctors/dentists to refuse treatment to HIV-infected patients.

There are many repercussions if these values are not expressed concerning HIV/AIDS epidemic, including increased incidence of transmission and disease. Evidence suggests that stigma is associated with delays in HIV testing by people who are at risk for infection.<sup>13</sup> Testing serves goals of primary and secondary prevention. Voluntary counseling and testing is a chance for educating those being tested about safe sexual behavior as well as safe drug use behavior for those who are HIV-negative. For those who are HIV-positive, testing provides information that can lead to changes in behavior and reduction of risk for further transmission.<sup>13</sup> A delay in testing increases chances of contracting disease for HIV-negative individuals and a chance for transmitting for HIV-positive persons. Stigmatized attitudes from health care professionals decreases chances for testing people.<sup>13</sup>

By creating a health care system free of stigma, health care professionals may also be at decreased risks from health care related transmission because seropositive individuals are more likely to divulge their status and those not tested are more likely to be tested. Stigmatization by health care professionals can lead to decreased access to prevention and care services (especially treatment), but it can also increase the

vulnerability to being exposed to infection or becoming infected because universal safety precautions are not be implemented or practiced.<sup>4</sup>

Anti-retrovirals are increasingly available in developing countries such as India. The complexities of prescribing these medications require physicians and health care professionals to be willing to treat PWHA. This can only happen if the current medical students are willing to treat people with HIV/AIDS in the future. It may be important to look closely at current literature of reducing HIV/AIDS stigma and further work may also be required.<sup>14</sup>

## KNOWLEDGE AND ATTITUDES OF MEDICAL STUDENTS AND HEALTH CARE PROFESSIONALS ABOUT HIV/AIDS

Many studies have been conducted on the subject of knowledge and attitudes of health care professionals and health care students in countries including Brazil, Canada, China, India, Madagascar, Nigeria, Oman, Pakistan, Thailand and the United States.<sup>12, 15-</sup>

<sup>38</sup> A summary of results from the studies are provided at the end of each section by the overall findings in each study and also by specific questions from the various studies. Because of the diversity in the types of questions asked and the various types of answers possible, it is difficult to create an all-inclusive table. In the following subsections, some studies will be described in detail. Most of these studies are about medical students but also other health professionals and health profession students including nurses, nursing students, physicians, residents, dentists, and dental students.

Before going further, it is important to also introduce risks associated with various types of transmission methods. The table 1 describes these risks.<sup>39</sup>

| Type of contact           | Risk  |
|---------------------------|---|
| Needle-sharing            | 6/1000 to 3/100   |
| Occupational needle stick | 1/300   |
| Receptive anal            | 8/1000 to 3/100   |
| Receptive vaginal         | 8/1000 to 2/1000  |
| Insertive anal or vaginal | 3/10,000 to 1/1000  |
| Receptive oral            | Case reports/no denominator (no epidemiological data available) |

### United States and Canada

Early research regarding knowledge and attitudes among medical students in the United States by Strunin *et al.* revealed mixed results about knowledge of casual

transmission of HIV. Strunin *et al.*, using an anonymous self-administered questionnaire of 135 1<sup>st</sup> year medical students at Boston University School of Medicine, did not find that knowledge varied with students' age and gender.<sup>23</sup> In this study, correct knowledge was high (greater than 90% of students) regarding transmission via public toilet seats, shaking hands, airborne transmission, blood transfusion, anal sex between men, vaginal sex between men and women, and anal sex between men and women. However, correct knowledge of transmission was less clear about sharing utensils with someone with AIDS (65% correct), saliva (43%), donating blood (82%), oral sex between men (75%), oral sex between men and women (69%), and oral sex between women (48%). Many medical students believed that prostitutes (60%) and intravenous drug users (54%) should have mandatory testing for HIV. Furthermore, 47% believed that a person should be tested prior to getting married. Comparably, only 8% of the students thought teachers should have mandatory testing.<sup>23</sup> Furthermore, 43% believed that doctors should be allowed to refuse treatment of AIDS patients and 43% believed they should not be allowed to refuse. The other students answered that they did not know.

Most students who wanted a choice to refuse treatment knew only some or little about risk groups or high-risk behavior ( $p=0.003$ ) indicating an association between lack of knowledge and negative attitudes. Furthermore, significantly more students who wanted to be able to refuse to treat said that a hospital should be allowed to revoke hospital privileges of physician who has a positive HIV test if the physician has direct patient contact ( $p=0.04$ ), and more of these students wanted health professionals and physicians to be tested ( $p=0.02$ ). Significantly more of those wanting to be allowed to refuse to treat reported knowing "a little" or nothing" about ethical obligations of



physicians to treated AIDS patients ( $p=0.01$ ). In 1988, Association of American Medical Colleges stated an ethical responsibility of physicians to treat AIDS patients.<sup>23</sup> The authors of this study sited that “fear among first year medical students of becoming infected, and the desire not to treat AIDS patients may worsen a deteriorating situation unless appropriate interventions to change these attitudes can be implemented.”<sup>23</sup>

A similar study among 1<sup>st</sup> and 2<sup>nd</sup> year medical students in 1990 at Eastern Virginia Medical School where students were tested for knowledge and attitudes before and after a two-day voluntary training program revealed significant ( $p<0.0001$ ) increase in knowledge from 65.5% to 73.7% on a 25 item same questionnaire approximately 2 months after the training program. However, the overall percentages of correct responses on the posttest were still low (72% for 1<sup>st</sup> year and 76% for 2<sup>nd</sup> year).<sup>20</sup> The change for nonparticipants was not significant.

On 10 attitudinal statements about AIDS, where the responses could range from strongly disagree (1) to strongly agree (5), there were no significant differences before and after the training program. Before the training program, mean score of 3.74 (between not sure and agree) for the statement “AIDS patients should not be quarantined to stop epidemic” and the statement “AIDS will be a major financial burden on the U.S. health care system” registered 4.47 (between agree and strongly agree) in the group who participated in the training program. Attitudes were similar for the nonparticipant group. Pretest students who participated in the training program generally tended to disagree strongly with statements such as “AIDS is God’s punishment to homosexuals and drug users” (1.18) and “AIDS patients deserve illness because of their behavior” (1.62).<sup>20</sup> The results were not different posttest or in non-participating students. These statements

suggest that stigmatization among students was not widespread against PWHA, however the medical students believed that HIV will still require a financial investment.<sup>20</sup> Caution must be used in generalizing these results, as those attending the workshop were self-selected. Furthermore, students were still unsure about risks that AIDS patients pose to health professionals, despite substantial evidence presented to them that HIV infection among health care workers in occupational settings is rare.

In a study by Najem *et al.* that compares medical students' perceptions of HIV/AIDS from New Jersey (NJ) with similar students in Benin, Nigeria, the NJ students appeared to have higher levels of knowledge. For only a few questions regarding HIV/AIDS transmission did more than 5% NJ medical students get the incorrect answer. The questions on which more than 5% of the students got the incorrect answer were: all infants born to HIV-infected mothers are HIV infected (26% incorrect), all blood donations in US are tested (11% incorrect), carrier state for AIDS (13% incorrect), mosquito as carrier (8% incorrect) and sharing needles for ear piercing (7% incorrect).<sup>40</sup> The overall beliefs and attitudes of NJ medical students were positive. For example, only 7% students believed they can get AIDS from eating in a restaurant where the cook has HIV infection, and 6% believed that AIDS can spread from an infected student to other students who are playing and eating together.<sup>40</sup> A male/female comparison of the NJ students on knowledge, attitudes and beliefs did not show major differences.<sup>40</sup>

More recently, in 1999, a study of a large midwestern university's second year medical students revealed students with a homosexual and/or HIV-positive friend were significantly more tolerant towards AIDS patients ( $p < 0.05$ ); 62% believed treating AIDS patients may be hazardous, 60% agreed that their education had not provided them with

enough education, and 30% agree to the statement “I believe I have the right to refuse to treat an AIDS patient”, something that is “unacceptable for future physicians” especially when the risk for transmission to health care workers after a single percutaneous exposure to HIV-infected blood is estimated at 0.3%.<sup>15</sup> However in Strunin’s study, 43% believed they had the right to refuse treatment to these patients and another 14% indicated they did not know. In the current study, only 7% said they would refuse to treat an AIDS patient. Also, AIDS-phobia was significantly associated with homophobia. Other findings were that approximately one third of students would inform a partner of an AIDS patient of the disease even against patient’s wishes. Students who had more negative attitudes towards AIDS patients and towards homosexuals more frequently believed they had the right to refuse to treat AIDS patients and those with higher levels of homophobia were also more negative in their attitudes towards AIDS.<sup>15</sup> One particular improvement in knowledge and attitudes over the 1989 study by Strunin is that 72% would agree to perform mouth-to-mouth resuscitation on AIDS patients. In the study by Strunin *et al.*, only 43% of students indicated that AIDS could not be transmitted by saliva.<sup>23</sup> The current study also reported that AIDS-phobia did not decrease with increased knowledge about AIDS.<sup>15</sup>

As part of the same questionnaire from their 1999 study, Klamen, Grossman and Kopacz, also analyzed medical students’ homophobia.<sup>41</sup> The main findings consisted of more homophobia among students without previous sexual partners ( $p < 0.002$ ), those not tested for HIV ( $p < 0.03$ ), those without HIV positive friends ( $p < 0.02$ ) or those without homosexual friends ( $p < 0.001$ ). There were significant differences if the student was male ( $p < 0.008$ ), or if the student had not treated AIDS patients ( $p < 0.012$ ). There was also

significant difference ( $p < 0.02$ ) found on analysis by ethnic origin, where Asians expressed more homophobia compared to white or African-American students ( $p < 0.05$ ). However, no significant difference was found in levels of homophobia between students with or without children and those with varying marital status and religion.<sup>41</sup>

Approximately a quarter students believed homosexuality to be immoral and dangerous to the institution of family and 9% expressed it to be a mental disorder. Attitudes about homosexuality are important to questions of treatment of HIV patients and stigmas such as those patients who have AIDS deserve their fate. This study cites previous work with increased homophobia and suggests that the decreased homophobia may be a result of medical students being too young to remember the early years of the AIDS epidemic, however 14% still agreed that they feel more negative about homosexuality since AIDS.<sup>40</sup>

A recent study by Woloschuk *et al.* in Canada found that attitudes towards social issues in medicine decreased as students progressed through medical school.<sup>42</sup> While this study did not focus on HIV/AIDS, it is important to recognize the effects of socialization into medicine and possible implications of increased negative attitudes towards people PLWA as students progress through their medical school education if such attitudes are allowed to perpetuate.

Yedidia *et al.* state that residents were more negative in their attitudes towards PWHA than were 4<sup>th</sup> year medical students in earlier cross-sectional studies.<sup>12</sup> In the current longitudinal study looking at two points in physician training, 4<sup>th</sup> year medical students (1989) and later the same individuals as 3<sup>rd</sup> year residents (1992), there was an overall positive change in attitudes about treating PWHA ( $p < 0.001$ ). However, this

change was not uniform across attitudes of willingness to treat PWHA, concerns about risks, perceived benefits of treating PWHA and concerns about interference of AIDS with other educational and patient-care activities. Instead, the significant increase was in perception of benefits associated with treating PWHA ( $p < 0.001$ ) and decrease in concerns that treating PWHA interfered with other educational and patient care activities ( $p < 0.001$ ), whereas willingness to treat PWHA increased marginally ( $p < 0.10$ ) and concerns about risks of exposure decreased slightly ( $p < 0.10$ ).<sup>12</sup>

Senior residents in family and internal medicine training programs in a nationwide survey indicated negative attitudes towards PWHA despite 98% having treated HIV/AIDS adult patients in the prior year and 60% currently following at least one HIV/AIDS patient. In both internal medicine and family medicine training, 35% of those surveyed indicated health care workers should have the right to refuse to work with AIDS patients,<sup>43</sup> only 8% less than Strunin *et al.*'s results.<sup>23</sup> The current study by Gresham *et al.* also found that 68% of internal medicine residents and 54% family practice residents believe health care professionals should be allowed to test for HIV without patient consent ( $p = .01$ ).<sup>43</sup> A large portion of residents (66% internal medicine and 50% family medicine) were concerned about contracting AIDS from patients even though chances of contraction even from a needle stick are very low. The difference between the two programs is significant ( $p < 0.001$ ). Furthermore, only 65% of residents in each group would choose to include AIDS patients in their practice.<sup>43</sup>

Overall, American doctors and medical school students are improving in attitudes and knowledge about HIV/AIDS but many stigmatizing attitudes still persist in a large proportion of medical students and doctors.

| Study   | Major Findings   |
|---|--|
| Strunin <i>et al.</i> <sup>23</sup><br>(1989)<br>N=135  | Students are unsure of some modes of transmission. First year medical students do not fully agree with the statement that they should be responsible for treating AIDS patients in medical school and fear of contracting HIV will affect their choice of medical careers.                                   |
| Johnson <i>et al.</i> <sup>20</sup><br>(1990)<br>N=122  | Correct knowledge before and after an educational intervention was relatively low. The attitudes did not indicate inherent discrimination towards PWHA and students rejected the notion that AIDS is a punishment. Students remain unsure about the level of risk that HIV poses in the health care setting. |
| Yedida <i>et al.</i> <sup>12</sup><br>(1996)<br>N=383   | Data collected on 4 <sup>th</sup> year medical students and the same students during 3 <sup>rd</sup> year of residency indicated decline in willingness to provide treatment for PWHA due to injection drug use-phobia and homophobia. Cynicism was associated with basic aspects of training.               |
| Najem <i>et al.</i> <sup>40</sup><br>(1998)<br>N=151    | Correct knowledge regarding transmission is good. Students showed positive attitudes and beliefs.  |
| Kopacz <i>et al.</i> <sup>15</sup><br>(1999)<br>N=72    | Students with homosexual and/or HIV-positive friends were more tolerant towards AIDS patients, half believed treating AIDS patients may be hazardous, one-third believed they had the right to refuse treatment and AIDS-phobia was significantly associated with homophobia                                 |
| Greshman <i>et al.</i> <sup>43</sup><br>(1999)<br>N=757 | A study of senior residents in Internal and Family Medicine showed they felt well prepared to provide primary care to AIDS patients. Only 7% felt AIDS treatment should be in specialty clinics. A large percentage (35%) felt they had the right to refuse treatment to AIDS patients.                      |

|  | Strunin (1987) <sup>1</sup> | Najem (1988) <sup>2</sup> | Brachman (1996) <sup>3</sup> | Kopacz (1999) <sup>4</sup> | Greshman (1999) IM/FM <sup>5</sup> |
|--|-----------------------------|---------------------------|------------------------------|----------------------------|------------------------------------|
| <b>Modes of HIV transmission:</b><br>(The responses shown indicate the percent of people who answered correctly, not the percent of people who answered yes) |                             |                           |                              |                            |                                    |
| Blood transfusion (Y)  | 95                          | 98                        | 98                           |                            |                                    |
| Sexual contact (Y)   | 48-98                       | 100                       | 99                           |                            |                                    |
| Sharing needles (Y)  |                             | 100                       |                              |                            |                                    |
| Mother-to-child (Y)  |                             |                           | 97                           |                            |                                    |
| Mosquitos (N)  |                             | 92                        | 93                           |                            |                                    |
| Donating blood (N)   | 82                          | 97                        |                              |                            |                                    |
| Saliva/mucous (N)  | 43                          | 99                        |                              |                            |                                    |
| Tears (N)  | 48                          | 97                        |                              |                            |                                    |

<sup>1</sup> Strunin *et al.* studied first year medical students.

<sup>2</sup> Nahem *et al.* studied 1st and 2nd year medical students in Newark, NJ and Benin Nigeria.

<sup>3</sup> Brachman *et al.* studied physicians and students in the United States, Canada, India and Thailand at various levels of their training.

<sup>4</sup> Kipacz *et al.* studied 2nd year medical students.

<sup>5</sup> Greshman *et al.* studied senior residents in Family (FM) and Internal Medicine (IM).

| <b>Table 3: Knowledge, Attitudes and Beliefs about HIV/AIDS Among Health Professionals in the United States</b> |                             |                           |                              |                            |                                   |
|---|-----------------------------|---------------------------|------------------------------|----------------------------|-----------------------------------|
|   | Strunin (1987) <sup>1</sup> | Najem (1988) <sup>2</sup> | Brachman (1996) <sup>3</sup> | Kopacz (1999) <sup>4</sup> | Gresham (1999) IM/FM <sup>5</sup> |
| Swimming in same pool as infected person (N)  |                             | 99                        |                              |                            |                                   |
| Being in same cafeteria/restaurant (N)  |                             | 100                       |                              |                            |                                   |
| Sharing toilet seat/bathroom (N)  | 97                          | 99                        |                              |                            |                                   |
| Shaking hands (N)   | 96                          |                           | 100                          |                            |                                   |
| Touch (N)   |                             |                           |                              |                            |                                   |
| Kissing/French Kissing (N)  | 38                          | 95                        |                              |                            |                                   |
| Living in same household (N)  |                             | 99                        | 97                           |                            |                                   |
| Eating food prepared by HIV-positive person (N)   |                             | 92                        | 98.7                         |                            |                                   |
| Infected/uninfected students playing together (N)   |                             | 94                        |                              |                            |                                   |
| Sperm (Y)   |                             | 54                        |                              |                            |                                   |
| <b>Do you believe</b> (The responses indicate the percentage of respondents who agree with the statement)       |                             |                           |                              |                            |                                   |
| You would Inform partner of infected person without consent   |                             |                           |                              | 36                         |                                   |
| Treating HIV/AIDS patients endangers health care provider's health  |                             |                           |                              | 62                         |                                   |
| HIV/AIDS has unknown methods of transmission  |                             |                           |                              | 65                         |                                   |
| HIV has a vaccine now   |                             | 3                         |                              |                            |                                   |
| All patients coming into a hospital should be tested for HIV  |                             |                           |                              | 46                         |                                   |
| A physician has (or you have) the right to refuse treatment for HIV/AIDS patient                                | 74                          |                           |                              | 30                         | 35/35                             |
| You would refuse caring for HIV patient   |                             |                           |                              | 7                          | 35/35                             |
| AIDS has carrier state  |                             | 87                        | 65                           |                            |                                   |

### **HIV/AIDS knowledge and attitudes among health care professionals in developing countries other than India**

We will evaluate five developing countries in this section: Brazil, China, Nigeria, Oman and Pakistan. We would expect the greatest similarity between health professionals of Pakistan and India in their knowledge and attitudes towards PWHA because of shared cultures and geographic closeness. However, all these countries may be closer to India in knowledge and attitudes than the United States, because AIDS started later and the

resources to combat it are not as great in developing countries as they are in the United States.

In a study of Brazilian dental students' knowledge and attitudes towards HIV infection by Oliverira *et al.* in 2002, most students knew of the association between HIV and its oral manifestations including Kaposi's sarcoma and oral candidiasis, and some (52.7%) knew about oral hairy leukoplakia.<sup>24</sup> Furthermore, there was a significant difference between knowledge and infection control practices among females compared with males ( $p < 0.05$ ). Greater than 50% of students believed that they did not have proper information to maintain infection control and 96% believed that they should receive special training in care and management of HIV/AIDS patients. Comparatively, a study of dental students in Texas reported 86.6% considered themselves well informed. Such differences may result from organizations such as Centers for Disease Control and Prevention (CDC) and Occupational Safety & Health Administration's (OSHA) work in the United States.<sup>24</sup> Low knowledge of measures to prevent infection in developing countries may amplify perceived risks.<sup>24</sup> For example, 91.2% of Brazilian students were concerned about treating "at risk" groups whereas slightly more than half of Texas students were concerned.<sup>24</sup> However, a comparison of willingness to treat HIV positive patients showed that the majority of Brazilian students would treat HIV patients, whereas less than half were willing in studies done in Texas. This latter observation may reflect the attitudes towards PWHA instead of the perceived risk for infection.

When Li *et al.* studied Chinese medical students' attitudes and knowledge about HIV/AIDS in 1992, they found a disparity in correct transmission methods (90%) versus only 72% correct responses to ways HIV is not transmitted. Blame for HIV/AIDS was



placed mainly on prostitutes (40%) compared to drug users (22%) and homosexuals (6%).<sup>21</sup> Furthermore, about 66% of the respondents believed that PWHA got what they deserve and this related to lack of sympathy for many groups, especially prostitutes. To the statement, "People with AIDS don't deserve the same medical care as other people," 82% agreed. Furthermore, 33% believed in quarantine measures and in keeping infected students out of classrooms. Also, 25% believed that the Chinese government was concealing information about AIDS.<sup>21</sup> These percentages do not include many people who did not respond to some of these questions. When asked about their own fears, 20% indicated they were afraid and worried. This is another example of inconsistency between AIDS-related knowledge and attitudes.

A later study in 2002 by Buskin *et al.* comparing HIV/AIDS knowledge and attitudes in Chinese medical professionals and students before and after an informational lecture, it was found that knowledge about HIV/AIDS was high (about 90% on knowledge related questions) before and after the lecture.<sup>22</sup> However, prior to the lecture, only 57% were willing to work with or sit next to a coworker or classmate infected with HIV and 85% said they would be willing to live with and care for an HIV-infected family member. Both increased after lecture to 79% ( $p < 0.001$ ) and 93%, respectively.<sup>22</sup> Of note was that 97% believed HIV is not transmitted by preparation or serving food by a person with HIV before the lecture, yet a large percentage of people would not be willing to care for AIDS patients. However, only 65% knew HIV could not be transmitted by sharing cups, chopsticks, toothbrushes or razors; such misconceptions may increase fear of caring for AIDS patients. The lectures increased knowledge about the last statement

significantly ( $p < 0.01$ ) to 75%. There was also an increase in correct knowledge that mosquitos do not transmit HIV from 90 to 98% ( $p < 0.01$ ).<sup>22</sup>

As part of the study on NJ medical students knowledge and attitudes about HIV/AIDS discussed earlier, Najem *et al.* noted knowledge of Benin students (Nigeria) was high and not significantly different for correct methods of HIV transmission (>94% in all correct methods), including sexual contact (97%), needle sharing (100%), blood transfusion (99%) compared to the NJ counterparts.<sup>40</sup> However, Benin students had significantly ( $p < 0.05$ ) more misconceptions about some incorrect methods compared to NJ students in the following five categories: sharing swimming pools, bathroom facilities, nurse washing AIDS patient, living in same household, and using same comb. In all, more than 5% had incorrect perceptions about getting infected from a swimming pool (12%), casually kissing (12%), donating blood (34%), sharing bathroom facilities (11%), living in the same household (8%), sharing combs (14%), and mosquito transmission (16%).<sup>40</sup> Donating blood may pose a danger if needles are re-used.

On two particular questions about attitudes, “do you believe AIDS can spread from an infected student to other students who are playing and eating together” and “do you believe that you can get AIDS from eating in a restaurant where the cook has HIV infection,” about 20% of Nigerian students agreed compared to only 6-7% of NJ students ( $p = 0.001$ ). It appears that there may be a correlation of misperceptions of HIV transmission and negative attitudes that may result.<sup>40</sup>

In a study of knowledge and attitudes of undergraduate medical and non-medical students of Sultan Qaboos University in Oman towards HIV transmission and PWHA, Al-Jabri and Al-Abri reported high levels of knowledge on most common methods of

transmission, including semen (97%), needles (99%), heterosexual intercourse (97.5%) and mother-to-child (97.5%).<sup>17</sup> However, all the students had decreased knowledge on some methods that are common misconceptions about transmission such as toilet seats (80% correct), drinking from same glass (86.3%), coughing and spitting (80%), same swimming water (71.7%), sharing clothes (82.7%), mosquito bite (70%), kissing (77.7%) and hugging/holding hands (92.8%).<sup>17</sup> In general, the misconceptions have a lower percentage of correct answers compared to those methods that are known to be correct. This may indicate that greater stress may be needed on those methods that are not correct methods of transmission as these are the means by which stigma and discrimination are often expressed. On two questions regarding transmission, there may be concern: regarding getting HIV by donating blood, 45.9% agreed with this statement and 3.6% said they did not know and on the question “condoms offer complete protection against HIV”, 10.7% agreed and 22.8% stated they did not know. Medical students were significantly better regarding this question than their non-medical counterparts. Overall, knowledge of correct transmission methods was high but there were misconceptions.

Attitudes towards PWHA did not reflect the high level of correct methods of transmission and above average knowledge of misconceptions.<sup>17</sup> Statements such as “A person who is infected with HIV should be allowed to eat lunch with others” had only 56.6% agreement, 13.3% agreed to the statement that “I would avoid a person whose family member has AIDS” and 68% agreed to the statement that people with AIDS should not be allowed to work in places that handle food. Furthermore, only 29.3% of respondents disagreed with the statement “people who have AIDS are getting what they

deserve”.<sup>17</sup> Since attitudes generally reflect behavior better than knowledge, knowledge alone may not be enough to counteract behavior.<sup>17</sup>

In a similar study by Ali *et al.* with Pakistani medical students in their 4th and 5th year in 1995, knowledge about cause and transmission about AIDS was high. The cause of AIDS was known by 96.7%, and its transmission by sexual contact and blood transfusion was known by 96.3% and 87.7% of students, respectively.<sup>18</sup> However, only 77% were aware of mother-to-child transmission. While 99.6% knew that AIDS cannot be transmitted through shaking hands, 6.6% incorrectly assumed that it could be transferred by coughing/sneezing and 19.3% believed it could be transmitted by respiratory droplets.

Despite overall high knowledge, negative attitudes persisted among many medical students towards AIDS patient management. Only 72.1% thought patients can be hospitalized in general hospital, and 24.6% incorrectly assumed that they couldn't be treated in any general hospital. Also, 26.6% thought PWHA required complete isolation. While almost all students agreed that doctors and nurses can touch AIDS patients and talk to them, about 25% of respondents believed PWHA should not be allowed to use common toilets and that health care workers should wear special dress while attending to patients with HIV/AIDS. Other S&D related attitudes included 26.6% agreeing that an HIV-positive child should be removed from school.<sup>18</sup> As was found in the study of Omani students, there is a disconnection between overall knowledge and attitudes, which indicates that while the knowledge may be present, there are other factors that influence the attitudes, such as culture and social beliefs.

Overall trends indicate good knowledge about known methods of HIV transmission, lower knowledge against common misconceptions and higher stigma towards PWHA.

| Study   | Major Findings  |
|---|---|
| Oliveira <i>et al.</i> <sup>24</sup><br>(2002)<br>N=135 | Brazilian dental students did not consider themselves well informed for appropriate infection control and over 90% of students were concerned about being infected in the medical setting, and 60% were willing to provide care to HIV patients.                                    |
| Li <i>et al.</i> <sup>21</sup><br>(1992)<br>N=302       | A study of Chinese medical students showed disparity in knowledge regarding how HIV is transmitted (90%) and how it is not transmitted (72%). About two-thirds of the students blamed the person for getting the disease and one-third supported quarantine measures                |
| Buskin <i>et al.</i> <sup>22</sup><br>(2002)<br>N=122   | Chinese health care professionals from many areas showed high level of knowledge about transmission and substantial fear of and/or prejudice towards PWHA.  |
| Nejem <i>et al.</i> <sup>40</sup><br>(1998)<br>N=141    | Nigerian medical students had good knowledge about correct modes of HIV transmission and some misconceptions regarding transmission by casual.  |
| Al-Jabri <i>et al.</i> <sup>17</sup><br>(2003)<br>N=200 | Knowledge of Omani medical and non-medical students regarding correct modes of HIV transmission was high. However, many students also believed it can be transmitted by donating blood and casual contact. About one-third of students would hesitate taking care of AIDS patients. |
| Ali <i>et al.</i> <sup>18</sup><br>(1996)<br>N=244      | A study of 244 4 <sup>th</sup> and 5 <sup>th</sup> year Pakistani medical students indicates high level of correct knowledge about AIDS transmission except mother-to-fetus transmission. About one-fourth of students think HIV transmission can be transmitted by casual contact. |

|  | Can             | Nig          | China                  |                            | Thai            | Oman                          | Pakis                   |
|--|-----------------|--------------|------------------------|----------------------------|-----------------|-------------------------------|-------------------------|
|  | Brachman (1996) | Najem (1999) | Li (1993) <sup>6</sup> | Buskin (2002) <sup>7</sup> | Brachman (1996) | Al-Jabari (2003) <sup>8</sup> | Ali (1995) <sup>9</sup> |
| <b>Modes of HIV transmission:</b><br>(The responses shown indicate the percent of people who answered correctly, not the percent of people who answered yes) |                 |              |                        |                            |                 |                               |                         |
| Blood transfusion (Y)  | 99              |              |                        | 98                         | 97              |                               | 87.7                    |
| Sexual contact (Y)   | 99              | 97           |                        | 100                        | 96              | 97.5                          | 96.3                    |

<sup>6</sup> Li *et al* studied medical students from various years of their training.

<sup>7</sup> Buskin *et al.* studied medical students and health professionals with various levels of training.

<sup>8</sup> Al-Jabri and Al-Abri studied both medical and non-medical students and the data reflects a composite of both types of students.

<sup>9</sup> Ali *et al.* studied medical students in their 4th and 5th year of their undergraduate (M.B.B.S) medical education.

**Table 5: Knowledge, Attitudes and Beliefs about HIV/AIDS Among Health Professionals in the Canada, Nigeria, China, Thailand, Oman and Pakistan**

|   | Can                     | Nig             | China                     |                               | Thai                    | Oman                                 | Pakis                      |
|---|-------------------------|-----------------|---------------------------|-------------------------------|-------------------------|--------------------------------------|----------------------------|
|   | Brach-<br>man<br>(1996) | Najem<br>(1999) | Li<br>(1993) <sup>6</sup> | Buskin<br>(2002) <sup>7</sup> | Brach-<br>man<br>(1996) | Al-<br>Jabari<br>(2003) <sup>8</sup> | Ali<br>(1995) <sup>9</sup> |
| Sharing needles (Y)   |                         | 100             |                           | 98                            |                         | 99                                   |                            |
| Mother-to-child (Y)   | 98                      |                 |                           | 57                            | 91                      | 97.5                                 | 77                         |
| Mosquitos (N)   | 86                      | 84              |                           |                               | 99                      | 70.4                                 |                            |
| Donating blood (N)  |                         | 66              |                           |                               |                         | 50.5                                 |                            |
| Saliva/mucous (N)   |                         | 97              |                           | 98                            |                         | 79.7                                 | 93.4                       |
| Tears (N)   |                         | 98              |                           |                               |                         |                                      |                            |
| Swimming in same pool as infected person (N)  |                         | 88              |                           |                               |                         | 71.7                                 |                            |
| Being in same cafeteria/restaurant (N)  |                         | 99              |                           |                               |                         |                                      |                            |
| Sharing toilet seat/bathroom (N)  |                         | 89              |                           | 65                            |                         | 79.7                                 |                            |
| Shaking hands (N)   | 100                     |                 |                           | 98                            | 96                      | 92.8                                 | 99.6                       |
| Touch (N)   |                         |                 |                           |                               |                         |                                      |                            |
| Kissing/French Kissing (N)  |                         | 88              |                           |                               |                         |                                      |                            |
| Living in same household (N)  | 98                      | 92              |                           | 85                            | 94                      |                                      |                            |
| Eating food prepared by HIV-positive person (N)   | 99                      | 80              |                           | 97                            | 98.4                    |                                      |                            |
| Sitting next to HIV-positive person (N)   |                         |                 |                           |                               |                         |                                      |                            |
| Sharing utensils  |                         |                 |                           | 65                            |                         | 86.3                                 |                            |
| Infected/uninfected students playing together (N)   |                         | 78              |                           |                               |                         |                                      |                            |
| Sperm (Y)   |                         | 65              |                           |                               |                         | 97                                   |                            |
| Sharing clothes (N)   |                         |                 |                           |                               |                         | 82.7                                 |                            |
| Sweat (N)   |                         |                 |                           |                               |                         |                                      |                            |
| <b>Do you believe</b> (The responses indicate the percentage of respondents who agree with the statement) |                         |                 |                           |                               |                         |                                      |                            |
| You would sit next to someone with HIV/AIDS (or have them in classroom/workplace)                         |                         |                 |                           | 57                            |                         | 44.7                                 |                            |
| You would Inform partner of infected person without consent   |                         |                 |                           |                               |                         |                                      |                            |
| Treating HIV/AIDS patients endangers health care provider's health  |                         |                 |                           |                               |                         |                                      |                            |
| HIV/AIDS has unknown methods of transmission  |                         |                 |                           |                               |                         |                                      |                            |
| HIV has a vaccine now   |                         | 6               |                           | 2                             |                         |                                      |                            |
| All patients coming into a hospital should be tested for HIV  |                         |                 |                           |                               |                         |                                      |                            |
| A physician has (or you have) the right to refuse treatment for HIV/AIDS patient                          |                         |                 |                           |                               |                         |                                      |                            |
| You would refuse caring for HIV patient   |                         |                 |                           |                               |                         |                                      |                            |

|  | Can             | Nig          | China                  |                            | Thai            | Oman                          | Pakis                   |
|--|-----------------|--------------|------------------------|----------------------------|-----------------|-------------------------------|-------------------------|
|  | Brachman (1996) | Najem (1999) | Li (1993) <sup>6</sup> | Buskin (2002) <sup>7</sup> | Brachman (1996) | A1-Jabari (2003) <sup>8</sup> | Ali (1995) <sup>9</sup> |
| AIDS has carrier state   | 74              | 71           |                        |                            | 60              |                               |                         |
| AIDS is only a problem of rich countries                       |                 |              | 5                      |                            |                 |                               |                         |
| Only homosexuals get AIDS                                      |                 |              | 1.3                    |                            |                 |                               |                         |
| AIDS is a result of germ warfare experiments                   |                 |              | 57.6                   |                            |                 |                               |                         |
| Reflects society's moral decadence                             |                 |              | 30.1                   |                            |                 |                               |                         |
| Is due to prostitutes  |                 |              | 43.4                   |                            |                 |                               |                         |
| Is due to homosexuals  |                 |              | 6.6                    |                            |                 |                               |                         |
| Is due to drug addicts   |                 |              | 22.2                   |                            |                 |                               |                         |
| People with HIV/AIDS deserve same medical care as other people |                 |              | 17.9                   |                            |                 |                               |                         |
| People with HIV/AIDS get what they deserve                     |                 |              | 66.6                   |                            |                 | 13.7                          |                         |
| Homosexuals with AIDS have only themselves to blame            |                 |              | 16.6                   |                            |                 |                               |                         |
| Prostitutes don't deserve your sympathy                        |                 |              | 24.8                   |                            |                 |                               |                         |
| We should quarantine people with AIDS                          |                 |              | 36.4                   |                            |                 | 34.2                          |                         |

### **Knowledge and Attitudes of Indian physicians and medical students and nurses regarding HIV/AIDS**

There have been no published studies to date that specifically evaluate knowledge and attitudes of Indian medical students regarding HIV/AIDS transmission and PWHA. However, a number of abstracts from conference proceedings are available related to medical students and HIV/AIDS knowledge and attitudes.<sup>44-47</sup> A few studies on health care professionals including physicians and those training to be physicians are also available.<sup>19, 25, 29</sup> Various studies have also been done regarding nurses' knowledge, attitudes and willingness to care for AIDS patients and AIDS-related apprehensions.<sup>26-28, 48, 49</sup> There have also been multiple studies concerning university students and AIDS knowledge and attitudes<sup>50, 51</sup> and school students from 7-12 grade levels.<sup>52-55</sup> Of the

latter, one study compared students and teachers<sup>53</sup> and another compared students living in India and migrants to the United States.<sup>52</sup> In the following pages, we will focus on available information on health care professionals and nursing students. These may give us an understanding of medical students' knowledge and attitudes, as these are the three most-closely related subjects to medical students.

In a 1994 study by Menon and Bharucha, 65% of the servants, such as housekeeping staff (n=40) had not heard of AIDS, 85% of nursing staff (n=45) did not apply Universal Safety Precautions, 13.5% residents (n=91) thought HIV was not transmitted by blood and 30% of consultants (n=27) would avoid contact with an HIV positive patient.<sup>29</sup> Furthermore 70% of the nursing staff and 30% of residents thought HIV-positive was synonymous with AIDS. About 77% of nursing staff correctly identified that HIV could be transmitted through blood, however a large percentage incorrectly thought HIV could be transmitted by touch (15%), stool/urine (56%), sputum (42%), food (10%), water (10%), tears (30%), insects (20%) and sweat (30%). While residents were overall better in their knowledge, 86% correctly identified blood, however many made similar mistakes as nurses: touch (23%), stool/urine (10%), sputum (24%), tears (21%), insects (6%) and sweat (25%). Furthermore, 62.5% of nursing staff and 45% of residents would avoid attending an HIV positive patient and 90% of all those questioned expressed desire for separate wards for HIV positive patients. This study in particular describes overall lack of knowledge in many important areas regarding HIV/AIDS and negative attitudes towards PWHA. The article states that "given the above figures, it is difficult to be optimistic."<sup>29</sup>



In a study of preclinical students (PCS), clinical students (CS) and new doctors (D) regarding HIV/AIDS knowledge and attitudes in 1995, there was a trend towards greater knowledge from PCS to CS to D. Knowledge of the permanent nature of AIDS was appreciated by 74% PCS, 90% CS and 95% D. Knowledge regarding the difference between AIDS and HIV positive patient was appreciated by 47% PCS, 62%CS and 73% D.<sup>25</sup> Asked if persons with HIV can be asymptomatic, 67% PCS, 82% CS, and 93% doctors agreed along with 82% nurses. Preclinical students had relatively poor knowledge of HIV/AIDS natural history and clinical manifestations (40-60% correct responses). A similar trend was seen in misconceptions regarding HIV transmission. The trend among Nurses-PCS-CS-D about responding yes to the statement “kissing an infected person’s mouth can transmit HIV” was 37%-50%-45%-55%. Similarly, sharing utensils showed a trend of 65%-82%-83%-87%, sharing toilets, 52%83%-89%-90%, restaurant cook HIV positive, 50%-90%-92%-94%. When asked about mosquito bites, the trend for a “no” answer was 36%-75%-70%-82%. A general trend of doctors having the least misconceptions was followed in questions regarding touching, attending school with an infected child and working next to an infected person. In all cases, the nurses had the greatest misconceptions.<sup>25</sup>

In a study by Branchman *et al.* where hospital-based physicians and trainees are compared from United States, Canada, India and Thailand with respect to knowledge and attitudes about HIV/AIDS, Indian and Thai health care professionals (HCP) were more uncomfortable with PWHA. There was a correlation with previous contact with HIV/AIDS patient and mean knowledge score and uncomfortableness. Indian HCPs had a mean knowledge score of 83%; 17% of Indian HCPs were uncomfortable eating at the

same table, 25% uncomfortable with physical exams, 43% with drawing blood and 72% performing or assisting with surgery. As seen in previous studies, a large portion of Indian HCPs thought HIV can be self-limiting (26%). Most Indian HCPs knew about transmission through blood transfusion (98%) and sexual intercourse (99%), however 12% did not know about mother-to-child transmission, and 20% thought HIV could be transmitted by mosquitos. Furthermore, 55% thought sharing a household with an HIV-positive person was a high risk behavior, and 12% thought shaking hands and hugging should be avoided. A large proportion of Indian HCPs were not aware of an asymptomatic stage (68%).

Three abstracts from the International Conference on AIDS specifically focused on undergraduate medical students and AIDS awareness. In a study by Purohit *et al.* of twenty eight 2<sup>nd</sup> year medical students relating to HIV exposure through semen, 25% females and 38% males felt vaginal discharge is the most common source of infection during intercourse, whereas 25% females and 75% males thought infected semen is not the most common vehicle for HIV infection.<sup>45</sup> This is contrary to known knowledge that semen is about 10 times as likely to cause infection as vaginal secretions.<sup>39</sup> Another study by Aggarwal and Sharma compared final year medical students with entering students to understand the impact of AIDS education and discovered increased levels of knowledge in the final year in every aspect but also noted overall gaps in knowledge.<sup>44</sup> A third study by Rathnam *et al.* reported knowledge of transmission by 98% of the students at Stanley Medical College in Madras, and 86% were ready to treat the AIDS patients but in a sanitorium only.<sup>47</sup> Without more detail, it is difficult to ascertain what the 98% transmission actually means because the abstract did not describe this information.

A study by Dutta in 1993 of 105 in-service nursing personnel reported significant ( $p < 0.001$ ) gains after a specific training program from a mean of 11.2 (45%) to a mean of 15.4 (62%) correct on a 25 multiple choice questionnaire designed by the WHO.<sup>49</sup> However, this study does not describe the specific questions that were missed and even after the training program, only about 50% received a score better than 75%.

In 1995, a study by Kubde *et al.* also studied knowledge of AIDS among nursing students using an anonymous self-administered questionnaire and found the average knowledge score to be 17.6 out of 28 (63%), and greater knowledge was found to be correlated with more positive and fearless attitudes.<sup>28</sup> In this study, all but two of the subjects were females. Along with low knowledge, about 32% of the students believe AIDS not to be serious, rather like getting the common cold, and 81% knew that AIDS is life threatening. Furthermore, 70% knew that it leads to loss of immunity and opportunistic infections and 85% knew it lead to death. The reason for inconsistency for these numbers is not clear. While known methods of HIV transmission were identified by many students such as sharing needles (88%), blood transfusion (96%), transplacental (88%), only 63.7% knew that it was transmitted by sex. As has been seen in earlier studies of medical school students, incorrect methods of transmission are still part of many nursing students' thinking, including kissing (49%), touching (23%), food (17%), being around AIDS patients (24%) and shaking hands (17%). Negative attitudes are also prevalent, including 43% having a negative attitude to serve AIDS patients and only 63% are ready to serve AIDS patients.

In a questionnaire of 233 female nursing students in Delhi during January 1993, Kumar *et al.* studied three different topics: AIDS awareness, AIDS related policy issues

and nursing students' willingness to provide care and apprehensions among nursing students.<sup>26, 27, 48</sup> Most students knew what the acronym for AIDS stood for (78.6%) and that AIDS is caused by virus (74.3%).<sup>27</sup> Knowledge regarding common forms of transmission was high, 78.9% knew it was transmitted by sexual contact, 91.8% knew it was transmitted by blood, and 78% and 74% knew HIV can be transmitted by needles and mother-to-child, respectively. However, misconceptions were also common. Regarding misconceptions about HIV transmission, hugging had the least misconception (16.7%) and social kissing (47.6%) had the most. About 20-26% thought HIV could be transmitted by sneezing/talking, mosquitos, sharing utensils, and sharing public toilets in this order.<sup>27</sup> Knowledge about various prevention means ranged from 75% (using sterilized needles) to 89% (avoiding sex), with using safe blood and using condoms in between these values.<sup>27</sup> Unfortunately, scientific journals were used by only about 25% of the students for knowledge.

When asked about policy related issues and willingness to provide care, 64%-85% were in favor of making HIV testing compulsory for various high risk groups ranging from foreigners to IV drug users. Over 80% were willing to get tested for HIV. Willingness to provide care for various high groups ranged from 59% for promiscuous heterosexuals, 72% for IV drug users and 60.5% for homosexuals.<sup>48</sup> Furthermore, 1/4<sup>th</sup> of those surveyed were in favor of a choice to refuse care to AIDS patients but 1/4<sup>th</sup> also believed in termination of health workers in case of refusal to care for AIDS victims.

Apprehensions about talking with patients (23.3%), shaking hands (28%), hugging (36%) and sharing rooms (24%) matches that of knowledge about these misconceptions except for hugging. While only 16.7% thought hugging could transmit

HIV, over 36% had apprehensions about it. This was also the apprehension that is higher among year II and III nurses than year I and higher in trained than untrained nurses.

Overall, doctors and medical students had good knowledge of correct forms of HIV transmission. Nurses, however, did not reflect this. Furthermore, there was lower knowledge about misconceptions about HIV transmission among medical students and physicians and even greater misconception among nurses. Lastly, similar to other developing countries, Indian medical students, physicians and nurses exhibited high levels of negative attitudes.

| <b>Table 6: Summary of Studies Regarding Knowledge and Attitudes of Health Care Professionals in India</b> |   |
|--|---|
| <b>Study</b>   | <b>Major Findings</b>   |
| Menon <i>et al.</i> <sup>29</sup><br>(1994)<br>N=136   | A study of health care professionals indicated lack of Universal Safety Precautions among nurses and residents. Two-thirds of nurses and about half of residents would avoid attending an HIV-positive person.  |
| Dobe <sup>25</sup><br>(1995)<br>N=??   | A study of medical students and doctors indicated poor knowledge among students regarding transmission and testing. Over half of the students thought transmission can occur through casual contact mechanisms.   |
| Brachman <i>et al.</i> <sup>19</sup><br>(1996)<br>N=340  | This study of Indian health care professionals indicated that about one-fourth felt uncomfortable doing a physical exam, three-fourth felt uncomfortable performing surgery on an HIV-positive person and had overall somewhat good knowledge about transmission. |
| Dutta <i>et al.</i> <sup>49</sup><br>(1993)<br>N=105   | All these studies done on nurses or nursing students indicated low knowledge regarding HIV/AIDS and negative attitudes towards PWHA and unwillingness to treatment people with HIV/AIDS.  |
| Kubde <i>et al.</i> <sup>28</sup><br>(1995)<br>N=??  |   |
| Kumar <i>et al.</i> <sup>27</sup><br>(1996)<br>N=233   |   |

| <b>Table 7: Knowledge, Attitudes and Beliefs about HIV/AIDS Among Indian Health Professionals</b>  |  |  |                               |                                  |                               |
|--|--|--|-------------------------------|----------------------------------|-------------------------------|
|  | Menon<br>(1994)<br>N/Res <sup>10</sup> | Dobe <sup>11</sup><br>(1995)<br>PC/C/D/N | Kudbe<br>(1995) <sup>12</sup> | Brachman<br>(1996) <sup>13</sup> | Kumar<br>(1996) <sup>14</sup> |
| <b>Modes of HIV transmission:</b><br>(The responses shown indicate the percent of people who answered correctly, not the percent of people who answered yes) |  |  |                               |                                  |                               |
| Blood transfusion (Y)  | 77/86                                  |  | 96                            | 98                               | 91.8                          |
| Sexual contact (Y)   |  |  | 63.7                          | 99                               | 93.9                          |
| Sharing needles (Y)  |  |  | 88.2                          |                                  | 78.1                          |
| Mother-to-child (Y)  |  |  | 88.2                          | 88                               | 74.3                          |
| Mosquitos (N)  | 80/94                                  | 75/70/82/36                              |                               | 94                               | 24.1                          |
| Donating blood (N)   |  |  |                               |                                  |                               |
| Saliva/mucous (N)  | 58/76                                  |  |                               |                                  | 78.5                          |
| Tears (N)  | 70/21                                  |  |                               |                                  |                               |
| Sharing toilet seat/bathroom (N)   |  | 83/89/90/52                              |                               |                                  | 72.5                          |
| Shaking hands (N)  |  | 89/91/92/91                              | 57.8                          | 88                               | 87.8                          |
| Touch (N)  | 85/77                                  |  | 62.8                          |                                  |                               |
| Kissing/French Kissing (N)   |  | 50/45/55/37                              | 43.1                          |                                  | 52.4                          |
| Living in same household (N)   |  |  |                               | 86                               |                               |
| Eating food prepared by HIV-positive person (N)  | 90/-                                   | 90/92/94/50                              | 72.5                          | 98.5                             |                               |
| Sitting next to HIV-positive person (N)  |  | 84/86/95/67                              |                               |                                  |                               |
| Sharing utensils   |  | 82/83/87/65                              |                               |                                  | 73.4                          |
| Infected/uninfected students playing together (N)  |  | 90/92/92/-                               |                               |                                  |                               |
| Sharing clothes (N)  |  |  | 43                            |                                  |                               |
| Sweat (N)  | 70/75                                  |  |                               |                                  |                               |
| <b>Do you believe</b> (The responses indicate the percentage of respondents who agree with the statement)  |  |  |                               |                                  |                               |
| Treating HIV/AIDS patients endangers health care provider's health   |  |  | 93                            |                                  | 81.1                          |
| A physician has (or you have) the right to refuse treatment for HIV/AIDS patient   |  |  |                               |                                  | 28.3                          |
| You would refuse caring for HIV patient  | 62.5/45                                |  | 36.8                          |                                  |                               |
| AIDS has carrier state   |  | 64/83/87/-                               |                               | 32                               |                               |
| AIDS is only a problem of rich countries   |  |  | 37.7                          |                                  |                               |

<sup>10</sup> Menon and Bharucha studied servants, nursing staff (N), residents and interns (Res) and consultants. The data is for nurses and residents only here.

<sup>11</sup> Dobe studied preclinical medical students (PC), clinical medical students (C), doctors (D) and nurses (N)

<sup>12</sup> Kudbe *et al.* studied nursing students from all levels of schooling

<sup>13</sup> Brachman *et al.* studied physicians and students in the United States, Canada, India and Thailand at various levels of their training

<sup>14</sup> Kumar *et al.* have published three papers from the same survey on similar topics relating to nursing students of Delhi. The data is from all their works.

## CURRENT HIV/AIDS SITUATION IN INDIA

This section will contain background information about India, the current epidemiology of HIV in India and the purpose of my project.

### **Current facts about India**

India has a population of 1.02 billion (2001 estimate), with a 1.8 percent annual growth rate, making it the second most populous country in the world.<sup>56</sup> About 74% of the population lives in rural areas. Even so, the population density average is about 284 people per square kilometer and can reach much higher in urban areas.<sup>57</sup> In terms of religion, a majority of the Indian population observes Hinduism (82%). Other religions that make up the remaining 18% include 12.1 % Muslim, 2.3 % Christian, 1.9 % Sikh, 0.8 % Buddhist, 0.4 % Jains, 0.4 % other<sup>57</sup>.

In 2001, life expectancy for the overall population was 64 years and the gross national income per capita was \$460. The adult literacy rate in 2000 was estimated at 56% overall, with 69% literacy for males and 42% for females. The net primary school enrollment was 79% for males and 73% for females between 1995-2001. However, the percentage of primary students reaching grade 5 was 60% and secondary school enrollment (6<sup>th</sup> grade) was 59% for males and 39% for females.<sup>56</sup> Overall population under 18 is about 400 million or 40% of the overall population.

India has a vast media network that is continuously expanding. It has the second largest movie industry in the world. There are 2734.62 annual visits to the cinema per 1000 people. Total number of radios is estimated at 116 million (111 radios per 1000) and total number of televisions is estimated at 63 million (60.24 televisions/1000). Newspaper circulation is 56.44 newspapers/1000. Personal computers are increasing in

number. In 2000, it was estimated that there are 4.4 computers/1000. Internet users are also increasing. Figures from 2000 show that the internet is used by 7 million people (almost 7/1000) <sup>58</sup>.

India's health care system consists of both a private and public sector. It is mainly based on a tiered system that funnels more difficult cases to urban hospitals and provides primary and preventative care in more rural areas <sup>59</sup>. By 1991, there were about 23,000 primary health centers, 11,200 hospitals and 27,400 dispensaries. A tremendous disparity exists in location of hospitals based upon socioeconomic status of the region. For example, Uttar Pradesh with a population of 139 million had 735 hospitals in 1990 compared to Kerala (population 29 million) with 2053 hospitals. Private studies estimated that there were 7300 hospitals in India in 1992. Of these, 4000 were government owned, 2000 were owned by charitable trusts and 1300 were private <sup>59</sup>. Because public hospitals are underfunded and equipment is obsolete, less than 20% of Indians seek outpatient services in the public sector and less than 45% seek inpatient facilities in public sector. <sup>60</sup> Traditional medicine is practiced throughout India including Ayurvedic medicine and Unani herbal medicine. <sup>59</sup>

### **HIV Epidemiology of India**

India's National AIDS Control Organization (NACO) adopted the Sentinel surveillance system in 1994 and started with 55 sentinel sites. During 2000, the sites were increased to 232 and the estimates for 2003 are based on 455 sentinel sites. <sup>2</sup> Of these 271 sites were at ante-natal clinics (as proxy for the general population), 166 sites in clinics for sexually transmitted diseases, 13 sites among injecting drug users, 3 sites for men having sex with men, 2 sites for commercial sex workers. Additional data was also



collected from 44 intervention-based sites. For 2004 data, there will be 670 sentinel sites.<sup>2</sup>

States are divided into three groups based on the prevalence of HIV. Group I states are identified as having HIV prevalence greater than 1 percent in antenatal women; Group II states are identified as having HIV infection prevalence greater than 5% in high risk groups and less than 1% in antenatal women; and Group III is identified as having HIV infection prevalence of less than 5% in high risk groups and less than 1% in antenatal women. Punjab has three STD sites and 4 antenatal clinics. STD sites have a prevalence of 1.60% and antenatal clinics have a prevalence of 0.00 %. Therefore, Punjab falls in Group III.<sup>61, 62</sup>

According to NACO, there are an estimated 5.1 million people as of October 2003 affected with HIV/AIDS in India. The trend from 1998-2003 shows that the epidemic may be plateauing, with a decreased trend towards new cases. The estimates for 1998, 1999, 2000, 2001 and 2002 were 3.5 million , 3.7 million , 3.86 million, 3.97 million and 4.58 million infections, respectively<sup>2, 63</sup>.

The epidemiology of the HIV/AIDS epidemic for youth shows estimates for prevalence of HIV/AIDS infection among males of age 15-24 to be between .22 and .46 % and for females to be between .46 and .96 %.<sup>64</sup> This corresponds to an estimated 220,000 to 470,000 seropositive males and 430,000 to 890,000 seropositive females between the ages of 15-24.<sup>64</sup>

### **HIV/AIDS Related Knowledge and Behavior in India**

A national survey to understand the HIV/AIDS scenario in India was conducted from March-August 2001 by NACO. The following data are from a sample of that

survey, where the age is restricted to 15-49 and the number of respondents from urban and rural areas was equal. Overall, 76.1% of the people surveyed had heard of HIV/AIDS, with greater awareness among males than females. There were rural/urban disparities, with 89.4% of urban respondents having heard of HIV/AIDS and 72.3% in rural areas. Punjab reported high awareness, where 92% of the respondents were aware of HIV/AIDS<sup>65</sup>.

Awareness of transmission of HIV/AIDS through various means was high for sexual contact, blood transfusions and sharing needles, but not for mother-to-child transmission and breast-feeding. Nearly 75% of respondents were aware that HIV/AIDS could be transmitted via sexual contact, 72.5% were aware of transmission through blood transfusions and 77.6% males and 64.9% females were aware of HIV/AIDS transmission through needle sharing. Urban males in Punjab reported 95% awareness of HIV/AIDS transmission through needle sharing. Only 54.4% of respondents were aware of transmission of HIV/AIDS through breast-feeding. Knowledge of HIV testing facility was 10.4% overall but was 33.8% in Punjab, the highest among all states. There is a general trend overall in all these figures that urban males tend to have the greatest knowledge, and rural females tend to have the lowest knowledge of HIV/AIDS transmission.<sup>65</sup>

In terms of prevention, 46.8% of all respondents were aware of prevention of AIDS/HIV transmission through condom use and sexual relationship with faithful and uninfected partners.<sup>65</sup> Furthermore, 71.2% of respondents were aware of abstinence as a preventative method. Again, rural females had the lowest level of knowledge on prevention of transmission.<sup>65</sup>

Awareness of HIV/AIDS links to STDs was very low. Only 32.1% of respondents had ever heard of STDs and only 20.7% of respondents were aware of a link between STD and HIV. Punjab had an awareness of 36.1%. In contrast, over 90% of respondents had seen or heard of a condom <sup>65</sup>.

The median age of sexual intercourse in India was 21 years for males and 18 years for females. Overall, sex with a non-regular partner (a person that is not a spouse) over the 12 months prior to the survey was 11.8% among males and 2% among females. These figures did not vary much from urban to rural. During these sexual encounters, 33.6% of males and 26.6% of females reported consistent condom use with all non-regular partners. Condom use consistency had wide ranges for males and females. Females of Orissa had reported no condom use while females in Punjab reported the highest condom use at 55.7% <sup>65</sup>.

## CHAPTER 2-

### TRANSITION

In order to study Indian medical students' knowledge and attitudes about HIV/AIDS, a 110 question survey instrument was administered to medical students of all five years of medical school. The goals of this study are:

- Assess overall knowledge and attitudes about HIV/AIDS
- Assess to what extent various types of knowledge are same or different across various years of medical school
- Assess how attitudes vary by medical school year
- Assess how attitudes vary with increasing knowledge
- Assess how knowledge and attitudes vary by gender, religion, language or background

Analyzing this data will help us understand in more detail how much Indian medical students know about HIV/AIDS transmission, prevention and misconceptions. We will also understand in more detail their attitudes regarding PWHA. As a result, we can more accurately conclude if their attitudes are positive or negative towards PWHA. The attitudes can serve as a proxy help in understanding their level of stigma and discrimination.

## METHODS

### Subjects

In August 2004, a 110-question survey instrument was administered to medical students of a Government Medical College in Punjab, India in a cross-sectional study to ascertain knowledge and attitudes of Indian medical students about HIV/AIDS. The survey instrument and procedures for administration were approved by the Committee on Protection of Human Subjects (CPHS) at University of California at Berkeley (Project number 2004-7-20) and by the Principal of the Medical College where this research took place. A total of 511 survey instruments, (242 male, 269 female) were completed satisfactorily for analysis from students across years 1-5 of medical education. The Indian Medical College consists of 4.5 years of education and is divided into 3 sections. Section one corresponds to year 1, section 2 corresponds to year 2 and 3, and section 3 corresponds to years 4 and 5. Some students were confused about answering question 2 on the survey instrument, "year in medical school/college". Often they answered the section they were in rather than the year but since all students in a lecture hall were of the same year, this was easily corrected. All surveys were completed during lecture time except year 4, which occurred after lecture. There were no refusals for all years except year 4. Six answer sheets were excluded based upon not finishing the first 33 questions and 3 were answer sheets were excluded on the basis that the students filled in more answers than the number of questions.

### Survey Instrument

The questionnaire was a self-administered survey with 110 total questions in English (appendix A). The distribution of questions is described in table 8.

|   |                 |
|---|-----------------|
| Demographics                                      | Questions 1-6   |
| HIV/AIDS Related Experience/Education             | Question 7-12   |
| HIV/AIDS Knowledge, especially about transmission | Question 13-33  |
| HIV/AIDS Related Attitudes and Beliefs            | Question 34-110 |

The demographics questions consisted of those relating to gender, year in medical school, age, rural or urban background, religion and primary language. Questions relating to HIV/AIDS self-reported knowledge consist of primary source of HIV/AIDS information, previous contact with people with HIV/AIDS (PWA), and how informed they consider themselves about their knowledge of HIV/AIDS. The knowledge-related questions had three possible answers: “true”, “false” and “don’t know”. These closed-ended questions were based upon the commonly asked questions in the studies done on this subject as reported in the literature review in the previous sections.<sup>12, 15-38</sup>

The questions related to attitudes were from a survey instrument designed and tested by Snell *et al.*<sup>66, 67</sup> Within the attitudes questions, a number of scales and subscales existed. A few stand-alone questions were also analyzed. The original survey has four broad categories: (A) global stereotypic beliefs about AIDS, (B) personal attitudes about AIDS, (C) medical issues about AIDS and (D) sexual issues about AIDS. Of these, B and C were used in their entirety and represent questions 34-67 and 68-97, respectively.

Questions 98-110 consisted of two subscales that were extracted from part A of the original survey instrument concerning global stereotypic beliefs about AIDS. The two subscales used were those concerning AIDS-related confidentiality and AIDS as caused by homosexuality. These were included on the basis that confidentiality is a

| Category                                       | Subscale/Questions  | Question                              |
|--|---|---------------------------------------|
| Global stereotypic beliefs about AIDS (98-110) | AIDS-related confidentiality  | 99, 100, 102, 103, 105, 107, 109, 110 |
|  | AIDS is caused by homosexuality                                     | 98, 101, 104, 106, 108                |
| Personal attitudes about AIDS (34-67)          | the desire to avoid those afflicted with AIDS                       | 34, 55, 56, 57, 66, 67                |
|  | AIDS not perceived as self-relevant                                 | 38, 39, 40, 41                        |
|  | AIDS is a moral offense   | 42, 64, 65                            |
|  | Social obligation to help   | 35                                    |
|  | AIDS epidemic exaggerated   | 36                                    |
| Medical issues about AIDS (68-97)              | Belief that AIDS is a threat to medical staff                       | 70, 71, 73, 78, 79, 85                |
|  | People with AIDS and hospital admission                             | 69                                    |
|  | Universal AIDS testing in hospitals                                 | 80                                    |
|  | Hospitals should have right to test all patients                    | 81                                    |
|  | A doctor with AIDS should not be allowed to treat patients          | 82                                    |
|  | A hospital worker should be required to work with AIDS patient      | 83                                    |
|  | Working with AIDS patients can be rewarding experience              | 88                                    |
|  | Hospital personnel should go out of their way to help AIDS patients | 89                                    |

major part of the doctor-patient relationship and to assess the level of homophobia relating to possible negative attitudes towards PWHA. The subscales that were excluded from this section were: the need for AIDS-related education and the transmission of AIDS. The former consisted of questions related to education beliefs in younger children that may not be pertinent to medical students whose age ranges from 18-25 and the latter is covered in many respects in the knowledge portion of the survey instrument used.

In category B concerning personal attitudes about AIDS, three subscales exist: the desire to avoid those afflicted with AIDS, AIDS not perceived as self-relevant and the notion that AIDS is a moral offense. Two questions are analyzed separately because of

their insight into the students' view on social obligation to help people with AIDS and the perception that the threat of AIDS is exaggerated.

In category C regarding medical issues about AIDS, one of the four original subscales is analyzed, the belief that AIDS is a threat to medical staff. Other subscales as a whole were not completely appropriate to analyze for Indian medical students, however specific questions from this category are analyzed because they inquire about specific attitudes towards medical care of AIDS patients and do not fit well into any subscales. Question 77 is disregarded prior to any analysis from this section because of the possible confusion it may cause. It reads "there are effective treatments for those with AIDS". In analysis, agreeing with this would indicate the person believes that there is a cure for AIDS. While anti-retroviral drugs may not cure AIDS, their ability to extend life by many years can be thought of as effective treatment. Therefore, this question will not be analyzed.

Many questions in the survey instrument used were altered from the original to be more specific to the population. For example the original statement, "only people from California have been affected by AIDS" was changed to "only people from Bombay (Mumbai) have been affected by AIDS", the statement "living in San Francisco would increase anyone's chance of getting AIDS was changed to "living in Bombay (Mumbai) would increase anyone's chance of getting AIDS" and the original statement "people with AIDS should not be allowed to work in public schools" was changed to "people with AIDS should not be allowed to work in schools." The first two statements were changed to be geographically specific about areas of high HIV incidence. The last



statement was changed because the meaning of “public school” in India refers to private schools only and those that are government-run are called government schools.

The answer choices for questions were different for knowledge and attitude questions. For knowledge questions, there were three choices: true, false, and don't know. The attitudes section of the survey is scored by giving a numerical value to the Likert scale used: agree (2), slightly agree (1), neither agree nor disagree (0), slightly disagree (-1) and disagree (-2). For some questions (69, 79, 102, 107) the scoring is reversed in order to comply with the overall subscale question. For example, question 102 reads “AIDS victims have a right to privacy about their lives and lifestyles” whereas the other questions are worded in the opposite manner such as “People with AIDS don't really have a right to confidentiality about their disease.”

### **Procedure**

The survey instrument was given to medical students in their lecture halls. They were provided with the consent form, survey instrument and a Scantron answer sheet (appendix C) to mark their answers along with a number 2 pencil to complete the answer sheet. Students were first given the consent form. In the consent form (appendix B), students were told that their participation was voluntary and that they could refuse to participate. They were also told that the questionnaire was completely anonymous and therefore they should not write their name or any identifying information on the survey instrument or the Scantron answer sheet. They were further told that by completing the survey instrument, they were consenting to the research. No consent forms with signatures were collected to maintain the anonymity of the students in accordance with the approved application of the protection of human subjects. The entire process of

completing the survey instrument took about 45 minutes and was undertaken in a manner consistent with approved administration methods outlined in the application for CPHS.

All survey instruments were completed within class time except for year 4. Professors for the various classes were contacted prior to the day that the survey took place for permission. The surveys were done at the beginning of the academic school year. In fact, the year 1 students were surveyed on the second day of their medical school education. The original research plan called for only surveying years 1, 3, and 5. However, all years were surveyed to provide better understanding of changes that may exist between years. The surveys were completed from August 13, 2004 to August 24, 2004. The first surveys were completed by year 4 after their morning lectures on August 13<sup>th</sup>.

Year 3 students were surveyed next in two groups because their class is split into two halves for pharmacology and pathology labs on August 14<sup>th</sup> and August 20<sup>th</sup>. Year 5 students were surveyed on August 16<sup>th</sup>, Year 2 students on August 23<sup>rd</sup> and 24<sup>th</sup>, and Year 1 students were surveyed on August 24<sup>th</sup>.

The students and faculty were not provided with any monetary compensation.

### **Data entry and analysis**

Students entered their responses to the survey instrument on a 200-question Scantron form F-3652-PAR-L. The Scantrons were read in the Molecular and Cell Biology Department at the University of California, Berkeley by OpScan® 8 NCS Pearson scanner. The data from the scanner was read by Remark Classic OMR software (version 2.5) and the raw-data was imported into Microsoft Excel 2000. Data was re-

coded based upon the codebook (appendix B) in Microsoft Excel and imported into the statistical package SPSS.<sup>68</sup>

Knowledge scores consisted of the number of correct responses the student produced. Missing answers and “don’t know” answers were regarded as incorrect. Knowledge questions are analyzed by question, total number correct, total correct on true nature of HIV transmission and total correct regarding misconceptions of HIV transmission. Individual questions are analyzed by using the chi-square test and scales regarding knowledge are analyzed by comparing means among various years of medical school.

For attitude questions, scales are constructed that combine the various questions from the survey based upon the matrix above. Some scales are further subdivided. The mean score of the scales are compared among various years of medical school using one-way analysis of variance (ANOVA). All attitude scales are constructed such that positive numbers indicate a positive attitude. For individual questions, the mean scores are compared similar to scales.

## RESULTS

### Demographics

Table 10 describes the demographics of the sample surveyed. A slightly greater percentage of females than males (53 versus 47 percent) were surveyed. Students were surveyed from all five years of medical school at the beginning of the school year. Year 1 had the largest response rate. Response rate was based upon those students present during lecture for all years except year 4 where students were surveyed after lecture therefore only those students willing to stay were surveyed. Year 5 may have a lower turnout as a result of having a test the day after the survey. Each year of medical school has about 150 students.

Indian medical students are generally “traditional,” meaning all students start medical school after age 17 and before 20. Most students finish 10<sup>th</sup> grade and do two years of further high school education or college level education before entering a university or medical school. Only 1 student older than 20 was in year 1 of medical school. Most students identified themselves as either Hindus (54%) or Sikhs (43%). Punjabi was

| Table 10: Demographics                          |              | N (%)    |
|---|--------------|----------|
| Gender  | Male         | 242 (47) |
|   | Female       | 269 (53) |
| Medical School Year                             | 1            | 134 (26) |
|   | 2            | 106 (21) |
|   | 3            | 121 (24) |
|   | 4            | 58 (11)  |
|   | 5            | 92 (18)  |
| Age   | ≤18          | 109 (21) |
|   | 19           | 130 (26) |
|   | 20           | 97 (19)  |
|   | 21           | 90 (17)  |
|   | ≥22          | 84 (17)  |
| Religion  | Sikhism      | 221 (43) |
|   | Hinduism     | 277 (54) |
|   | Christianity | 1 (0.2)  |
|   | Islam        | 0 (0)    |
|   | Other        | 12 (2.3) |
| Primary Language                                | Punjabi      | 405 (79) |
|   | Hindi        | 96 (19)  |
|   | English      | 7 (1.4)  |
|   | Other        | 2 (0.4)  |
| Background                                      | Urban        | 68 (13)  |
|   | Rural        | 442 (87) |
| History of knowing someone with AIDS personally | yes          | 45 (8.8) |
|   | no           | 465 (91) |

the primary language of most students (79%) followed by Hindi (19%). Most students were from an urban background (87%). Very few students knew anyone with AIDS (9%).

### Knowledge comparisons by medical school year

Table 11 shows the students' answers to various knowledge questions about HIV/AIDS transmission, prevention and clinical course. Chi-squared analysis was not done when all class individually had greater than 95% correct answers. These are indicated by "--" in the p-value column. Of the 20 questions,

| Question  | Medical School Year (percent of students with correct answer) |      |      |      |      | Total | p-value | p-value for trend |
|---|---|------|------|------|------|-------|---------|-------------------|
|   | 1   | 2    | 3    | 4    | 5    |       |         |                   |
| The AIDS virus can be transmitted through sexual intercourse between a man and a woman        | 100   | 96.2 | 100  | 96.6 | 100  | 98.8  | --      | .896              |
| A man with the AIDS virus can pass it on to another man through sexual intercourse            | 60.4  | 84.0 | 90.1 | 93.1 | 96.7 | 82.6  | <.0005  | <.0005            |
| A pregnant woman who has the AIDS virus can give it to her baby                               | 97.0  | 99.1 | 99.2 | 100  | 100  | 98.8  | --      | .032              |
| There is a vaccine available to the public that protects a person from getting the AIDS virus | 94.0  | 92.5 | 93.4 | 74.1 | 89.1 | 90.4  | <.0005  | .011              |
| A person who has the AIDS virus can look well and healthy                                     | 79.9  | 87.7 | 87.6 | 91.4 | 90.2 | 86.5  | .107    | .017              |
| Only a person who looks sick can spread the AIDS virus  | 97.8  | 98.1 | 98.3 | 94.8 | 97.8 | 97.7  | .664    | .667              |
| Condoms reduce the risk of transmitting the AIDS virus  | 94.0  | 98.1 | 99.2 | 98.3 | 98.9 | 97.5  | .063    | .021              |
| Most people who have AIDS show signs of getting sick right away                               | 46.3  | 53.8 | 74.4 | 79.3 | 72.8 | 63.0  | <.0005  | <.0005            |
| You can get AIDS by being bitten by a mosquito that has bitten someone with AIDS              | 75.4  | 69.8 | 80.2 | 75.9 | 84.8 | 77.1  | .126    | .056              |
| Birth control pills protect a woman from getting the AIDS virus                               | 85.8  | 84.9 | 94.2 | 93.1 | 95.7 | 90.2  | .016    | .002              |

| Question  | Medical School Year (percent of students with correct answer) |      |      |      |      | Total | p-value | p-value for trend |
|---|---|------|------|------|------|-------|---------|-------------------|
|   | 1   | 2    | 3    | 4    | 5    |       |         |                   |
| AIDS only gets transmitted in homosexual sex                                  | 82.8  | 88.7 | 99.2 | 100  | 97.8 | 92.6  | <.0005  | <.0005            |
| Hypodermic syringes that are not properly cleaned can transmit the AIDS virus | 96.3  | 96.2 | 90.9 | 89.7 | 98.9 | 94.7  | .028    | .892              |
| AIDS can be transmitted by using a toilet used by an infected person          | 94.8  | 87.7 | 93.4 | 91.4 | 95.7 | 92.8  | .186    | .594              |
| AIDS is not life-threatening (it does not lead to death)                      | 94.8  | 96.2 | 93.4 | 89.7 | 96.7 | 94.5  | .350    | .866              |
| AIDS can be transmitted by being in the same room with an AIDS patient        | 98.5  | 97.2 | 100  | 94.8 | 97.8 | 98.0  | .189    | .562              |
| AIDS can be transmitted by kissing an individual with AIDS                    | 89.6  | 84.9 | 93.4 | 77.6 | 77.2 | 85.9  | .003    | .008              |
| A person can get AIDS from fellow workers at a job                            | 96.3  | 98.1 | 97.5 | 98.3 | 93.5 | 96.7  | .354    | .351              |
| AIDS can be transmitted by sharing eating utensils with an AIDS patient       | 93.3  | 93.4 | 95.9 | 96.6 | 100  | 95.5  | .128    | .011              |
| AIDS cannot be transmitted by shaking hands with an AIDS patient              | 88.1  | 83.0 | 86.0 | 79.3 | 80.4 | 84.1  | .419    | .108              |
| The virus that causes AIDS is ssDNA virus                                     | 78.4  | 68.9 | 76.0 | 75.9 | 82.5 | 76.3  | .232    | .315              |

the students got higher than 70% overall correct responses in 19 questions, higher than 80% in 17 questions, higher than 90% in 13 questions and higher than 95% in 7 out of 20 questions. The lowest percentage correct response was regarding latency between seroconversion and symptoms of disease, where only 63% knew that a person with the AIDS virus does not show signs of getting sick right away. Year 1 and 2 had this question correct less than 55% of the time, whereas year 3-5 got it correct over 70% of the time; fewer than 80% of the students in any given class. The highest percent correct were for questions regarding transmission via sexual intercourse, mother-to-fetus

transmission and lack of transmission by being in the same room. For all these questions, students were correct 98% of the time.

Significant differences based upon ANOVA between class years were found in questions regarding transmission via homosexual sex, availability of vaccine, latency between seroconversion and symptoms, the misconception regarding transmission through homosexual sex only, transmission via hypodermic syringes and transmission via kissing.

When testing for linearity, 10 of the 19 questions showed significant results. All questions that were significant on ANOVA were significant on test for linearity as well. Furthermore, four other questions were significant for trend: mother-to-fetus transmission, visual presentation of person with AIDS, condom use for prevention and transmission via eating utensils. All except two questions that were significant for trend showed less knowledge in later years of medical education: a vaccine is available and transmission via kissing.

Table 12 and figure 3 show how students did when scores for all 20 questions were combined and how they did when questions were separated into knowledge of correct modes of transmission and correct responses knowledge about transmission misconceptions. Overall, the average number of correct for all students was 89.7% and ranged from 87.2% to 92.1%. One-way ANOVA showed the differences among medical students in various years to be significant ( $p$ -value  $<.0005$ ). For questions regarding correct knowledge of transmission, the students had better knowledge than misconceptions about transmission. The average percent score for correct knowledge about transmission routes was 93.7% and ranged from 88.4% in year 1 to 98.9% in year

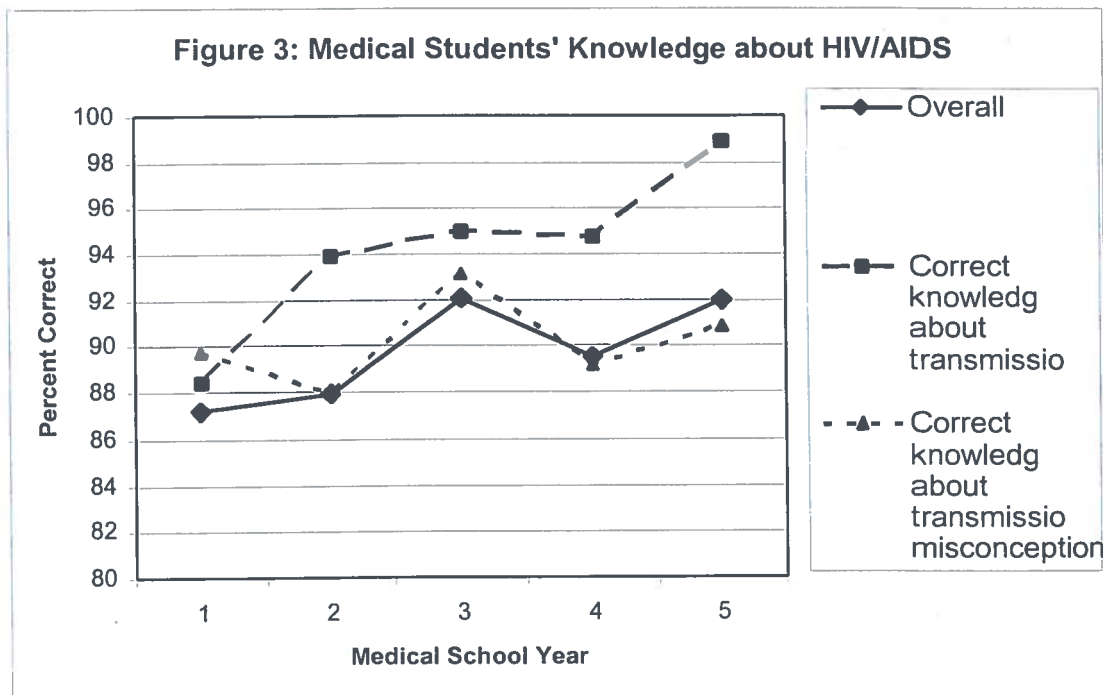
5. The differences were significant based upon the one-way ANOVA test (p-value <.0005). For knowledge about transmission misconceptions, the average percent correct was 90.3% and ranged from 87.9% to 93.2%. The differences between the various years were also significant on one-way ANOVA (p-value <.012).

Figure 3 and table 12 shows that there are variations in knowledge overall and regarding correct transmission and transmission misconceptions among all years based upon ANOVA. Both overall knowledge and correct knowledge show a positive trend. There is no clear direction for correct knowledge about misconceptions based upon test for linearity (p-value=.244). There are many more questions about misconceptions than correct knowledge in the knowledge portion of the survey and therefore result in the overall correct knowledge increased correlation with misconceptions rather than correct knowledge.

**TABLE 12: Knowledge Scores by Medical School Year**

|   | Medical School Year |                 |                 |                 |                 | Total           | F     | p-value | Linear trend |
|---|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|---------|--------------|
|   | 1                   | 2               | 3               | 4               | 5               |                 |       |         |              |
| <b>Overall Correct: 20 questions (% correct)</b>                                    | 17.43<br>(87.2)     | 17.58<br>(87.9) | 18.42<br>(92.1) | 17.90<br>(89.5) | 18.47<br>(92.0) | 17.94<br>(89.7) | 10.43 | <.0005  | <.0005       |
| <b>Correct knowledge about modes of transmission: 4 questions (% correct)</b>       | 3.54<br>(88.4)      | 3.76<br>(93.9)  | 3.80<br>(95.0)  | 3.79<br>(94.8)  | 3.96<br>(98.9)  | 3.75<br>(93.7)  | 12.49 | <.0005  | <.0005       |
| <b>Correct knowledge about transmission misconceptions: 8 questions (% correct)</b> | 7.19<br>(89.8)      | 7.03<br>(87.9)  | 7.45<br>(93.2)  | 7.15<br>(89.2)  | 7.27<br>(90.9)  | 7.22<br>(90.3)  | 3.25  | .012    | .244         |





#### Attitudes comparison by medical school year

The attitudes scales range in answer from  $-2$ , meaning negative attitudes toward a set of questions, to  $+2$ , meaning positive attitudes. For example  $+1.25$  means that the average attitudes for that group range between slightly agree to agree towards a positive attitude statement. Therefore, a positive number always means a positive attitude in this section.

Table 13 and figure 4 describe the results for attitudes towards confidentiality by medical school year. Overall attitudes tend to indicate a neutral response to questions regarding confidentiality. However, the graph and the table do indicate that the scale has two different factors. For questions that are specifically about a more theoretical right to confidentiality such as people with AIDS have a right to confidentiality about their disease, the attitudes are positive across the years and average near “slightly agree”. However, questions that ask if a person should be able to keep their diagnosis secret in a

particular situation such as “keep the diagnosis secret from employers and fellow co-workers,” the attitudes are more negative. The p-values on a one-way ANOVA test indicate that the results for the scale and its two subscales are different across medical school years ( $p$ -value  $<.05$ ), however only two of the three scale/subscales show linear trend. The test for linearity shows linear trend for overall confidentiality and confidentiality to keep diagnosis private but not for a right to confidentiality meaning that differences across years for confidentiality as a right does not have a trend even though there are significant differences among years.

|  | Medical School Year |       |       |       |       | Overall | F    | p-value          | Linear trend     |
|--|---------------------|-------|-------|-------|-------|---------|------|------------------|------------------|
|  | 1                   | 2     | 3     | 4     | 5     |         |      |                  |                  |
| <b>Scale:</b> The right to confidentiality and the ability to keep the diagnosis private from others | +0.12               | -0.11 | -0.05 | +0.21 | -0.19 | -0.01   | 5.40 | <b>&lt;.0005</b> | <b>.044</b>      |
| <b>Subscale:</b> The right to confidentiality abstractly   | +0.92               | +0.76 | +1.01 | +1.22 | +0.97 | +0.93   | 2.51 | <b>.041</b>      | <b>.112</b>      |
| <b>Subscale:</b> The ability to keep diagnosis of HIV/AIDS private from others                       | -0.35               | -0.65 | -0.70 | -0.36 | -0.87 | -0.59   | 7.22 | <b>&lt;.0005</b> | <b>&lt;.0005</b> |

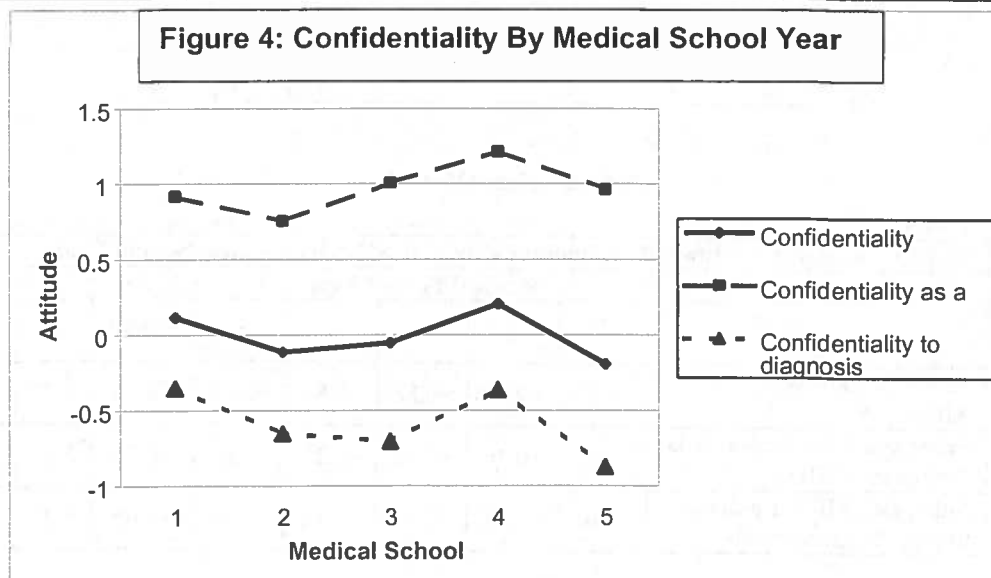
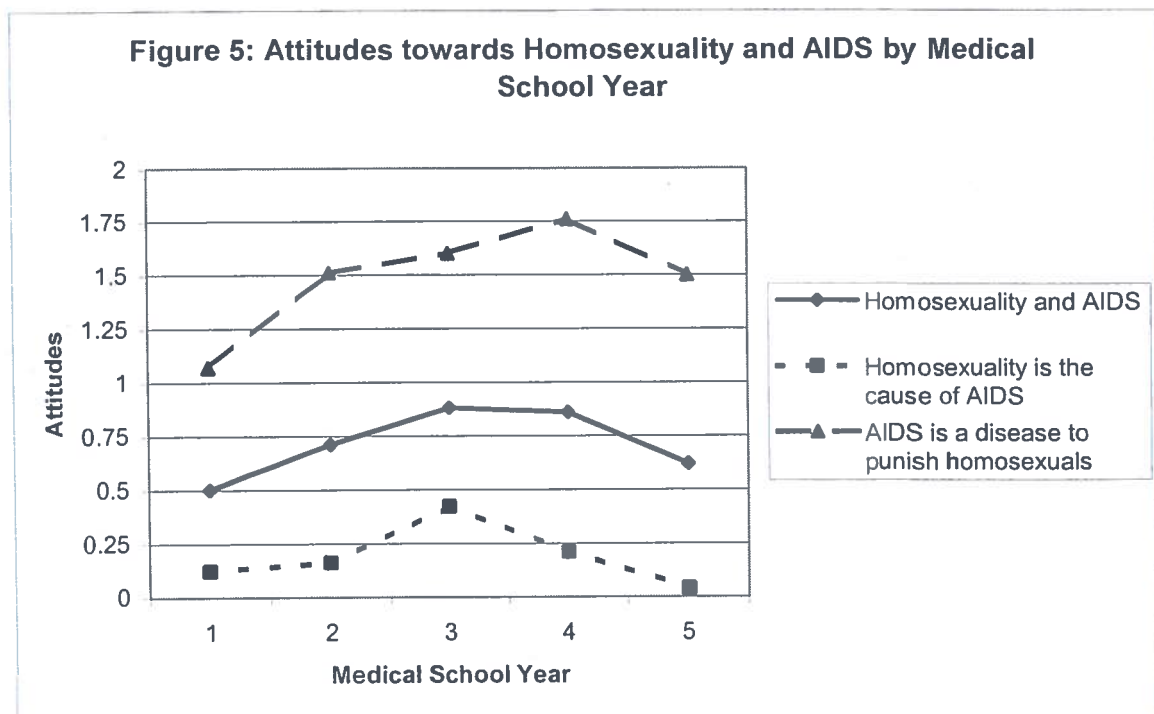


Table 14 and figure 5 depict attitudes towards homosexuality and AIDS by medical school year. Like confidentiality, questions regarding homosexuality and AIDS can be subdivided into homosexuality as the cause of AIDS and AIDS as a punishment for homosexuality. Positive numbers indicate positive attitudes. The mean score for attitudes towards homosexuals and AIDS are all towards the positive side. There are significant differences among years regarding homosexuality and AIDS scale and among years regarding the subscale, AIDS is a disease to punish homosexuals on ANOVA testing, however a linear trend is only significant regarding AIDS as a disease to punish



|  | Medical School Year |       |       |       |       | overall | F    | p-value          | Linear Trend     |
|--|---------------------|-------|-------|-------|-------|---------|------|------------------|------------------|
|  | 1                   | 2     | 3     | 4     | 5     |         |      |                  |                  |
| <b>Scale: Homosexuality and AIDS</b>                     | +0.50               | +0.71 | +0.88 | +0.86 | +0.62 | +0.70   | 4.32 | <b>.002</b>      | .071             |
| <b>Subscale: Homosexuality is the cause of AIDS</b>      | +0.12               | +0.16 | +0.42 | +0.21 | +0.04 | +0.20   | 2.13 | .076             | .954             |
| <b>Subscale: AIDS is a disease to punish homosexuals</b> | +1.07               | +1.51 | +1.60 | +1.76 | +1.50 | +1.45   | 6.75 | <b>&lt;.0005</b> | <b>&lt;.0005</b> |

homosexuals. The attitudes are more positive when asking if AIDS is a punishment for homosexuality than considering homosexuality as a cause for AIDS. Still, in all years of medical school, the mean attitudes are positive, especially when asked about AIDS as punishment where the average response for all years was +1.45 indicating that students slightly agree or agree that AIDS is not a punishment for homosexuality.

Table 15 and figure 6 show comparison of attitudes towards AIDS avoidance, AIDS as self-relevant, AIDS as being offensive morally and AIDS as a threat to medical staff. All four attitude scales have positive attitudes among medical school students in year 1 and are significant for trend. However, while attitudes regarding not avoiding people with AIDS, AIDS as self-relevant and AIDS and morality remain positive and somewhat consistent in figure 6, AIDS as not being a threat to medical staff shows a consistent trend towards negative attitudes among medical students in later years of their education. Overall attitudes for not avoiding people with AIDS, AIDS as self-relevant and not a moral offense are in the slightly positive to positive range. While the overall average indicates a neutral response to AIDS not being a threat to medical staff, attitudes are more negative in later years and start from +0.75 to -0.98 indicating that later years feel that AIDS is a greater threat to the medical staff.

|   | Medical School Year |       |       |       |       | overall | F     | p-value          | Linear trend     |
|---|---------------------|-------|-------|-------|-------|---------|-------|------------------|------------------|
|   | 1                   | 2     | 3     | 4     | 5     |         |       |                  |                  |
| <b>Scale: Not avoid people with AIDS</b>            | +1.39               | +1.27 | +1.28 | +1.11 | +1.12 | +1.26   | 1.99  | .094             | <b>.008</b>      |
| <b>Scale: AIDS is self-relevant</b>                 | +0.88               | +1.24 | +1.30 | +1.22 | +1.35 | +1.18   | 3.93  | <b>.004</b>      | <b>.001</b>      |
| <b>Scale: AIDS is not a threat to medical staff</b> | +0.75               | +0.14 | -0.09 | -0.65 | -0.98 | -0.04   | 47.49 | <b>&lt;.0005</b> | <b>&lt;.0005</b> |
| <b>Scale: AIDS not a moral offense</b>              | +1.20               | +1.36 | +1.47 | +1.47 | +1.49 | +1.38   | 2.82  | <b>.025</b>      | <b>.003</b>      |

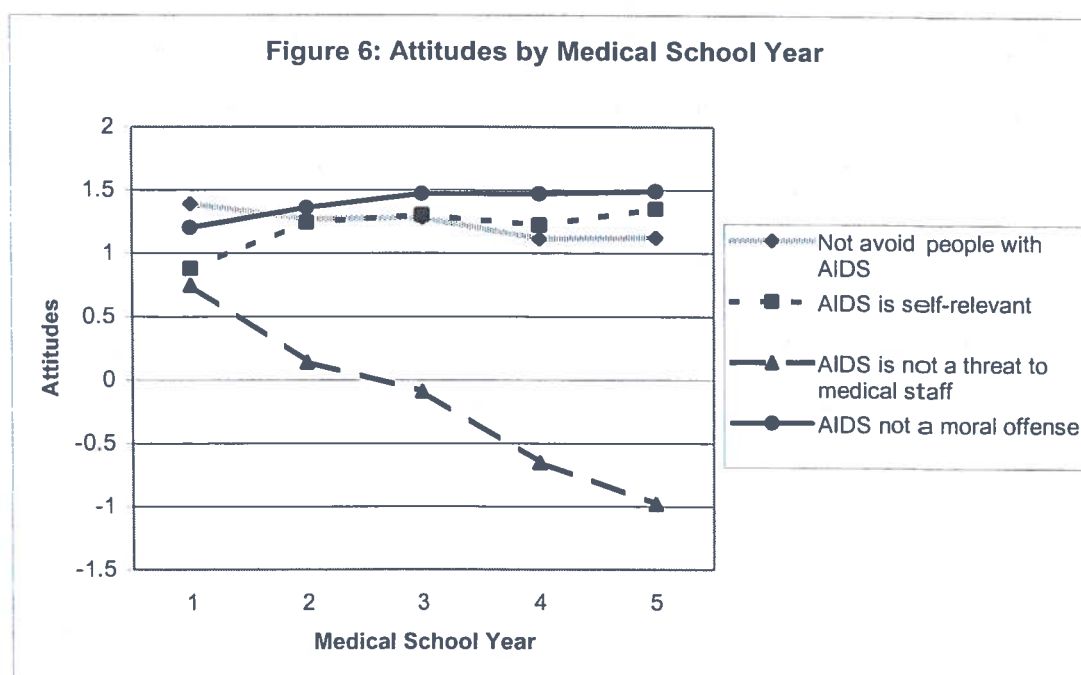


Table 16 and figure 7 describe answers to four questions in the survey instrument pertaining to helping AIDS patients. Average attitude scores for all questions are greater than +1 indicating that students agree with statements regarding the need to help patients with HIV/AIDS. There were no statistically significant differences in responses for all four questions by medical school year based on ANOVA testing. Trend is present only for the question regarding requirement for hospital workers to help. Table 16 and figure 7 indicate that responses were similar for questions regarding social obligation to help AIDS patients, working with AIDS patients is a rewarding experience and that hospital personnel should go out of their way to be helpful to AIDS patients. However, when asked whether or not hospital workers should be required to help AIDS patients, the average score was more positive towards requiring hospital workers to help.

|                                       | Medical School Year |       |       |       |       | overall | F    | p-value | Linear trend |
|---------------------------------------|---------------------|-------|-------|-------|-------|---------|------|---------|--------------|
|                                       | 1                   | 2     | 3     | 4     | 5     |         |      |         |              |
| Question 1: Social obligation to help | +1.18               | +1.10 | +1.24 | +1.14 | +1.00 | +1.14   | .409 | .802    | .499         |

|   | Medical School Year |       |       |       |       | overall | F     | p-value | Linear trend |
|---|---------------------|-------|-------|-------|-------|---------|-------|---------|--------------|
|   | 1                   | 2     | 3     | 4     | 5     |         |       |         |              |
| Question 2: Hospital workers should be required to help                               | +1.28               | +1.47 | +1.64 | +1.36 | +1.65 | +1.48   | 2.294 | .058    | <b>.033</b>  |
| Question 3: Rewarding experience to work with AIDS patients                           | +1.26               | +1.14 | +1.02 | +1.00 | +1.14 | +1.13   | .890  | .470    | .253         |
| Question 4: Hospital personnel should go out of their way to helpful to AIDS patients | +1.10               | +1.00 | +1.19 | +1.09 | +1.07 | +1.09   | .307  | .873    | .898         |

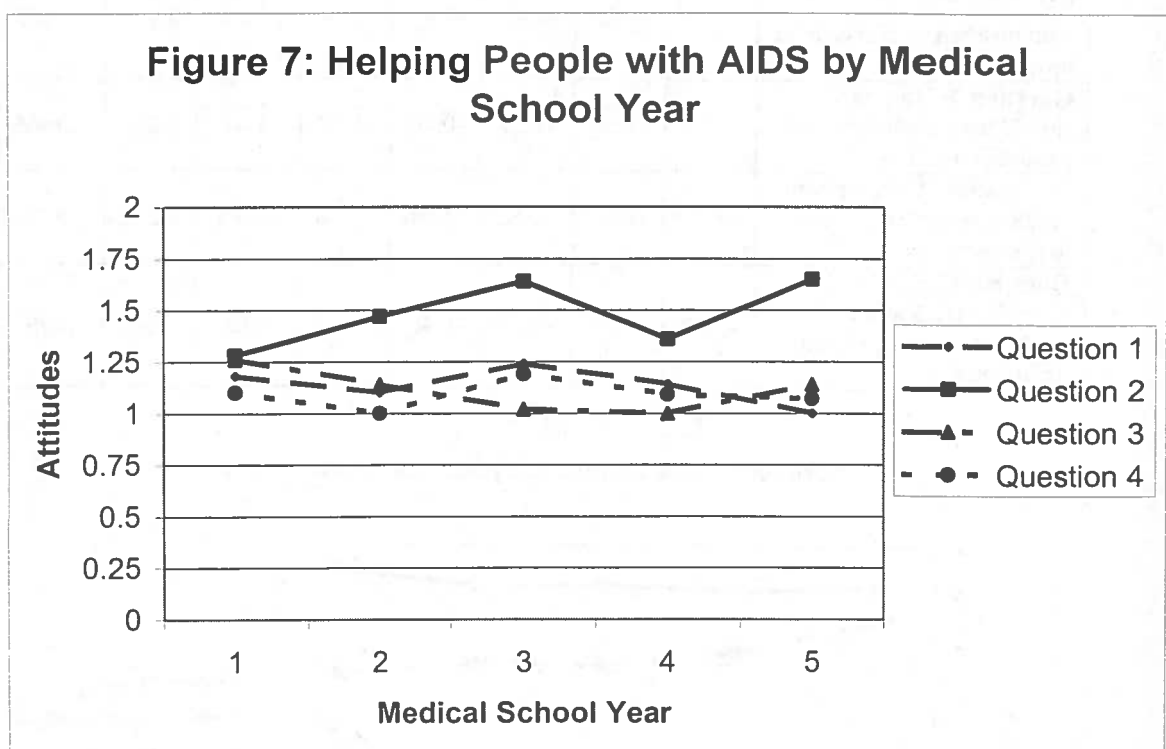
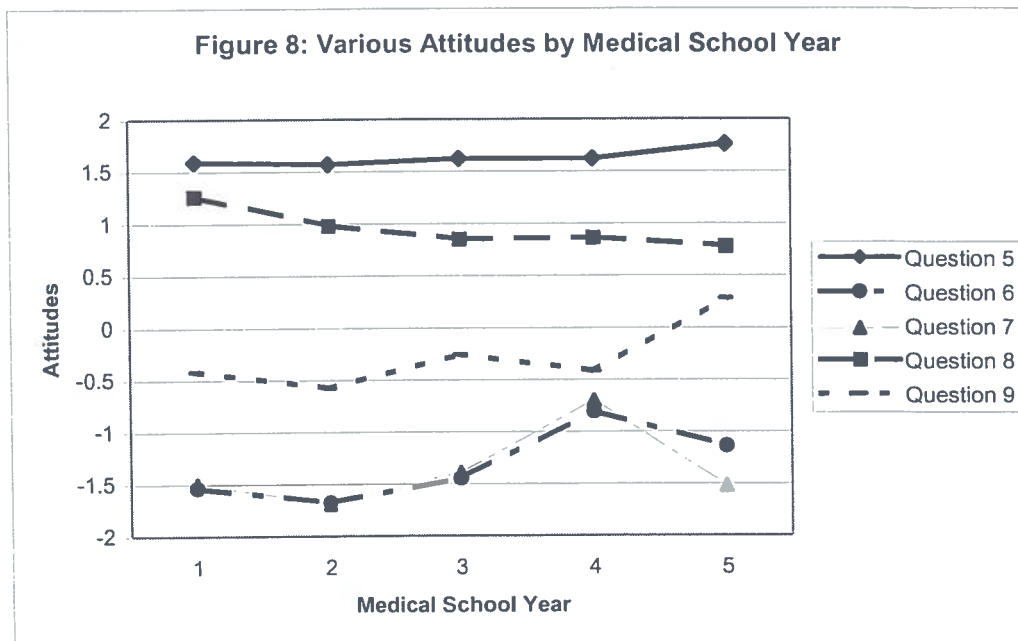


Table 17 and figure 8 indicate that medical students have positive attitudes towards people with AIDS being in hospitals and slightly less positive attitudes towards doctors with AIDS practicing medicine. However, medical students for all years believed that everyone in the hospital should have an AIDS blood test or that the hospital has right to test all patients with AIDS. The response to the AIDS epidemic being

exaggerated can be characterized as slightly negative to neutral for all years except year 5 where the attitudes on average are slightly positive. All questions except AIDS and hospital admission showed significance for trend.

|   | Medical School Year |       |       |       |       | overall | F     | p-value | Linear trend |
|---|---------------------|-------|-------|-------|-------|---------|-------|---------|--------------|
|   | 1                   | 2     | 3     | 4     | 5     |         |       |         |              |
| <b>Question 5:</b> People with AIDS shouldn't be admitted to hospitals                      | +1.59               | +1.57 | +1.62 | +1.62 | +1.76 | +1.62   | .487  | .745    | .233         |
| <b>Question 6:</b> AIDS blood tests should be administered to everyone in hospitals         | -1.54               | -1.68 | -1.45 | -0.81 | -1.14 | -1.39   | 6.909 | <.0005  | <.0005       |
| <b>Question 7:</b> Hospitals should have right to test all patients for AIDS                | -1.50               | -1.69 | -1.39 | -0.70 | -1.52 | -1.42   | 7.290 | <.0005  | .042         |
| <b>Question 8:</b> A doctor with AIDS shouldn't be allowed to treat patients                | +1.27               | +0.98 | +0.85 | +0.86 | +0.78 | +0.98   | 2.212 | .077    | .009         |
| <b>Question 9:</b> People who describe AIDS as an epidemic are exaggerating its true nature | -0.42               | -0.58 | -0.26 | -0.42 | +0.28 | -0.29   | 3.805 | .005    | .002         |



### Attitudes comparison by knowledge

Table 18, figure 9 and figure 10 show changes in attitudes based upon level of correct knowledge about HIV transmission and misconceptions about HIV transmission. All positive numbers indicate positive attitudes and negative numbers indicate negative attitudes. Of all the various attitudes, 7 showed significant differences between low (three or fewer questions correct) and high level (all four answers correct) of correct knowledge regarding transmission: homosexuality is the cause of AIDS (p-value=.014), AIDS as self-relevant (p-value=.016), AIDS as a threat to medical staff (p-value<.0005), AIDS not a moral offense (p-value=.03), hospital workers should be required to help (p-value=.032) and hospital personnel should go out of their way to help (p-value=.01). The other 13 scales and questions did not indicate any significant differences at the .05 alpha level. Of these six attitudes, two had more positive attitudes with lower knowledge: homosexuality as cause of AIDS and AIDS as a medical threat. The other four attitudes had negative attitudes with lower levels of knowledge (see figure 9).

Regarding attitudes and misconceptions about HIV transmission, there were three possible categories: low (six or fewer questions correct), medium (seven questions correct) and high (all 8 questions correct). Using the ANOVA test to compare the three categories by various attitudes, four attitudes indicated significant differences (see figure 10): AIDS as a punishment for homosexuals (p-value=.036), avoiding people with AIDS (p-value<.0005), hospital workers should be required to help (p-value=.007) and doctors with AIDS shouldn't be allowed to treat patients (p-value=.008). Three of the four were significant for trend; only AIDS as punishment for homosexuality was not. In all four of these, attitudes were the most negative for students with the lowest knowledge. The other



15 scales and questions did not show any significant differences among various levels of knowledge about HIV transmission misconceptions.

**TABLE 18: Attitudes by Correct Knowledge and Misconceptions about HIV transmission**

| ATTITUDES   | Correct Knowledge regarding HIV transmission |                               |       |                  | Misconceptions regarding HIV transmission |                                 |                               |       |                  |                  |
|---|--|-------------------------------|-------|------------------|---|---------------------------------|-------------------------------|-------|------------------|------------------|
|   | Low <sup>15</sup><br>(n=119)                 | High <sup>16</sup><br>(n=392) | T     | p-value          | Low <sup>17</sup><br>(n=90)               | Medium <sup>18</sup><br>(n=177) | High <sup>19</sup><br>(n=244) | F     | p-value          | Linear Trend     |
| Confidentiality overall   | +0.02  | -0.02                         | 0.413 | .521             | -0.09                                     | -0.02                           | +0.02                         | .929  | .396             | .180             |
| --Confidentiality as right  | +0.97  | +0.95                         | 0.034 | .854             | +0.94                                     | +0.91                           | +0.98                         | .308  | .735             | .580             |
| --Confidentiality to keep diagnosis private                           | -0.54  | -0.61                         | .542  | .462             | -0.69                                     | -0.58                           | -0.56                         | .752  | .472             | .288             |
| Homosexuality and AIDS  | +0.79  | +0.67                         | 1.823 | .178             | +0.60                                     | +0.73                           | +0.72                         | .843  | .431             | .356             |
| --Homosexuality is cause of AIDS                                      | +0.41  | +0.14                         | 6.041 | <b>.014</b>      | +0.15                                     | +0.21                           | +0.21                         | .091  | .913             | .758             |
| --AIDS a punishment for homosexuals                                   | +1.30  | +1.50                         | 3.070 | .080             | +1.20                                     | +1.54                           | +1.48                         | 3.361 | <b>.036</b>      | .088             |
| Avoiding people with AIDS   | +1.22  | +1.28                         | .487  | .486             | +0.94                                     | +1.27                           | +1.38                         | 9.144 | <b>&lt;.0005</b> | <b>&lt;.0005</b> |
| AIDS is self-relevant   | +0.98  | +1.24                         | 5.852 | <b>.016</b>      | +1.15                                     | +1.26                           | +1.13                         | .807  | .447             | .634             |
| AIDS not a threat to medical staff                                    | +0.31  | -0.15                         | 14.43 | <b>&lt;.0005</b> | -0.21                                     | -0.08                           | +0.04                         | 1.809 | .165             | .058             |
| AIDS not a moral offense  | +1.24  | +1.42                         | 4.723 | <b>.030</b>      | +1.25                                     | +1.36                           | +1.44                         | 1.859 | .157             | .056             |
| Question 1: Social Obligation to help                                 | +1.09  | +1.15                         | .162  | .687             | +0.93                                     | +1.14                           | +1.22                         | 1.287 | .277             | .122             |
| Question 2: Hospital workers should be required to help               | +1.28  | +1.54                         | 4.615 | <b>.032</b>      | +1.14                                     | +1.50                           | +1.58                         | 5.004 | <b>.007</b>      | <b>.004</b>      |
| Question 3: Rewarding experience to work with AIDS patients           | +0.98  | +1.17                         | 2.347 | .126             | +1.00                                     | +1.11                           | +1.18                         | .799  | .450             | .213             |
| Question 4: Hospital personnel should go out of their way...          | +0.81  | +1.18                         | 6.739 | <b>.010</b>      | +0.93                                     | +1.09                           | +1.16                         | .942  | .391             | .184             |
| Question 5: People with AIDS and hospital admission                   | +1.53  | +1.65                         | 1.390 | .239             | +1.57                                     | +1.62                           | +1.64                         | .198  | .820             | .540             |
| Question 6: AIDS blood tests for everyone in hospitals                | -1.43  | -1.38                         | .164  | .686             | -1.60                                     | -1.28                           | -1.39                         | 2.170 | .115             | .344             |
| Question 7: Hospitals should have right to test all patients          | -1.39  | -1.43                         | .141  | .708             | -1.46                                     | -1.38                           | -1.44                         | .163  | .850             | .984             |
| Question 8: A doctor with AIDS shouldn't be allowed to treat patients | +1.00  | +0.97                         | .042  | .838             | +0.60                                     | +0.93                           | +1.15                         | 4.873 | <b>.008</b>      | <b>.002</b>      |
| Question 9: People who describe AIDS as epidemic are exaggerating     | -0.42  | -0.25                         | .992  | .320             | -0.20                                     | -0.14                           | -0.42                         | 1.538 | .216             | .150             |

<sup>15</sup> Three or fewer questions correct

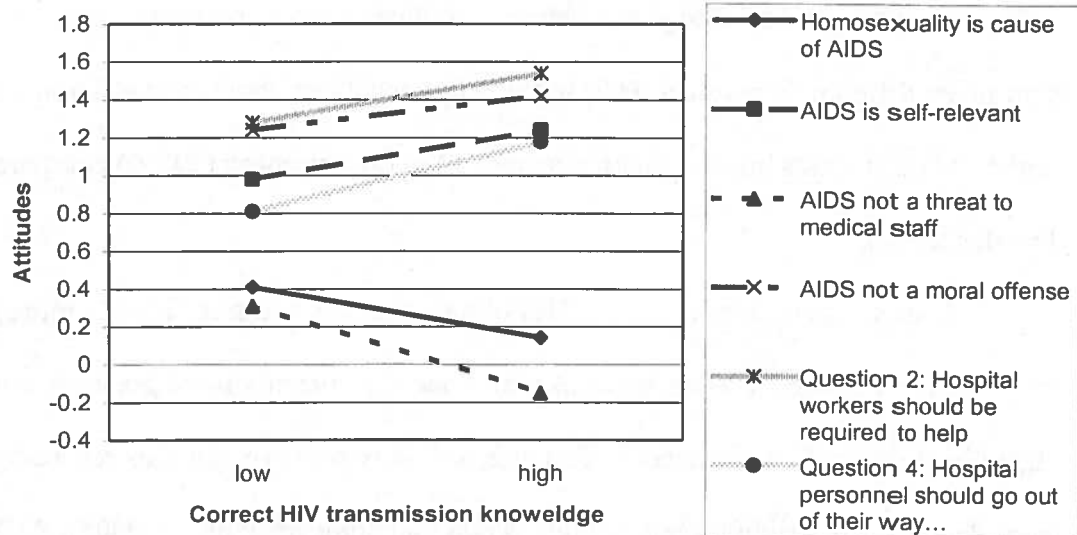
<sup>16</sup> All four questions correct

<sup>17</sup> Six or fewer questions correct

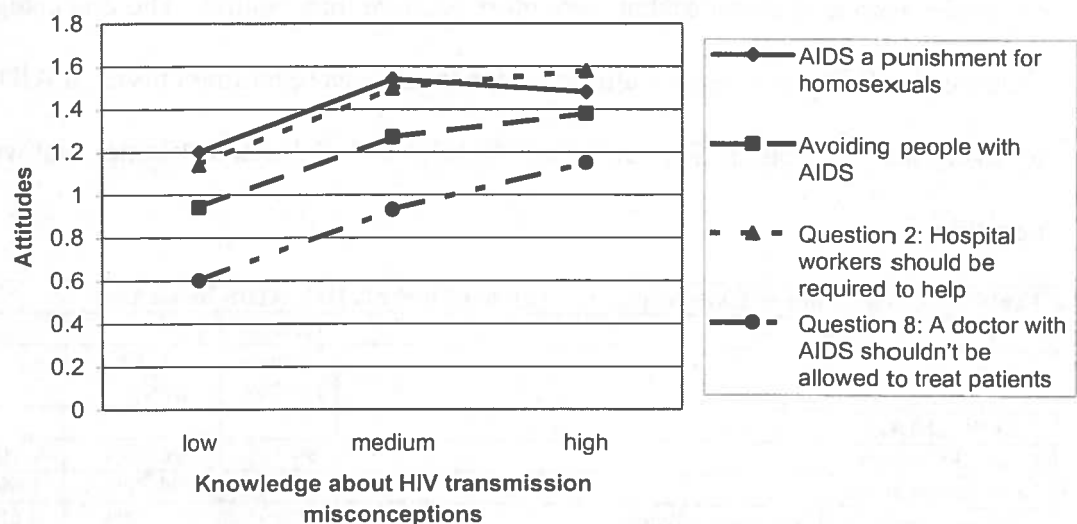
<sup>18</sup> Seven questions correct

<sup>19</sup> All 8 questions correct

**Figure 9: Attitudes and Correct Knowledge about HIV/AIDS Transmission**



**Figure 10: Attitudes and Misconceptions about HIV/AIDS Transmission**



**Attitude and knowledge comparison by gender**

Table 19 shows knowledge and attitude differences by gender. There was no significant difference in the distribution of males and females in various classes based

upon chi-square test (p-value = .596) and therefore the results in table 19 are not controlled for year in medical school. Of the 3 knowledge measures, there was no difference in overall knowledge and correct knowledge about transmission but a significant difference (p-value=.003) in the misconceptions about transmission was noted. Male students got a higher percentage of questions correct (92%) compared to females (89%).

Regarding attitudes related to HIV/AIDS, females had significantly more positive responses in 7 of the attitudes, whereas males had significantly more positive attitudes than females in only one category. Females had more positive attitudes regarding confidentiality as a right (p-value=.009), AIDS and homosexuality (<.0005), AIDS as self-relevant (p-value=.001), AIDS not a moral offense (p-value<.0005) and hospital workers should be required to help people with HIV/AIDS (p-value=.004). All these categories indicated attitudes that were more positive than neutral. The one category in which males had more positive attitudes than males was regarding universal AIDS tests for everyone in hospitals. However, both females and males had attitudes that were negative.

| <b>Table 19: Comparison of Knowledge and Attitudes Towards HIV/AIDS By Gender</b> |                   |                 |       |                  |
|---|-------------------|-----------------|-------|------------------|
|   | <b>Gender</b>     |                 |       |                  |
|   | Female<br>(n=269) | Male<br>(n=242) | T     | p-<br>value      |
| <b>KNOWLEDGE</b>  |                   |                 |       |                  |
| Overall Correct   | 89.33%            | 90.08%          | 1.10  | .294             |
| --Correct transmission  | 93.22%            | 94.32%          | 1.09  | .297             |
| --Misconceptions about transmission   | 88.89%            | 91.94%          | 8.68  | <b>.003</b>      |
| <b>ATTITUDES</b>  |                   |                 |       |                  |
| Confidentiality overall   | +0.016            | -0.044          | 1.05  | .306             |
| --Confidentiality as right  | +1.06             | +0.84           | 6.97  | <b>.009</b>      |
| --Confidentiality to keep diagnosis private                                       | -0.59             | -0.59           | .009  | .925             |
| Homosexuality and AIDS  | +0.83             | +0.55           | 15.48 | <b>&lt;.0005</b> |
| --Homosexuality is cause of AIDS  | +0.31             | +0.07           | 7.06  | <b>.008</b>      |
| --AIDS a punishment for homosexuals   | +1.62             | +1.26           | 15.62 | <b>&lt;.0005</b> |
| Avoiding people with AIDS   | +1.32             | +1.20           | 2.91  | .089             |

|  | <b>Gender</b>             |                         |          |                  |
|--|---------------------------|-------------------------|----------|------------------|
|  | <b>Female<br/>(n=269)</b> | <b>Male<br/>(n=242)</b> | <b>T</b> | <b>p-value</b>   |
| <b>AIDS is self-relevant</b>   | +1.33                     | +1.01                   | 12.08    | <b>.001</b>      |
| <b>AIDS not a threat to medical staff</b>                                    | -0.03                     | -0.05                   | .05      | .824             |
| <b>AIDS not a moral offense</b>  | +1.52                     | +1.22                   | 18.42    | <b>&lt;.0005</b> |
| <b>Question 1: Social Obligation to help</b>                                 | +1.18                     | +1.10                   | .343     | .559             |
| <b>Question 2: Hospital workers should be required to help</b>               | +1.59                     | +1.36                   | 5.49     | <b>.02</b>       |
| <b>Question 3: Rewarding experience to work with AIDS patients</b>           | +1.19                     | +1.06                   | 1.53     | .217             |
| <b>Question 4: Hospital personnel should go out of their way...</b>          | +1.06                     | +1.13                   | .312     | .576             |
| <b>Question 5: People with AIDS and hospital admission</b>                   | +1.68                     | +1.55                   | 1.92     | .167             |
| <b>Question 6: AIDS blood tests for everyone in hospitals</b>                | -1.53                     | -1.23                   | 8.31     | <b>.004</b>      |
| <b>Question 7: Hospitals should have right to test all patients</b>          | -1.44                     | -1.41                   | .059     | .807             |
| <b>Question 8: A doctor with AIDS shouldn't be allowed to treat patients</b> | +1.02                     | +0.92                   | .503     | .479             |
| <b>Question 9: People who describe AIDS as epidemic are exaggerating</b>     | -0.33                     | -0.23                   | .442     | .507             |

#### **Attitude and knowledge comparison by religion and language**

Because the demographics for religion was divided mostly between Sikhs and Hindus and for language between Punjabi and Hindi, there were the only factors analyzed. Using chi-squared test, there were no differences in the sample for religion (p-value=.435) or language (p-value= .749) by medical school year.

Overall, there were only two significant differences when comparing students who spoke Punjabi versus Hindi and one significant difference in religion. Hindi speaking students had more positive attitudes regarding homosexuality as a cause of AIDS (p-value=.014), whereas Punjabi speaking students had more positive attitudes regarding avoidance of people with AIDS (p-value=.017). Those students who identified themselves as Sikh had more positive attitudes regarding avoidance of people with AIDS (p-value=.024).

|  | Language        |                 |       |             | Religion           |                     |      |             |
|--|-----------------|-----------------|-------|-------------|--------------------|---------------------|------|-------------|
|  | Punj<br>(n=405) | Hindi<br>(n=96) | T     | p-<br>value | Sikhism<br>(n=211) | Hinduism<br>(n=271) | T    | p-<br>value |
| <b>KNOWLEDGE</b>   |                 |                 |       |             |                    |                     |      |             |
| <b>Overall Correct</b>   | 89.74%          | 89.58%          | 0.029 | .865        | 89.84%             | 89.62%              | .093 | .761        |
| <b>--Correct transmission</b>  | 93.70%          | 93.75%          | 0.001 | .973        | 93.89%             | 93.41%              | .196 | .658        |
| <b>--Misconceptions about transmission</b>                                   | 90.71%          | 88.80%          | 2.04  | .154        | 90.33%             | 90.57%              | .053 | .819        |
| <b>ATTITUDES</b>   |                 |                 |       |             |                    |                     |      |             |
| <b>Confidentiality overall</b>   | -0.027          | +0.031          | .580  | .447        | +0.02              | -0.06               | 1.47 | .226        |
| <b>--Confidentiality as right</b>  | +0.959          | +0.909          | .220  | .639        | +1.02              | +0.90               | 2.09 | .149        |
| <b>--Confidentiality to keep diagnosis private</b>                           | -0.616          | -0.510          | 1.23  | .268        | -0.58              | -0.62               | .264 | .608        |
| <b>Homosexuality and AIDS</b>  | +0.672          | +0.802          | 1.92  | .166        | 0.70               | 0.71                | .002 | .966        |
| <b>--Homosexuality is cause of AIDS</b>                                      | +0.137          | +0.428          | 6.04  | <b>.014</b> | +0.16              | +0.24               | .742 | .390        |
| <b>--AIDS a punishment for homosexuals</b>                                   | +1.465          | +1.39           | .415  | .520        | +1.52              | +1.41               | 1.47 | .226        |
| <b>Avoiding people with AIDS</b>   | +1.31           | +1.09           | 5.70  | <b>.017</b> | +1.35              | +1.18               | 5.09 | <b>.024</b> |
| <b>AIDS is self-relevant</b>   | +1.18           | +1.25           | .379  | .538        | +1.23              | +1.12               | 1.28 | .259        |
| <b>AIDS not a threat to medical staff</b>                                    | -0.02           | -0.07           | .123  | .726        | -0.05              | -0.02               | .048 | .826        |
| <b>AIDS not a moral offense</b>  | +1.38           | +1.41           | .672  | .413        | +1.44              | +1.32               | 2.49 | .115        |
| <b>Question 1: Social Obligation to help</b>                                 | +1.15           | +1.11           | .063  | .802        | +1.00              | +1.25               | 3.65 | .057        |
| <b>Question 2: Hospital workers should be required to help</b>               | +1.47           | +1.57           | .672  | .413        | +1.54              | +1.48               | .371 | .543        |
| <b>Question 3: Rewarding experience to work with AIDS patients</b>           | +1.20           | +0.95           | 3.623 | .058        | +1.09              | +1.10               | .210 | .657        |
| <b>Question 4: Hospital personnel should go out of their way...</b>          | +1.13           | +1.04           | .328  | .567        | +1.10              | +1.10               | <.01 | .989        |
| <b>Question 5: People with AIDS and hospital admission</b>                   | +1.61           | +1.69           | .389  | .533        | +1.64              | +1.61               | .142 | .707        |
| <b>Question 6: AIDS blood tests for everyone in hospitals</b>                | -1.39           | -1.45           | .235  | .628        | -1.39              | -1.44               | .189 | .664        |
| <b>Question 7: Hospitals should have right to test all patients</b>          | -1.40           | -1.52           | .824  | .361        | -1.43              | -1.44               | .007 | .933        |
| <b>Question 8: A doctor with AIDS shouldn't be allowed to treat patients</b> | +1.01           | +0.85           | .997  | .319        | +1.05              | +0.93               | .749 | .387        |
| <b>Question 9: People who describe AIDS as epidemic are exaggerating</b>     | +0.32           | -0.12           | 1.15  | .285        | -0.25              | -0.36               | .512 | .475        |

### Attitudes and knowledge comparison by background (rural/urban)

When comparing students by urban or rural background, there were only four significant differences (Table 21). Students from a rural background had less overall knowledge than urban students (p-value=.006), a more positive attitude towards keeping an HIV/AIDS diagnosis private (p-value=.018), a more negative attitude regarding the belief that homosexuality is the cause of AIDS (p-value=.01) and more positive attitude regarding blood tests for all hospital patients. Two attitudes, the requirement for hospital workers to help people with HIV/AIDS (p-value=.05) and confidentiality overall (p-value=.062), were close to achieving significance at the .05 alpha level.

| TABLE 21: Comparison about Knowledge and Attitudes by Rural or Urban Background |                                |         |
|---|--------------------------------|---------|
|   | Urban/Rural differences        |         |
|   | Coefficient sign <sup>20</sup> | P-value |
| <b>KNOWLEDGE</b>  |                                |         |
| Overall Correct   | Negative                       | .006    |
| --Correct transmission  | Negative                       | .510    |
| --Misconceptions about transmission   | Negative                       | .114    |
| <b>ATTITUDES</b>  |                                |         |
| Confidentiality overall   | Positive                       | .062    |
| --Confidentiality as right  | Positive                       | .798    |
| --Confidentiality to keep diagnosis private                                     | Positive                       | .018    |
| Homosexuality and AIDS  | Negative                       | .523    |
| --Homosexuality is cause of AIDS  | Positive                       | .526    |
| --AIDS a punishment for homosexuals   | Negative                       | .010    |
| Avoiding people with AIDS   | Positive                       | .405    |
| AIDS is self-relevant   | Negative                       | .964    |
| AIDS not a threat to medical staff  | Positive                       | .982    |
| AIDS not a moral offense  | Negative                       | .610    |
| Question 1: Social Obligation to help   | Negative                       | .945    |
| Question 2: Hospital workers should be required to help                         | Negative                       | .050    |
| Question 3: Rewarding experience to work with AIDS patients                     | Positive                       | .936    |
| Question 4: Hospital personnel should go out of their way to help               | Positive                       | .158    |
| Question 5: People with AIDS and hospital admission                             | Negative                       | .565    |
| Question 6: AIDS blood tests for everyone in hospitals                          | Positive                       | .027    |
| Question 7: Hospitals should have right to test all patients                    | Negative                       | .714    |
| Question 8: A doctor with AIDS shouldn't be allowed to treat patients           | Positive                       | .628    |
| Question 9: People who describe AIDS as epidemic are exaggerating               | Positive                       | .449    |

<sup>20</sup> "positive coefficient" indicates a more knowledge or positive attitude for students with rural background and a "negative coefficient" indicates less knowledge or a more negative attitude of students from rural background

## DISCUSSION

The major findings regarding Indian medical students' knowledge and attitudes can be summarized as follows:

1. Knowledge regarding various aspects of HIV/AIDS including transmission and prevention is good. For almost all the questions, more than 80% of the students answered correctly.
2. Knowledge about correct modes of transmission such as sexual contact, hypodermic syringes and mother-to-fetus is excellent in all years of medical school. Knowledge about transmission by men who have sex with men is lower in earlier years than later years of medical school and explains much of the difference in the trend towards increasing knowledge for students in years 3-5.
3. Knowledge about transmission misconceptions is good, although it is less than knowledge regarding correct modes of transmission.
4. Students believe confidentiality as a right, homosexuality is not a punishment, people with AIDS should not be avoided and health care workers should help PWHA.
5. Students are neutral about homosexuality as a cause of AIDS and AIDS epidemic as being exaggerated.
6. Students do not believe in confidentiality to keep diagnosis private and believe agree with mandatory testing in a hospital setting.
7. Students in later years are more likely to perceive HIV as a threat to the medical staff.

8. Six of the 19 attitudes analyzed showed significant differences between low and high levels of correct knowledge. Students with higher correct knowledge were more likely to believe that AIDS is self-relevant, AIDS is not a moral offense, hospital workers' should be required to help and hospital workers should go out of their way for PWHA. However, students with more correct knowledge were also likely to believe that homosexuality is the cause of AIDS and AIDS is a threat to the medical staff.
9. Students with fewer misconceptions about transmission have a trend towards more positive attitudes in all four of the attitudes that were significant.
10. Female students have more misconceptions about HIV transmission but generally have more positive attitudes.
11. Language, religion and background are not associated with clear trends regarding knowledge and attitudes.

The high level of knowledge about transmission among all students on three of the four questions indicates that students may know about HIV/AIDS transmission outside of medical school. While both mother-to-fetus transmission and transmission via sexual intercourse between men were significant for trend, the p-values were .032 and <.0005 respectively. Since the 1<sup>st</sup> year medical students have had no medical education, they have received all their knowledge through other means. Over 95% of the 1<sup>st</sup> years knew transmission for all modes except sex between men, where only 60% knew the correct answer. Increased knowledge across years regarding this question may be indicative of good teaching about transmission.



The same cannot be said about misconceptions. For three out of the eight questions, 14% of more students from all years did not know the correct answer. None of these three questions showed a positive trend across years. Hence, medical school may need to focus more attention on alleviating the misconceptions. If 15% of the students think shaking hands can transmit HIV/AIDS, they are probably less likely to treat people with HIV/AIDS regardless of their knowledge about correct transmission.

Comparing this study to other studies on medical students and health-care professionals showed a consistent trend towards good correct knowledge about transmission and lower level of knowledge regarding misconceptions. For both correct modes of transmission and misconceptions, Indian medical students did not have a consistent deviation from Strunin's study<sup>23</sup> on American medical students in 1987 even though there were some differences. The trend towards high knowledge about correct modes of transmission and lower level of knowledge for misconceptions was similar to a study done by Li *et al*<sup>21</sup> in China in 1992, Najem's<sup>40</sup> study of Nigerian medical students and Al-Jabri and Al-Abri's study on medical students in Oman.<sup>17</sup> Medical students in this study had about the same knowledge as Pakistani medical students from Ali's study in 1995 in most categories except mother-to-child transmission where 99% of Indian medical students knew this to be mode of transmission compared to 77% of Pakistani medical students. Conversely, almost 100% Pakistani medical students knew that AIDS cannot be transmitted by hand shakes compared to 85% of Indian medical students. The Indian medical students in this study did much better than Indian nursing students in previous studies<sup>26, 29, 49</sup> and were similar to Indian health-care professionals study by Branchman *et al.* except in mother-to-fetus transmission where 99% knew the correct

answer compared to 88% in Branchman's study. The two studies were also similar in terms of misconceptions. Compared to the only previous study that provided data on Indian medical students by Dobe in 1995, students in this study did better in both misconceptions and correct modes of transmission<sup>25</sup>.

The results from this study and others may indicate that while medical school is a place to learn about modes of transmission and the science behind a disease, it may not be alleviating the misconceptions some students carry about a disease such as HIV/AIDS.

Attitudes of medical students may be broken into three broad categories: AIDS as a moral punishment, helping people with HIV/AIDS, and mandatory testing in hospital setting. Overall, students felt that AIDS is not a moral punishment generally or in the case of homosexuality. This outcome is positive because it does not indicate overt forms of stigma and discrimination towards PWHA. However, since attitudes were neutral towards homosexuality as the cause of AIDS, a large portion of students believe that homosexuality causes AIDS. This may describe the second part of the vicious cycle of stigma and discrimination where PWHA are seen as generally marginalized groups and that marginalized groups such as homosexuals are responsible for HIV/AIDS.<sup>5</sup>

In contrast, medical students had overall very positive attitudes towards all mechanisms towards in treating and helping PWHA. They not only felt that AIDS patients should be admitted to hospitals but also felt that it was a social obligation to help PWHA, hospital workers should be required to help PWHA and treating AIDS patients can be a rewarding experience. Such attitudes are important in making hospitals more open to all patients and are contrary to the widespread stigma and discrimination noticed

by Bharat in hospital settings.<sup>6</sup> However, it must be remembered that her study looked at behavior, not just attitudes, and not just the medical staff but at all hospital staff.

The finding that many students believe in mandatory testing in the hospital setting or allowing the hospital to test those they wish may reflect the underlying fear of medical students about contracting HIV, necessity of identifying PWHA for the benefit of those affected with this disease or or a combination of the two. Slightly more positive results were found in Kopacz's study of American medical students where 46% indicated patients coming into hospitals should be tested.<sup>15</sup> However, such thinking may describe the lack of understanding about various mechanisms by which these measures hinder access to care for PWHA. If these beliefs are an expression of fear, they may be used to discriminate against PWHA similar to the findings in Bharat's study.<sup>6</sup> This must be considered in light of the finding that medical students, from year 1-5 show a trend towards a belief that AIDS is a threat to the medical staff. Many studies found that health care workers think that treating AIDS patients endangers their health including Kopacz's study where 62% shared this belief. Studies done in India by Kudbe *et al.* and Lal *et al.* show that 93% and 81% of nursing students feel treating PWHA endangers their health, respectively.

Few previous studies looked at an association between knowledge and attitude. Although it might be hypothesized that correct knowledge about transmission may lead to more positive attitudes, this was not always the case. Knowledge about transmission, especially without addressing the fears that could result from that knowledge, may actually lead to worsening of attitudes. This may have been manifested in the fact that students who were in later years of their education and students with more correct

knowledge actually had worse attitudes regarding HIV being a threat to the medical staff and homosexuality as a cause of AIDS. It is true that two modes of HIV transmission are hypodermic syringes and men who have sex with men. However, it must also be told that chances of transmission via hypodermic syringes are low when using proper precautions and that the spread of HIV in India is mainly via heterosexual sex and requires appropriate measures to stop further transmission instead of blame.

While this study had many strengths including a large sample size, high participation rate, data from all five years of medical school and data on many forms of knowledge and attitudes, the limitations of the study must also be evaluated. Specifically, the study design was a cross-sectional design, which limits the comparisons that can be made across medical school years because we cannot be sure about the baseline attitudes and behaviors. Because all subjects were from one study site, it is difficult to generalize the results of this study beyond the region of Punjab where the study took place. Many factors differentiate Punjab from other parts of India. Punjab's is one of the richest states in India, has a population distribution different from the rest of the country and has a very low HIV prevalence. Punjab's population is 65% Sikh, and this sample had a 43% Sikh population however Sikhism makes up only 2% of the Indian population as a whole. According to the Indian system of classification for prevalence, Punjab is a group III state indicating that it is among the states with the lowest HIV prevalences.<sup>61</sup> Other limitations result from study design. Students' responses were on paper and may not reflect their true behavior. Reporting bias can exist in many ways. Students may respond more positively than their true beliefs. Few students have had any contact with PWHA; therefore they may not be able to assess their attitudes properly.

While this study is a good first step in understanding Indian medical students' knowledge and attitudes, future research with better techniques will be required to accurately assess their questions. For example, a better study design to assess attitudes may be to randomly divide students into various groups and given clinical vignettes with either a patient with AIDS or another disease that is less stigmatizing. It may also be interesting to follow the 1<sup>st</sup> year medical students in this study through the course of their medical education and see the changes in their attitudes over time as well as repeat the study at other sites in Punjab and India for greater generalizability.

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## APPENDIX A: Questionnaire and Code Book

*In this questionnaire, AIDS and HIV are used interchangeably.*

### Part I: In this part, you will answer some questions about yourself.

1. Sex

- a. Male
- b. Female

A = 1  
B = 0  
Missing = .

2. Year in Medical School/College

- a. 1<sup>st</sup> year
- b. 2<sup>nd</sup> year
- c. 3<sup>rd</sup> year
- d. 4<sup>th</sup> year
- e. 5<sup>th</sup> year

A=1  
B=2  
C=3  
D=4  
E=5  
Missing = .

3. What is your age

- a. 18 or below
- b. 19
- c. 20
- d. 21
- e. 22 or above

A=18  
B=19  
C=20  
D=21  
E=22  
Missing = .

4. Before you entered medical school, did you live in a rural (i.e. village) or urban (i.e. city) setting?

- a. rural
- b. urban

A = 1  
B = 0  
Missing = .

5. Which religion do you observe?

- a. Sikhism
- b. Hinduism
- c. Christianity
- d. Islam
- e. Other

A=Sikh  
B=Hindu  
C=Christian  
D=Muslim  
E=Other  
Missing = .

6. What is the primary language you use to communicate at home with your family (select only one)?

- a. Punjabi
- b. Hindi
- c. English
- d. Other

A=punjabi  
B=Hindi  
C=English  
D=Other  
Missing=.

7. What is your primary source of HIV/AIDS information (select only one)?

- a. Newspaper
- b. Television
- c. Scientific journals
- d. Radio
- e. Other

A=newspaper  
B=television  
C=sci\_journal  
D=radio  
E=other  
Missing = .

8. Have you ever treated/worked near a patient who you knew had HIV/AIDS in a hospital setting?

A = 1  
B = 0  
Missing = .

- a. Yes
- b. No

9. Have you ever personally known anyone with AIDS?

- a. Yes
- b. No

A = 1  
B = 0  
Missing = .

10. If you answered, "Yes" to the previous question, select the answer or choice that best describes your relationship to him/her. If you know more than one person with AIDS, and these persons have different relationships to you, you may mark more than one choice.

- a. family member
- b. fellow student
- c. friend
- d. other
- e. I don't know anyone with AIDS

A=family  
B=student  
C=friend  
D=other  
E=none  
Missing = .

11. So far in my medical education, there has been sufficient focus on the HIV/AIDS.

- a. Agree
- b. Slightly Agree
- c. Neither agree of disagree
- d. Slightly Disagree
- e. Disagree

A=2  
B=1  
C=0  
D=-1  
E=-2  
Missing = .

12. I believe that I have sufficient knowledge about HIV/AIDS to treat people living with HIV/AIDS.

- a. Agree
- b. Slightly Agree
- c. Neither agree of disagree
- d. Slightly Disagree
- e. Disagree

A=2  
B=1  
C=0  
D=-1  
E=-2  
Missing = .

Part II: For the following questions, please indicate whether you think each statement is true/false or don't know. On your answer sheet:

a = true

b = false

c = don't know

Here, correct answer = 1; not correct = 0; don't know = 9. Those that have true as the correct answer are not marked. Those with false as the correct answer are boxed!

13. The AIDS virus can be transmitted through sexual intercourse between a man and a woman.
14. A man with the AIDS virus can pass it on to another man through sexual intercourse.
15. A pregnant woman who has the AIDS virus can give it to her baby.
16. There is a vaccine available to the public that protects a person from getting the AIDS virus.
17. A person who has the AIDS virus can look well and healthy.
18. Only a person who looks sick can spread the AIDS virus.
19. Condoms reduce the risk of transmitting the AIDS virus.
20. Most people who have AIDS show signs of getting sick right away.
21. You can get AIDS by being bitten by a mosquito that has bitten someone with AIDS.
22. Birth control pills protect a woman from getting the AIDS virus.
23. AIDS only gets transmitted in homosexual sex.
24. Hypodermic syringes that are not properly cleaned can transmit the AIDS virus
25. AIDS can be transmitted by using a toilet used by an infected person
26. AIDS is not life-threatening (it does not lead to death)
27. People can catch AIDS by giving CPR to an individual with AIDS.
28. AIDS can be transmitted by being in the same room with an AIDS patient.
29. AIDS can be transmitted by kissing an individual with AIDS.
30. A person can get AIDS from fellow workers at a job.
31. AIDS can be transmitted by sharing eating utensils with an AIDS patient.
32. AIDS cannot be transmitted by shaking hands with an AIDS patient.
33. The virus that causes AIDS is ssDNA virus.

**Part III: The items listed below refer to people's beliefs about the topic of AIDS. We are interested in whether you agree or disagree with these statements. As such, there are no right or wrong answers, only your own individual opinions. On your answer sheet:**

**a = agree**

**b = slightly agree**

**c=neither agree or**

**d=slightly disagree**

**e=disagree**

For all remaining questions, almost all questions are coded: 2=agree, 1=slightly agree, 0=neither, -1=slightly disagree and -2= slight disagree. This system is reversed on a few questions that do not fit with the subscales related to attitudes. Those questions with the reverse style are boxed!!!

34. I don't want to talk or interact with anyone with AIDS.
35. We have a social obligation to help those with AIDS.
36. People who describe AIDS as an epidemic are exaggerating its true nature.
37. As always, science will eventually find a cure for AIDS.
38. AIDS is really not my problem; it's somebody else's.
39. AIDS is not my problem.
40. AIDS is not a threat to me.
41. The AIDS crisis is really removed from me.
42. People who die from AIDS are being punished for their past wrongs.
43. People are blowing the issue of AIDS way out of proportion.
44. People should test themselves for AIDS.
45. People who get AIDS can blame only themselves.
46. Only people from Bombay (Mumbai) have been affected by AIDS.
47. Part of the problem with AIDS is that people don't talk about it.
48. The AIDS epidemic will soon be a financial burden on the Indian economy.
49. You can't teach young children about AIDS.
50. Men and women don't really need to discuss AIDS with each other.
51. AIDS has become a significant problem in prison populations.
52. A cure for AIDS is inevitable.
53. AIDS is easy to get.
54. AIDS may eventually bankrupt the Indian health care system.
55. People with AIDS should not be allowed to work in schools.
56. People with AIDS should not be allowed to handle food in restaurants.
57. People with AIDS should not be allowed to work with patients in hospitals.
58. AIDS is not as big a problem as the media (ex. TV, newspapers, radio) suggests. I am not the kind of person who is likely to get AIDS.

59. I am less likely than most people to get AIDS.

**a = agree**

**b = slightly agree**

**c=neither agree or disagree**

**d=slightly disagree**

**e=disagree**

60. I'd rather get any other disease than AIDS.

61. I've heard enough about AIDS, and I don't want to hear any more about it.

62. Living in Bombay (Mumbai) would increase anyone's chances of getting AIDS.

63. If a free blood test was available to see if you have the AIDS virus, I would take it.

64. AIDS is God's punishment for immorality.

65. AIDS patients offend me morally.

66. If I knew someone with AIDS, it would be hard for me to continue that relationship.

67. Children with AIDS should not be allowed to attend public schools.

**Part IV: The items listed below refer to people's beliefs about the topic of AIDS. We are interested in whether you agree or disagree with these statements. As such, there are no right or wrong answers, only your own individual opinions. On your answer sheet:**

**a = agree**

**b = slightly agree**

**c=neither agree or disagree**

**d=slightly disagree**

**e=disagree**

68. The family of AIDS victims ought to have the right to participate in medical decisions.

69. People with AIDS should not be admitted to medical hospitals.

70. Doctors can catch AIDS if they treat patients with this disease.

71. AIDS patients will contaminate medical staff and other hospital patients.

72. It's important to maintain a safe blood banking system, because of AIDS.

73. Health care workers can catch AIDS in medical situations.

74. Medicine has a test to identify whether a person has AIDS.

75. The medical test for AIDS will not always identify a recently infected person.

76. There's a vaccine that prevents the spread of AIDS.

77. There are effective medical treatments for those with AIDS.

78. Doctors and nurses are at risk for catching AIDS from infected patients.

79. No medical assistance person has ever caught AIDS from a patient.

80. AIDS blood tests should be administered to everyone in hospitals.

81. Hospitals should have the right to test all patients for AIDS.

82. A doctor with AIDS should not be allowed to treat patients.

83. A hospital worker should not be required to work with AIDS patients.

**a = agree**

**b = slightly agree**

**c=neither agree or disagree**

**d=slightly disagree**

**e=disagree**

84. AIDS patients have as much right to quality medical care as anyone else.

85. AIDS makes a medical job a high-risk occupation.

86. Dealing with AIDS patients is different from dealing with other types of patients.

87. The high cost of treating AIDS patients is unfair to other people in need of care.

88. Working with AIDS patients can be a rewarding experience for medical personnel.

89. Hospital personnel should go out of their way to be helpful to a patient with AIDS.

90. People with AIDS can be cured if they seek medical attention.

91. To get AIDS, a person must have intimate sexual or blood contact with an AIDS carrier.

92. The disease AIDS can be transmitted by the exchange of blood (or blood products).

93. AIDS has been identified in hemophiliacs (people who bleed easily).

94. AIDS has been linked to blood transfusion.

95. AIDS is probably in most of the country's blood supply.

96. A blood test can identify testing for AIDS.

97. People get AIDS from blood transfusion.

98. Homosexuality is the cause of AIDS.

99. People with AIDS don't really have a right to confidentiality about their disease.

100. People ought to notify their employees if they contact AIDS.

101. If it weren't for homosexuals, we wouldn't have the disease AIDS.

102. AIDS victims have a right to privacy about their lives and lifestyles.

103. Businesses should have the right to fire people if they have AIDS.

104. The sexual promiscuity of homosexuals is the reason why AIDS exists.

105. The government should be able to test anyone for AIDS.

106. AIDS is really a punishment sent from God for the sinful acts of homosexuality.

107. Having a co-worker with AIDS would not bother me.

108. AIDS is God's way of getting rid of homosexuals.

109. Identifying those people with AIDS should be a high priority.

110. Employees have a right to know if any of their co-workers have AIDS.

## APPENDIX B: Consent form

### UNIVERSITY OF CALIFORNIA

Berkeley • Davis • Irvine • Los Angeles • Riverside • San Diego • San Francisco



Santa Barbara • Santa Cruz

HEALTH AND MEDICAL SCIENCES

570 UNIVERSITY HALL #1190  
BERKELEY, CALIFORNIA 94720-1190

Dear Medical Students,

My name is Harkawal S. Hundal. I am a medical student in the Joint Medical Program between the School of Medicine at University of California at San Francisco and the School of Public Health at University of California at Berkeley in the United States.

The purpose of this research is to better understand what you know about HIV/AIDS transmission as well as your personal beliefs regarding this disease and those people who carry this disease. We ask that you answer each question truthfully. If you choose to take part in my research, you will take a single survey/questionnaire that lasts about 35 minutes. The survey will take place in this classroom. There are no known risks to you from taking part in this research, and no foreseeable direct benefit to you either. Some questions may evoke uncomfortable thoughts and ideas. It is hoped that the research can be used to improve the medical curricula such so that the curricula incorporates the information learned from this research.

All the survey answer sheets we obtain from you will not have any identifiable information that will connect you to the survey. Only I will be looking at the survey answers and entering the data into the computer. They will not be shared with your faculty. The data from the questionnaire will be available to others but you will not be connected to the data in any identifiable way. Once all data has been entered, I will keep the questionnaire answer forms that you fill out in a locked file cabinet and at a later date discard all questionnaires in a safe manner.

Your participation in this research is voluntary. You are free to refuse to take part. Whether you take part in this questioner or not, your marks for medical school will not be affected.

If you have any questions about the research, you may telephone me, Harkawal S. Hundal, at 011-510-642-5671 or contact me by e-mail: [hshundal@socrates.berkeley.edu](mailto:hshundal@socrates.berkeley.edu). By completing the questionnaire, you are agreeing to participate in this research project. Please keep this form for your future reference.

If you have any question regarding your treatment or rights as a participant in this research project, please contact the University of California at Berkeley's, Committee for Protection of Human Subjects at 011-510-642-7461, [subjects@uclink.berkeley.edu](mailto:subjects@uclink.berkeley.edu).

Thank you,  
Harkawal S. Hundal



