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FACTORS INFLUENCING NURSES' COMPLIANCE
WITH UNIVERSAL PRECAUTIONS

by
Joel D. Ray



A Thesis Presented In Partial Fulfillment
of the Requirements for the Degree
Master of Science

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FACTORS INFLUENCING NURSES' COMPLIANCE
WITH UNIVERSAL PRECAUTIONS

by
Joel D. Ray

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ABSTRACT

The purpose of this study was to identify factors that affect nurses' compliance with the Center for Disease Control's (CDC) recommended precautions to prevent acquisition of human immunodeficiency virus (HIV) infections by health care workers in the workplace.

The sample consisted of 179 nurses from two Veterans Administration hospitals in a southwestern state whose job descriptions included direct patient care. The primary data collection instrument was the Protective Practice Assessment Tool (PPAT) containing four subscales: The AIDS Knowledge - Health Belief Scale, The AIDS Health Threat Scale, The Health Care Worker Conflict Scale, and The Health Care Worker Compliance Scale. Other data collection instruments included a demographic information sheet, a ten point semantic differential estimating perceived vulnerability to AIDS, and an open-ended item allowing participants to list perceived barriers to following universal precautions. The PPAT was an original instrument. Cronbach's Alpha and Test-Retest procedures were calculated indicating promising reliabilities for the instrument.

Demographic data were analyzed with descriptive statistics. The variables of the PPAT were analyzed with descriptive statistics. Pearson's Correlation Coefficients were calculated between the subscales of the PPAT. Correlations were also calculated between the subscales of the PPAT and selected demographic variables.

The findings demonstrated that higher levels of knowledge - health beliefs were correlated with lower levels of perceived threat. Higher levels of knowledge - health beliefs were also correlated with lower levels of conflict when following universal precautions and higher levels of

compliance with universal precautions. Lower levels of conflict regarding following universal precautions was found to be correlated with higher levels of compliance. Vulnerability was identified as a distinguishable component of perceived health threat. A revised empirical model demonstrating these relationships was developed.

Findings suggest the importance of accurate knowledge of both Acquired Immunodeficiency Syndrome (AIDS) and the effectiveness of universal precautions in contributing to compliance with universal precautions. It also suggests the importance of identifying the conflicts nurses encounter when following infection control and other personal health protective measures when providing patient care. *Keywords: HIV, infection, universal precautions, compliance, conflict, vulnerability, perceived health threat.*

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CHAPTER 1

Introduction

The evolution of knowledge on the epidemiology of acquired immunodeficiency syndrome (AIDS) due to a viral component, human immunodeficiency virus (HIV), have resulted in major changes in the infection control practices of contemporary health care systems. In the past, traditional disease or diagnosis-specific isolation precautions were satisfactory. Now, universal precaution techniques that address contact with all blood and potentially infectious body fluids have evolved. A critical difference in the two approaches is the populations to which they are applicable. Diagnosis or disease specific isolation procedures were designed and recommended for patients with a particular set of diagnoses. Universal precaution techniques extend the isolation precautions to all patients regardless of their diagnosis or lack of diagnosis.

The protection of health care workers (HCW) has always been a major concern in infection control. Infectious diseases present a very real occupational hazard. The mortality rates associated with contracting HIV and AIDS have heightened concern about occupationally acquired infections among nurses as well as other health care providers.

The Centers for Disease Control (CDC) have recommended precautions to prevent acquisition of HIV infections by HCW in the workplace. While these recommendations do not represent radical changes in nursing technique or practice, they do require changes in many frequently employed procedures and in the disposal of contaminated equipment.

The new CDC guidelines require the wearing of protective gear ranging from gloves to goggles, dependent upon the type of exposure most likely to occur. Compliance in wearing protective clothing has not been well

investigated and needs further inquiry. Crow and Taylor (1983) demonstrated important infractions in technique relating to protective gear and personnel apparel in the operating room. Areas of infraction included, but were not limited to, the surgical cap not being adequately donned, sterile surgical gowns not secured at the neck, long fingernails, and wearing of jewelry.

When factors affecting compliance in the workplace are identified, actions can be taken to enhance those elements that promote compliance and to remove or diminish the effect of those elements causing resistance to compliant behaviors. Knowledge of nursing personnel's acceptance of the CDC's guidelines for preventing HIV infections in the work place is of paramount importance. This knowledge can be utilized in constructing education programs and administrative policy designed to minimize the risk of both nosocomial and occupational transmission of AIDS and other infectious diseases to patients and HCW.

Problem Statement

The CDC's guidelines to prevent the acquisition of AIDS among HCW in the workplace have resulted in significant changes in infection control practices. Compliance by nurses with these guidelines represents changes in routine procedures and practices. The degree of compliance by nurses may be affected by knowledge of the disease, health beliefs, personally perceived threat, and conflicts encountered when following the guidelines. This investigation sought to explore the impact of these factors on compliance with the CDC's guidelines.

Purpose of the Study

The purpose of this study was to identify factors that affect nursing personnel compliance with the CDC's recommended precautions to prevent acquisition of HIV infections by HCW in the workplace. This study focused specifically on the CDC guidelines relating to the handling and disposing of sharp items, and techniques utilized in prevention of exposure to blood or other body fluids.

Research Question

This study addressed the following research question: What was the relative importance of knowledge-health beliefs, health threat, and conflict in predicting the compliance by nurses with universal precautions?

Definition of Terms

The constructs investigated in this study are defined as follows:

Knowledge. The nurses' understanding of AIDS including incidence, transmission and appropriate protective measures as provided in the CDC's recommendations of universal precautions.

Health belief. The degree to which the nurse believed the CDC guidelines to be an effective measure in reducing the threat of acquiring AIDS from a work related incident.

AIDS health threat. The degree to which the nurse felt endangered by AIDS including personal susceptibility and the seriousness of the disease should it occur.

Health care delivery motives. The nurses' motives to give the best quality and most efficient care of which the nurse is capable.

Health care protection motives. The nurses' motives to avoid putting self at risk to acquiring HIV during the process of health care delivery.

Universal precautions. The recommendations given by the CDC to prevent acquisition of HIV infections by HCW in the workplace. The recommendations are presented in Appendix A.

Conflict. The extent to which the nurses' health care delivery motives and health care protective motives were in conflict when following the CDC guidelines of universal precautions.

Compliance. Behavior conforming to the guidelines of universal precautions.

Theoretical Framework

A health belief model (HBM) presented by Rosenstock (1960) constitutes the basis of the theoretical framework for this study. The underlying assumption of the HBM is that all behavior is motivated. Assuming all behavior is motivated, behavior can be understood, predicted, and controlled to the extent that motivations are adequately identified. The HBM assumes three principles that motivate health related actions and behavior.

The first principle concerns motives and health beliefs that determine health-related actions or behaviors. Health motives depend upon the degree to which the individual feels threatened by a given disease. Threat is defined as one's perception of susceptibility to the condition and the seriousness of that condition should it occur. Health beliefs are the degree to which an individual believes that various courses of action are available to reduce the likelihood of occurrence or the seriousness of the problem.

Health motives and health beliefs define whether a health event will become motivating or threatening. For an individual to take a course of action relative to a real or potential health problem, the individual must not

only feel threatened by the health problem, but must also see the specific actions available to decrease the health threat.

The second principle of the HBM suggests that an individual's motives and beliefs about various courses of action are often in conflict with one another. Behavior emerges as the resolution of these conflicts. There are three basic types of conflicts.

The first type of conflict involves two conflicting motives each of which demands satisfaction. Economic motives and motives related to health could constitute such a conflict. The motives having the highest importance to the individual will usually become dominant and direct behavior.

The second type of conflict arises when the available course of action to satisfy a motive is intrinsically frustrating to the individual. Unpleasant, upsetting, or painful stimuli related to a behavior are a source of this type of conflict.

The third type of conflict results when the individual does not see any course of action to satisfy an existing motive. Believing that no effective means exists to prevent a condition or seeing no action as effective would result in this third type of conflict.

These conflicts are resolved depending upon which alternative is of greater importance or value to the individual experiencing the conflict. It is from the resolution of these conflicts that the health motivators which affect health-related behaviors are formulated.

The third principle of motivation assumes that health-related motives can sometimes give rise to behavior unrelated to health. Conversely, behavior which appears to be health-related may be determined by motives

unrelated to health. An example might be taking a flu shot because of admonition from your boss rather than from intrinsic health promotion motives.

These three principles are presented in the HBM as determinates of health-related behaviors. The relationships among the major variables of the HBM as they relate to this study are illustrated in Figure 1.

Modified Framework

The theoretical framework for this study was derived from the HBM (Rosenstock, 1960) but modified for the purpose of this investigation. Knowledge and health beliefs were treated as one variable. The two concepts were difficult to separate for the purpose of estimation. What an individual believes about the effectiveness of universal precautions, correct or incorrect, is essentially knowledge to the individual.

This investigator proposed that higher levels of knowledge - health beliefs would be correlated with lower levels of conflict experienced by the nurse. A lower level of conflict by the nurse was predicted to be correlated with higher levels of compliance with universal precautions. Higher levels of perceived health threat were predicted to be associated with higher levels of compliance. Finally, higher levels of knowledge - health beliefs were predicted to be correlated with higher levels of compliance. See Figure 2 for diagrammatic presentation.

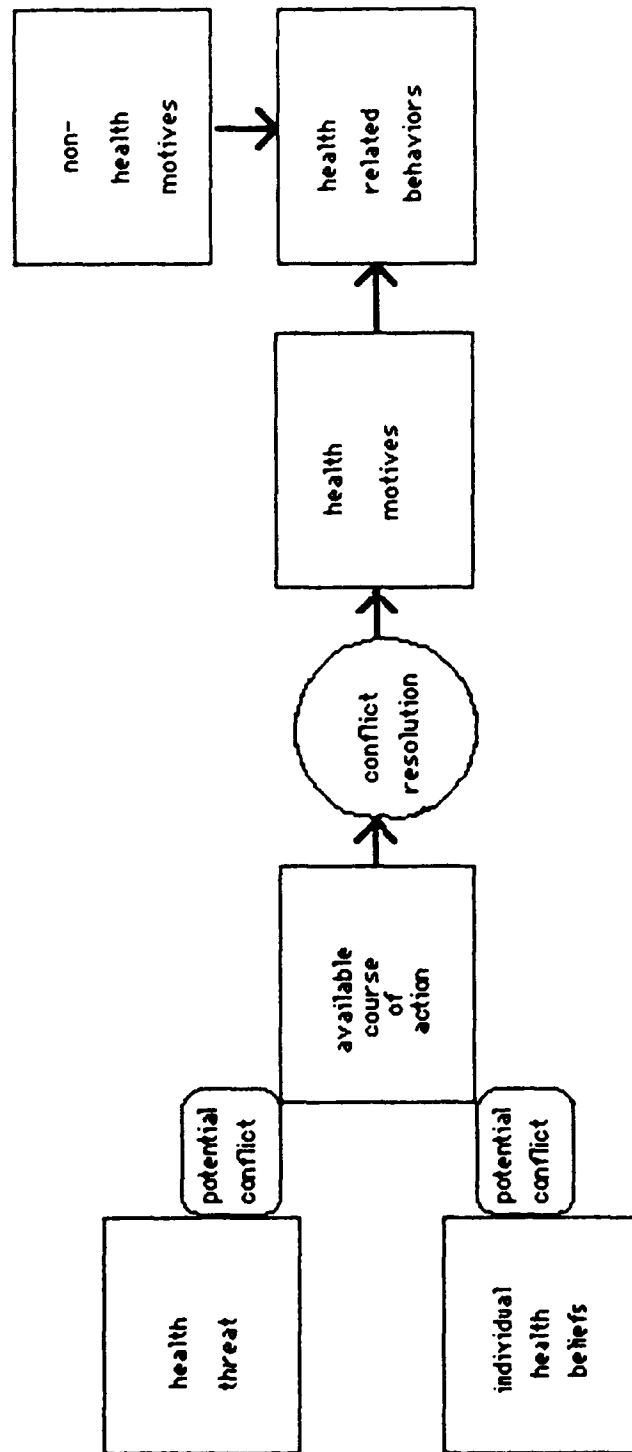
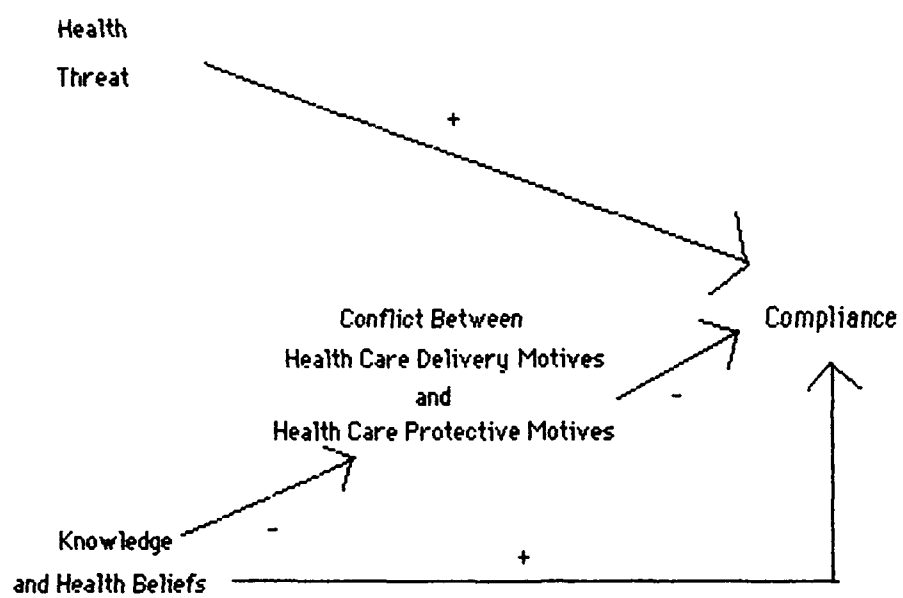


Figure 1. Health Belief Model (Rosenstock, 1960)



CHAPTER 2

Review of the Literature

The literature review will consist of a spectrum of studies including a review of the occupational hazards HCW face, an examination of the the incidence of occupationally acquired HIV infections among HCW, the incidence of other similarly transmitted diseases among HCW, and CDC recommendations to prevent HIV infections by HCW in the workplace. An examination of the knowledge and attitude of HCW caring for AIDS patients will be followed by a review of the changes that have occurred in infection control practices as a result of the AIDS virus. The literature review will be concluded with a survey of other studies on compliance with infection control practices and use of protective gear in prevention of occupational hazards and occupationally acquired diseases.

Occupational Hazards Health Care Workers Encounter

When attempting to understand the response of HCW to the occupational risk of acquiring an HIV infection it is important to realize that HCW encounter many health risks in the work environment. The presence of multiple health hazards in some instances may be a persistent threat and could potentially influence the response of the HCW to any individual health risk. Clever and Omenn (1988) stated that the almost seven million HCW in the United States (US) face essentially all of the hazards found throughout the nation's industry, and additional hazards particular to the health care environment. They further stated, "Sixty-five percent of health care personnel work in nursing and personal care facilities and hospitals: 11.6 per 100 full-time nursing and personal care facilities workers and 7.3 per 900 full-time hospital workers are hurt or sickened by work per year and lose 121 and 63 work days per 100 full-time workers, respectively,"

(Clever & Omenn, 1988, p. 273). Clever and Omenn (1988) addressed five specific hazards faced by HCW because of their high prevalence, potential severity, widespread current concern, or significant body of scientific study. While AIDS topped the list of hazards, chemical hazards, back injuries, and stress are also of high prevalence in the health care setting. A relatively new health care hazard is manifesting itself with the increased use of video display terminals (VDT). VDT use is being associated with negative visual effects, musculoskeletal symptoms, and stress.

Williamson et al. (1988) identified 11 communicable diseases of major concern to nursing personnel. Those diseases included AIDS; acute diarrhea; hepatitis A and B; non-A, non-B hepatitis; herpes simplex viruses I and II; tuberculosis, meningococcal disease, cytomegalovirus (CMV), and rubella. HCW are continually faced with multiple health hazards to which they must respond and determine the extent to which their behaviors will be personally health protective.

Incidence of HIV Infections

The HCW's risk of occupationally acquired infections was studied by McCray (1986) who conducted a surveillance project to quantify prospectively the risk to HCW of acquiring the AIDS virus, as a result of work related exposures. More than 900 HCW were studied who were exposed to blood or other body fluids of a patient with AIDS or an AIDS related illness as a result of a needle-stick, a cut with a sharp object, contamination of an open wound, or contamination of a mucous membrane. Upon enrollment each subject completed a confidential questionnaire about nonoccupational risk factors for AIDS, received a physical examination, and submitted blood specimens for white-cell count with differential and

platelet count. The investigators also sent serum and whole blood specimens to the CDC. The serum specimens were tested for HIV antibody and phenotypic T-cell subset analyses were performed on the whole blood specimens.

Over 56% of the exposures occurred in direct patient care areas. McCray (1986) explained that if recommended precautions had been followed, 40% of the 938 exposures to HIV would probably have been prevented including 16% ($n = 152$) from recapping a used needle, 13% ($n = 119$) due to injury from a needle or sharp object improperly disposed, 10% ($n = 93$) from contamination of open wounds, and 1% ($n = 9$) from using needle-cutting devices. Following the recommended guidelines would have prevented these exposures.

Only two of the 900 HCW were seropositive for the antibody to HIV. Both workers had parenteral exposure to blood from a patient with AIDS. Heterosexual transmission could not be ruled out for one of the HCW, leaving only one documented case of occupationally acquired HIV infection from this study. The seroprevalence rate among HCW with at least one serum sample tested more than 90 days following exposure was 0.53% and among subjects with parenteral exposures to blood, the seroprevalence rate was 0.72%. The low prevalence of antibody to HIV in HCW in this surveillance project suggests that the risk of occupational transmission of HIV to HCW is very low. McCray (1986, p. 1132) concluded that "despite the low incidence of documented transmission of HTLV-III/LAV infections from patients to HCW, the precautions remain valid because they emphasize infection-control practices that may reduce the risk of acquiring other infections, such as hepatitis B virus."

Weiss et al. (1985) investigated HIV infections among HCW in association with needle-stick injuries. They studied 361 health care and clinical laboratory personnel in several metropolitan areas with both moderate and high levels of HIV infection among high-risk group members to evaluate routes of exposure to HIV. Fourteen percent ($n = 39$) of the HCW reported possible percutaneous exposure to HIV. Most of the injuries were related to needles that had been used on AIDS patients. Only three HIV seropositive subjects who reported possible parenteral exposure to HIV had no recognized AIDS risk factors. Two of the subjects could not be ruled out for heterosexual transmission as the possible source of HIV exposure. One person was seropositive, apparently as a result of a needle-stick injury. The exposure consisted of two puncture wounds without injection of blood, with needles used on AIDS patients. Weiss et al. (1985) suggested that the risk of nosocomial transmission of HIV appears to be low and related to percutaneous injury.

Henderson et al. (1986) studied the risk of occupational infection with HIV in highly exposed HCW. They conducted a prospective study of 531 HCW of which 150 reported percutaneous or mucous membrane exposures to blood or body fluids from a patient with AIDS. None of the 150 HCW had serologic evidence of HIV at 46 months after exposure. Three workers were seropositive at the time they entered the study and none reported occupational exposures. All three reported membership in one or more of the established high risk groups. This study also suggests that the risk of occupational transmission of HIV is extremely low.

Day (1989a) stated that reports vary considerably on estimates of the number of HCW who have contracted HIV from occupational exposures. She stated that Dr. James Curran of the CDC reported on the television program 60 Minutes that there were 18 such cases on Sept 24, 1989, and the Occupational Safety and Health Administration (OSHA, 1989), identified at least 169 HCW infected from occupational exposure. She further reported that of the total of 6.5 million HCW in the US only about 2400 have been tested according to the (Day, 1989a). She concluded, "officials have downplayed the seriousness of the problem and failed to perform the appropriate studies early. The result is unfounded complacency and widening spread of the disease" (Day, 1989a, p. 2).

Incidence of Similarly Transmitted Diseases

Although the literature seems to present a case for low incidence of transmission of HIV in the occupational setting, Kuhls et al. (1987), suggested that insufficient attention has been given to the possible acquisition of other occupationally acquired infections in HCW who provide care to AIDS patients. Opportunistic infections are commonly seen in AIDS patients who excrete high concentrations of many agents including CMV, hepatitis B virus (HBV), and herpes simplex virus type 2 (HSV-2). They conducted a 9 to 12 month prospective study of 246 female HCW and categorized them into three groups according to their level of exposure to patients with AIDS. The HCW were asked to estimate the intensity and frequency of their exposure to biological specimens of AIDS patients. The HCW were then placed in either a high, low, or no exposure group according to their estimate. The high exposure group contained 102 HCW who reported more than 50 AIDS specimen contacts in the previous three years. The low

exposure group contained 43 HCW who reported between five and 49 AIDS specimen contacts, and the no exposure group contained 101 HCW who reported no exposure to AIDS specimens in the same three year period. No HCW developed HIV antibodies. No HCW in the high risk group seroconverted to CMV and no differences between groups for HBV seropositivity were observed. One nurse in the high exposure group seroconverted to HBV; however, she did not report any accidental needle-sticks or membrane exposure to specimens from AIDS patients. One nurse seroconverted to HSV-2 during the study but refused to answer questions about her sexual history. Kuhls et al. (1987), supported previous investigations showing a low risk of occupationally acquired HIV infections. This study further indicates that the risk of occupationally acquiring CMV, HBV, or HSV-2 infections from exposures to AIDS specimens appears to be low.

Denes et al. (1978) studied HBV infections in physicians to define the epidemiologic features of occupationally acquired HBV infections among physicians. They surveyed physicians attending three American Medical Association (AMA) conventions in 1975 and 1976. Each physician was asked to complete a questionnaire and donate a specimen of venous blood. Results from a national survey of anti-HBV prevalence among 1,542 first-time volunteer blood donors was matched for race and sex then used as a comparison group with the results for the physicians. The number of physicians participating in the study was 1,192. Of those, 18.5% ($n = 220$) had serologic evidence of prior HBV infections. The infection rate was also noted to be higher among physicians practicing in metropolitan areas with a population greater than one million. These physicians were more likely to have positive results, 27.2%, than those practicing in smaller

communities, 15.6%, ($p < .001$). It was also noted that infection rates increased with the number of years in practice, and among selected specialty areas with the highest incidences in pathologists, 27%, and surgeons, 28%. Exposure seemed to be accelerated in the early years of clinical activities when the physicians' patient pool is expanding and exposure to new patients is greatest. These investigators called for more effective control measures to prevent occupationally acquired HBV infections among health care professionals.

CDC Recommendations

In 1981, after the recognition of AIDS caused by HIV, the occupational safety of HCW with potential for exposure to HIV became a concern to all involved in the prevention of infectious diseases. In 1982 even though there was, "no evidence of AIDS transmission to hospital personnel from contact with affected patients or clinical specimens" (CDC, 1982, p. 577), the CDC recommended precautions to those providing care for AIDS patients. These precautions included avoiding wounds from sharp instruments contaminated with potentially infectious material, avoiding contact of open skin lesions with materials from AIDS patients, and wearing gloves when handling blood specimens, body fluids or objects exposed to them. Hands were to be washed after removing gloves or gowns, and blood and other specimens were to be labeled with a warning of "blood precautions" or "AIDS precautions". The precautions also emphasized the importance of using disposable syringes and not manipulating contaminated syringes to avoid puncture wounds. The CDC's recommendations were not given as a substitute for precautions for particular infections, but as an additional precaution when

indicated. These precautions also contained other recommendations for laboratory personnel which did not affect the clinical nurse.

In 1983 the CDC recommended that precautions for the prevention of AIDS transmission in the health care setting also be adopted by allied professionals not addressed previously, but who could potentially have contact with infected patients and materials (CDC, 1983). In 1985 the CDC released, "Recommendations for Preventing Transmission of Infection with Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus in the workplace" (CDC, 1985, p. 681). The document (CDC, 1985) provided recommendations in the form of precautions to be taken to prevent transmission of blood-borne infectious diseases to HCW exposed to blood from persons who may be infected with human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV). The document emphasized the similarities between the transmission of HBV and the AIDS virus. The critical differences between this document and the 1982 recommendations centered around the need for emergency resuscitation efforts and addressing concerns of pregnant HCW. The need for mouth to mouth resuscitation was to be minimized through the use of other ventilatory devices. Pregnant HCW, though not at greater risk, were encouraged to become very familiar with the guidelines. These precautions came to be referred to by health care professionals as "universal blood and body fluid precautions" or "universal precautions" (CDC, 1988, p. 377).

In 1987 the CDC recommended that "universal precautions" be used in the care of all patients stating, "since medical history and examination cannot reliably identify all patients infected with HIV or other blood-borne pathogens, blood and body fluid precautions should be consistently used on

all patients" (CDC, 1987 p. 55). The CDC emphasized that although the use of universal precautions eliminates the need for the isolation category of "blood and body fluid precautions", other disease specific isolation precautions should be used as indicated by diagnosis. The specific recommendations of universal precautions included in this study are presented in Appendix A.

In 1988 the CDC published an update to universal precautions for the purpose of clarification. The update indicated that universal precautions continued to apply to the care of all patients but not for all body fluids. The precautions continue to apply to blood and other body fluids containing blood as well as to semen, vaginal secretions, tissues, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid. The CDC stated that universal precautions do not apply to "feces, nasal secretions, sputum, sweat, tears, urine, and vomitus unless they contain visible blood" (CDC, 1988, p. 378). These fluids are not included because the risk of transmission of HIV and HBV from exposure to these fluids is "extremely low" (CDC, 1988 p. 378).

Day (1989b) questioned the changes in universal precautions that do not include all body fluids, citing that HIV has been found in human blood, semen, breast milk, vaginal secretions, saliva, tears, urine, cerebrospinal fluid and amniotic fluid. She further stated that the CDC experiments to investigate the transmission of AIDS by body fluids found blood to transmit the disease most readily and persons exposed to other body fluids were excluded from the study according to OSHA (1989). The concern over the appropriateness of infection control practices is being reiterated by others as well. Nurses have called for increased research into the efficacy of

infection control practices to prevent the practice of "rituals without reasons" (Williamson et al., 1988, p. 53) and effectively reduce the occupational hazards facing HCW.

The discovery of a new HIV strain further complicates the debate over appropriate protective measures. The CDC has identified a strain of HIV not previously seen in the US, but prevalent in Africa. The virus is being called HIV-2. The virus was discovered in a West African woman who came to New Jersey in 1987, but who reported no sexual contacts, use of nonsterile needles, or donation of blood while in this country ("Universal Precautions," 1988).

Hughes, Garner, Marcus, and Jaffe (1988, p. 215) of the Hospital Infections Program and AIDS Program, Center for Infectious Diseases which is a branch of the public health service of the CDC, summarized current knowledge in their report on AIDS by stating:

We do not know the prevalence of infection in groups with extensive blood exposure, the efficacy of 'extraordinary' precautions beyond universal precautions in further minimizing the risk of transmission to HCW, the optimal methods of ensuring compliance with existing recommendations, and the impact of knowledge of serologic status of patients on the compliance of HCW with existing recommendations (p. 276).

Knowledge and Concerns of Health Care Workers

Valenti and Anarella (1984) conducted a survey of hospital personnel's knowledge about AIDS. The survey consisted of three parts. Part I dealt with the demographic data of the respondents. Part II was a series of true-false questions that measured the respondents' understanding of AIDS.

Part III consisted of questions dealing with the subjects' level of concern when caring for persons with AIDS, sources of information on AIDS, and what kinds of additional information employees would like regarding AIDS. In February, 1984, 741 surveys were distributed to hospital personnel working in selected departments within a 750 bed university teaching hospital. These departments were chosen on the likelihood of their employees having contact with persons with AIDS. A total of 36% ($n = 266$) surveys were returned. It must be noted that surveying only one institution and such a low response rate are substantial limitations to the generalizability of this study. The respondents' knowledge of the disease appeared to increase with their level of medical education with a positive Pearson's correlation ($p < .002$). Twenty-two percent ($n = 58$) indicated no concerns in caring for AIDS patients, while 76% ($n = 202$) indicated some form of concern when caring for AIDS patients. When scores were compared with the educational portion of the questionnaire it was found that those who scored more than 80% on the knowledge portion of the questionnaire were more likely to choose a no concern response ($p < 0.03$). The questions missed most frequently on the knowledge section of the questionnaire were related to isolation precautions, and they were answered correctly less than 80% of the time by all groups except medical students. However, all groups tended to have lower scores on the questions concerning infection control precautions. The largest single reported source of information on AIDS was the media. Valentia and Anarella (1984) suggested that by providing information that has not been educational the media has escalated confusion over issues such as contracting AIDS while donating blood and the proper precautions to use when caring for patients with AIDS.

Changes in Infection Control Practices

Schaffner (1988) suggested that the recognition of the epidemic of AIDS has resulted in major changes in hospital infection control policies. Infection control programs have gone through three periods of change since the first diagnosis of AIDS in 1981.

The first period was marked by confusion. Without specific knowledge, infection control programs and policies could offer little guidance in avoiding infection from the causative agent. During this period some hospitals denied admission to patients who were suspected of having AIDS. In some instances, once patients were admitted, they were quarantined, confined to their rooms and "placarded". Instances of incineration of discarded linen, mattresses, and even diagnostic instruments thought to be contaminated have been reported.

The second period identified by Schaffner (1988) was a period of consolidation. Intensive educational programs for HCW were implemented using the well-established infection control protocols designed to interrupt transmission of HBV. During this period, the discovery of the responsible virus and the availability of serological testing of HIV antibodies helped to reinforce these infection control practices.

A period of renewed concern began when reports began to surface of HCW who apparently acquired occupationally associated HIV infection through skin and mucous membrane exposures. In some aspects the data regarding the ease of transmission seemed to be conflicting. Recent reports seemed to suggest that relatively minor types of exposure could be extremely hazardous. In contrast, prospective studies of HCW who had sustained parenteral and other exposures to patients with HIV infections

suggested a risk of seroconversion of less than 1%. This paradox has resulted in the introduction of two new elements of infection control policy, a reinforcement of the practice of taking rigorous aseptic precautions with every patient and initiatives to conduct routine serological testing of patients.

As these periods of change are viewed in light of the HBM (Rosenstock, 1960), the confusion and ambiguity of the change process must influence the health beliefs and motives of the community of HCW. The rapid changes in infection control practices may be observed to have a negative impact upon the compliance of nurses with universal precautions.

Compliance with Infection Control Practices

No studies have been found investigating nursing or HCW compliance with the CDC guidelines for the prevention of the acquisition of HIV infections in the workplace. J. Garner (personal communication, September 20, 1988), of the CDC, stated "the CDC is not aware of any studies on nursing compliance with these guidelines."

Crow and Taylor (1983), who examined nurse compliance with aseptic technique in the operating room, suggested that discipline is essential in maintaining appropriate aseptic technique. They indicated that discipline includes a set of complex rules for maintaining a sterile field. This also suggests the importance of active control efforts in reduction of nosocomial infections in ensuring that compliance with these regulations is enforced.

Kaplan and McGuckin (1986) investigated the effects of greater accessibility of sinks on handwashing compliance. The frequency of handwashing in one medical and one surgical intensive care unit (ICU) were

observed. The medical ICU contained seven beds and seven sinks in an open unit. The 16 bed surgical ICU included four isolation rooms with separate sinks and 12 beds in an open unit with three sinks. The ratio of beds to sinks was thus 1:1 for the medical ICU and 4:1 for the surgical ICU. The HCW were not told the exact purpose of the project, only that Quality Assurance was conducting an audit. The personnel surveyed included physicians, nurses, and technicians. These personnel were observed from the moment of their first interaction with a patient up to and including their first subsequent activity not involving the observed patient. The number of handwashes after direct contact with patients or their support equipment was recorded. The number of handwashes were recorded after contacts. The study did not include the number of patients being cared for, or an evaluation of the handwashing technique. The observation period was from 6:30 a.m. to 9:30 a.m. for six consecutive days. This permitted the observation of two shifts. The medical ICU nurses washed their hands more frequently (76%) compared to the surgical ICU nurses (51%), ($p < .01$). The frequency of handwashing was consistently higher in the medical ICU from day one through day six with no changing trend.

These results indicated that greater availability of sinks was associated with a significant increase in the number of handwashes per contact by nurses. The investigation did not consider other factors such as the patient's diagnosis and the amount of direct "hands on" contact required by each patient. Kaplan and McGuckin (1986) suggested that to increase compliance, medical personnel should police themselves and each other.

Use of Protective Gear

In reviewing the literature for worker compliance with the use of protective clothing and or equipment to prevent occupational hazards few research studies were found. Although industrial and business literature were reviewed, as well as nursing literature, the studies found related to the use of protective clothing by nurses handling contaminated materials and antineoplastic agents.

Kaplan and McGuckin (1986) found that in 25 observations of emptying foley urine bags, gloves were worn 40% of the time, with a handwashing rate of 88%. Gloves were worn 94% of the time during 18 observations of performing tracheal care. While not the specific intention of the study, results did seem to indicate that nurses are more likely to utilize gloves when the risk of contact with body fluids or excrement is greater.

Valanis and Browne (1985) studied the use of self-protection by nurses during occupational handling of antineoplastic drugs. They conducted a survey of 67 nurses in the greater Cincinnati metropolitan area who handled antineoplastic drugs. The purpose of the investigation was to determine the extent to which nurses used protective measures while handling antineoplastic agents. The study primarily included nurses from inpatient and outpatient hospital settings, but a few from community settings were also included. Over half of the sample, 58%, reported handling at least six different drugs on a routine basis and 70.2% reported preparing and administering the drugs. The number of preparations per week ranged from 1 to greater than 50. Only 32% of the subjects reported using gloves at least one half of the time they worked in preparation of chemotherapy. Over 85% reported never wearing a face mask, a disposable lab coat, or a reusable

lab coat. None of the subjects used eye goggles. Although a percentage was not given, Valanis and Browne (1985) stated that most nurses indicated the reason they did not use protective clothing was because they did not feel they were at any risk. Nurses also reported they felt wearing protective clothing would be psychologically threatening to patients. Valanis and Browne (1985) suggested that the establishment of a reasonable policy in institutions where nurses handle antineoplastic agents will offer some motivation and justification for self-protection. They further suggested these policies should be accompanied by educational programs regarding the potential risk, sources of exposure, and a statement of what reasonably constitutes self protection and protection for others in the environment.

Valanis and Shortridge (1987) investigated the use of protective measures by nurses handling antineoplastic drugs one year after OSHA issued protective guidelines for handling antineoplastic agents. The investigation compared nurses' utilization of protective measures in a variety of work setting and examined the reasons protective measures were not used. The sample contained 632 oncology nurses who currently mixed or administered antineoplastic drugs. The subjects represented a variety of facilities and departments. The majority of the nurses reported handling antineoplastic drugs for more than 3 years, with a range from 2 months to 26 years, and an average of 5 years. Of the 632 nurses, 49% both mixed and administered antineoplastic drugs, 49% only administered and 2% only mixed the drugs.

While administering chemotherapy 50% reported wearing gloves, 14% wearing gowns, 51% wearing labcoats, 6% wearing masks and 1% wearing goggles, at least three fourths of the time. While mixing chemotherapy 76%

reported wearing gloves, 36%, wearing gowns, 58% wearing labcoats, 15% wearing masks, and 5% wearing goggles, at least three fourths of the time. These results consistently indicate less use of protective gear when administering the medication to the patient versus mixing the medication.

A comparison was also done to assess whether handling of large quantities of antineoplastic drugs or having more years of working with the drug is associated with more frequent use of protection. Spearman's rank-order correlation of these variables with use of gowns, gloves, and labcoats were calculated within categories of handling activities. For the group of nurses who only administered antineoplastics, the use of gowns had a statistically significant inverse correlation with both the number of doses handled per week ($r = -.250$; $p < .001$) and with the number of years the nurse had handled the drugs ($r = .198$; $p < .01$) (Valanis & Shortridge, 1987). Similar tendencies toward less protection were observed in the group of nurses who both mixed and administered antineoplastic agents. Glove use during mixing drugs showed a statistically significant inverse correlation with the number of weekly doses handled by the nurse ($r = -0.129$; $p < .05$) and again in the duration of handling ($r = -.23$; $p < .05$). Common reasons given for not using protective equipment or clothing included nonavailability, convenience and comfort for the nurse, belief that no personal hazard existed, and belief that the use of protective gear was inappropriate. No statistical data were given on reasons for not using protective gear.

Both the study by Valanis and Browne (1985) and Valanis and Shortridge (1987) indicated the nurses' belief systems and practical factors in the work place strongly effect nursing compliance with the use of protective

clothing and equipment when handling antineoplastic drugs. These studies also indicate a need for further investigation.

Summary

This review of the literature has indicated that while the risk of occupationally acquired HIV or AIDS presently appears to be extremely low, documented cases do exist and there are some discrepancies over the actual number of cases. Nurses caring for patients with AIDS are also exposed to a number of other infectious diseases associated with the chronically ill state of the AIDS patient. The recommendations by the CDC for the prevention of hospital acquired HIV and AIDS infections by HCW in the workplace are effective for the prevention of many similarly transmitted diseases. However, some are questioning the recent reductions in these precautions.

While studies on nursing compliance with aseptic technique have been minimal they have indicated improper use of clothing as a barrier against contaminants and the availability of equipment are significant factors affecting compliance. The role of education and experience in this area requires further study. Investigations in the use of protective clothing and equipment among nurses is also at a minimum in the literature, and have focused primarily on their use when handling antineoplastic agents. In spite of the documented risks in handling antineoplastic agents nurses fail to see themselves at risk. Disturbingly, nurses with more experience in handling such agents have shown that they are less likely to use protective equipment.

The literature also indicates that protective measures and isolation precautions are perhaps the area of greatest misunderstanding among HCW

concerning the AIDS epidemic, and little is known about factors that affect compliance with the CDC guidelines. Nurse researchers must seek to identify the attitudes, beliefs, and practices that are being exhibited by nurses coming in contact with HIV, AIDS and other serious infectious diseases. After identifying prevalent attitudes and practices, this knowledge can then be used to remodel educational and administrative policies to promote needed change in these practice and thereby diminish the occupational health risks to nurses.

CHAPTER 3

Methodology

The discussion in this section will address the following topics: research design, sample, procedures for data collection, instruments, reliability and validity, data analysis, and the assumptions made in the investigation. The instruments utilized in this study are presented in the appendices as referred to in the discussion.

Research Design

This investigation utilized an exploratory design to investigate factors that affect compliance by nurses with the CDC's recommendations of universal precautions. The primary instrument used for data collection was the Protective Practice Assessment Tool (PPAT) with four subscales to estimate the relationship between selected factors and compliance with universal precautions as identified in the review of the literature and the modified HBM. The secondary instrument contained the demographic data sheet, a semantic differential estimating perceived vulnerability to acquiring AIDS from a work related exposure, and an open-ended item allowing participants to list perceived barriers to following universal precautions.

Sample

The target population of this study was staff nurses employed at Veterans Administration (VA) hospitals. The sample consisted of staff nurses employed at two VA hospitals in a southwestern state. One hospital was a large facility in a metropolitan area and the second facility was much smaller and located in a rural part of the state. A list was obtained of the nurses employed at both facilities whose present job description included direct patient care responsibilities. From this list a random sample was

obtained by utilizing a table of random numbers for the purpose of sample selection. A total of 231 questionnaires were distributed to nurses at the larger VA hospital and 50 questionnaires were distributed to nurses employed at the smaller VA hospital. A total of 179 usable questionnaires, 63% ($n = 146$) from the metropolitan VA hospital and 66% ($n = 33$) from the rural VA hospital, were returned yielding a response rate of 64%.

Questionnaires were delivered to subjects at the institution of their employment. All subjects were requested to complete and return the questionnaire within one week of receiving it. Questionnaires were distributed at both VA hospitals between July 24th and August 7th 1989.

Human Subjects Protection

The proposed investigation was first approved for exemption under Category 3 by the Human Subjects Research Review Committee on May 4, 1989. Participation in the study was voluntary. Each subject was given a letter of transmittal (see Appendix B) requesting voluntary participation in the study. Subjects were informed of the general purpose of the study at the beginning of the questionnaire. Return of the questionnaire was considered to be indicative of informed consent to participate in the study. Anonymity for the subjects was achieved by having all subjects return unsigned questionnaires to the investigator via the mail without identification of the participating subject. The investigator kept a coded list of subjects to whom questionnaires were sent and returned completed, in order to be able to calculate the stability of the instrument. Each questionnaire was identified by a code number corresponding to the coded list of subjects kept in a locked file cabinet by the investigator. The list will be destroyed upon completion of the project. A pre-addressed stamped

envelope was provided with each questionnaire. A decorative pencil was given to each subject along with the questionnaire as an inducement to participate in the study as well as a token of appreciation for their time taken to complete the study.

Sixty nurses were requested to complete the questionnaire a second time, three weeks after initial completion of the questionnaire for the purposes of computing test-retest reliability coefficients. Informed consent and anonymity were provided for subjects participating in the test-retest procedures in the same manner as previously described.

Instruments

The primary instrument for data collection was the PPAT which contained the following four separate subscales: AIDS Knowledge - Health Belief Scale, AIDS Health Threat Scale, Health Care Worker Conflict Scale and Health Care Worker Compliance Scale. With the exception of portions of the AIDS Knowledge - Health Belief Scale, the PPAT was an original instrument. The scale was presented in a 5 point Likert format with the range of options including: strongly disagree, disagree, neutral, agree and strongly agree.

The AIDS Knowledge - Health Belief Scale was developed to estimate the nurses' understanding of AIDS, including incidence, transmission and appropriate protective measures (see Appendix C). The scale was also used to estimate the degree to which the nurse believed the CDC guidelines to be an effective measure in reducing the threat of acquiring AIDS from a work related incident. The true and false questions measuring knowledge were taken from the investigation by Valenti and Anarella (1984). Some editing of the items was accomplished for the purpose of clarification. Valenti

(personal communication, September 30, 1988) indicated that no reliability or validity measures had been established on those items. All other items on this scale were developed by the investigator.

The AIDS Health Threat Scale was developed by the investigator to estimate the degree to which the nurse feels threatened by AIDS including personal susceptibility and the seriousness of the disease should it occur (see Appendix D). The Health Care Worker Conflict Scale estimates the degree to which the nurses' health care delivery motives and health care protective motives are in conflict when following the CDC guidelines of universal precautions (see Appendix E). The last subscale of the PPAT is the Health Care Worker Compliance Scale estimating the degree to which behavior conforms to the guidelines recommended in universal precautions (see Appendix F). The questionnaire, in its final form which included all of the items from the four subscales presented in random order along with secondary instrument addressing demographic data, vulnerability and barriers to following universal precautions is shown in Appendix G.

Reliability and validity

Face and content validity on each of the four subscales were analyzed by a panel of three experts in the field of infection control practice. Adjustments were made to each of the subscales based upon the recommendation of the panel. Internal consistency of the scales was then quantified by calculation of Cronbach's coefficient alpha. Cronbach's coefficient alpha for each of the subscales of the PPAT are presented in Table 1. Results indicated promising reliability for the instrument with coefficients ranging from .73 to .90. Polit and Hungler (1987) suggested

that reliability coefficients greater than .70 are generally considered satisfactory.

Stability of the subscales of the PPAT was estimated through test-retest procedures and analysis using Pearson's correlation. The questionnaire was randomly distributed to 60 nurses for the purpose of test-retest procedures. A total of 34 usable questionnaires, 56% ($n = 28$) from the metropolitan VA hospital and 60% ($n = 6$) from the rural VA facility, were returned yielding a total response rate of 56%. The results of the test-retest procedures for each of the subscales of the PPAT are presented in Table 2. These coefficients also indicate promising utility of the instrument.

The secondary instrument utilized in data collection contained demographics, a semantic differential item estimating perceived vulnerability to acquiring AIDS from occupational exposure, and one item giving participants the opportunity to list up to 5 specific barriers encountered when attempting to follow universal precautions (see Appendix G, section III).

Table 1

Reliabilities of PPAT Subscales

Scale	Alpha
AIDS Knowledge - Health Belief Scale	.73
AIDS Health Threat Scale	.90
Health Care Worker Conflict Scale	.84
Health Care Worker Compliance Scale	.75

Table 2

Test-Retest Reliability for the Subscales of the PPAT using Pearson's Correlation

Scale	N = 34	r	p
AIDS Knowledge - Health Belief Scale		.793	.0001
AIDS Health Threat Scale		.908	.0001
Health Care Worker Conflict Scale		.816	.0001
Health Care Worker Compliance Scale		.794	.0001

Data Analysis

AIDS Knowledge - Health Belief Scale Scoring

Twelve statements were listed which contained either true or false information regarding the prevention, transmission, and incidence of the AIDS virus. Beside each statement the response options of true, false, and not sure were given. One response was circled for each statement. For each correct statement selected a score of 1 was given. Wrong answers and the selection of not sure were given a score of zero. A total of 12 points could be accumulated on this portion of the scale.

Eight statements were listed estimating confidence in the CDC guidelines of universal precautions as an effective measure in reducing the threat of acquiring AIDS from a work related incident. Beside each statement was a 5 point scale which ranged from strongly disagree (SD) to strongly agree (SA). One response was checked for each statement. A response of strongly agree was scored as a 5 and a response of strongly disagree was given a score of 1 in those statements stated favorably. The opposite is true for those statements worded negatively.

The scores from the true and false segment of the scale and the Likert-type segment of the scale were added together to obtain a total score for the AIDS Knowledge - Health Belief Scale. A maximum score of 52 points was possible when scoring this scale. A final score of 52 reflected an individual with accurate knowledge regarding the prevention, transmission, and incidence of the AIDS virus and who believed the CDC recommendations of universal precautions to be an effective measure in reducing the threat of acquiring AIDS from an occupational incident. When a participant failed to respond to one of the true and false items a score of

zero was given for that particular item. When a participant failed to respond to one of the Likert-type scale items that participant's score on the Likert-type portion of the scale was tabulated and the mean was utilized for that item when calculating the participant's final scale score.

Scoring of The AIDS Health Threat Scale, Health Care Worker Conflict Scale, and the Health Care Worker Compliance Scale

The AIDS Health Threat Scale, Health Care Worker Conflict Scale, and Health Care Worker Compliance Scale were all scored in the same manner. Each of these scales contained items to estimate the designated variable. Beside each statement was a 5 point scale which ranged from strongly disagree (SD) to strongly agree (SA). One response was checked for each statement. A response of strongly agree (SA) was given a score of 5 and a response of strongly disagree (SD) was given a score of 1 for statements indicating a high degree of the variable being measured. The opposite is true for statements which were negatively worded. The responses were added together resulting in a total possible score for each subscale. The higher the individual's score on the subscale the greater the perceived threat, conflict, or compliance on the part of the individual. When a participant failed to respond to an item that participant's score on the scale was tabulated and the mean was utilized for that item when calculating the participant's final scale score. Total possible scores on the subscales were 70 for the AIDS Health Threat Scale, 95 for the AIDS Health Care Worker Conflict Scale, and 75 for the Health Care Worker Compliance Scale.

Statistical Analysis

Demographic data were analyzed with descriptive statistics for the purpose of describing the sample. The estimated number of AIDS patients

cared for and the estimated number of sticks with a contaminated needle were categorized prior to data collection. Pearson's product moment correlations were calculated to investigate the relationships between the variables measured by the PPAT (see Figure 2). In addition to correlations among the variables measured by the PPAT Pearson's product moment correlations were also calculated among selected demographic variables with the variables of the PPAT and the semantic differential vulnerability scale.

Assumptions

Several assumptions were made for the purpose of data collection and to keep continuity with the selected theoretical framework. These assumptions were as follows:

1. All behavior is motivated.
2. Behavior can be modified to the degree that its motivating factors are understood.
3. Compliance is affected by identifiable factors
4. Subjects honestly reflected their beliefs and behaviors when responding to the questions of PPAT.

CHAPTER 4

Results

The results of this study are discussed in five sections. First, a description of the participants in the study will be presented. Second, the descriptive statistics on the PPAT will be given followed by the results of the correlational analysis among the concepts measured by the PPAT. Fourth, the results of the correlational analysis between the variables of the PPAT and selected components of the demographic data will be presented. This section will also include the results of the semantic differential scale estimating the participant's perceived vulnerability to AIDS, as presented in the demographic segment of the questionnaire, and the frequency of reported primary barriers to universal precautions. The last segment of this chapter will address additional information offered by the participants which was not solicited by the instruments utilized in conducting the investigation.

Description of the Sample

The sample consisted of 179 participants of which 146 subjects were employed at a large VA hospital in a metropolitan area and 33 subjects were employed in a smaller VA facility in a rural area of the same southwestern state. Tables 3 and 4 present the demographic characteristics of the sample including age, years of nursing practice, highest level of nursing education, number of AIDS patients for which the respondent had provided nursing care, and the number of accidental sticks with a contaminated needle. The majority of the participants were female (87.4%; $n=153$). There were 22 male participants in the study representing 12.6% of the sample. The age range of the respondents was 24 to 64 ($M = 44.4$, $SD = 9.99$) as indicated in Table 3. The average number of years of nursing practice

was 18.1 (SD = 10.5; range = 1 to 47). Four subjects did not disclose their age and three subjects did not disclose their educational background. The percentages for each of these categories were calculated based upon the participants who responded. Education was presented by category and checked by the participants.

As illustrated in Table 4, 51.4% of the sample indicated they had provided nursing care for ten or more AIDS patients with 39.3% indicating they had provided nursing care for between 10 and 30 patients. The number of AIDS patients cared for was collapsed into categories and checked by the participants. Seven participants elected not to disclose, or could not estimate, the number of AIDS patients for which they had provided nursing care. The percentage indicated in Table 4 reflects only the subjects who responded. Over 81% of the sample reported having had an accidental stick with a contaminated needle. The majority of the subjects, 59.5% ($n = 103$), reported between 1 and 5 accidental sticks with a contaminated needle. Six participants elected not to disclose the number of accidental sticks with a contaminated needle. The percentages presented in Table 4 are based upon the number of participants who responded.

Table 3

Demographic Characteristics of the Sample

Characteristic	N	%	M	SD
Age	179		44.4	9.99
Years of Nursing Practice			18.1	10.5
Type of Facility				
Metro	146	81.6		
Rural	33	18.4		
Highest Level of Nursing Education				
Associate Degree	50	28.4		
Diploma	52	29.5		
BSN	60	34.1		
MSN	14	8.0		

Table 4

AIDS Related Experiences of Health Care Providers

Characteristic	N	%
Number of AIDS Patients Cared For		
<10	83	48
10-30	68	39.3
31-50	12	6.9
>50	9	5.2
Reported Number of Sticks with a Contaminated Needle		
0	32	18.5
1-5	103	59.5
6-10	18	10.4
11-15	6	3.5
>15	14	8.1

Descriptive Statistics of the PPAT

Table 5 presents the descriptive statistics from the scoring of the subscales of the PPAT. The results indicate a high level of knowledge-health beliefs, a moderate level of perceived threat and conflict, and a high level of compliance on the part of participants.

Table 5

Descriptive Statistics of Participants by Subscale Scores of the PPAT

Subscale	M	SD	Range	Possible Range
Knowledge - Health Beliefs	42.53	5.07	28 to 52	0 to 52
Health Threat Scale	46.47	11.06	25 to 70	0 to 70
Health Care Worker Conflict Scale	46.42	10.70	27 to 81	0 to 95
Health Care Worker Compliance Scale	61.63	7.05	40 to 75	0 to 75

Correlations Between Variables of the Modified HBM

Pearson Product Moment Correlations

A correlation matrix was generated for all model variables (health threat, knowledge - health beliefs, conflict, and compliance). Tables 6 presents the results of those relationships. Figure 3 presents the Pearsons correlation coefficients among hypothesized relationships of the modified HBM.

Table 6

Pearson Product Moment Correlations Between all Variables of the Modified Health Belief Model

	Knowledge Health Beliefs	Threat	Conflict	Compliance
Knowledge Health Beliefs p=	1.000	-.376 .0001	-.321 .0001	.394 .0001
Threat p=		1.000	-.032 .671	.006 .932
Conflict p=			1.000	-.529 .0001
Compliance				1.000

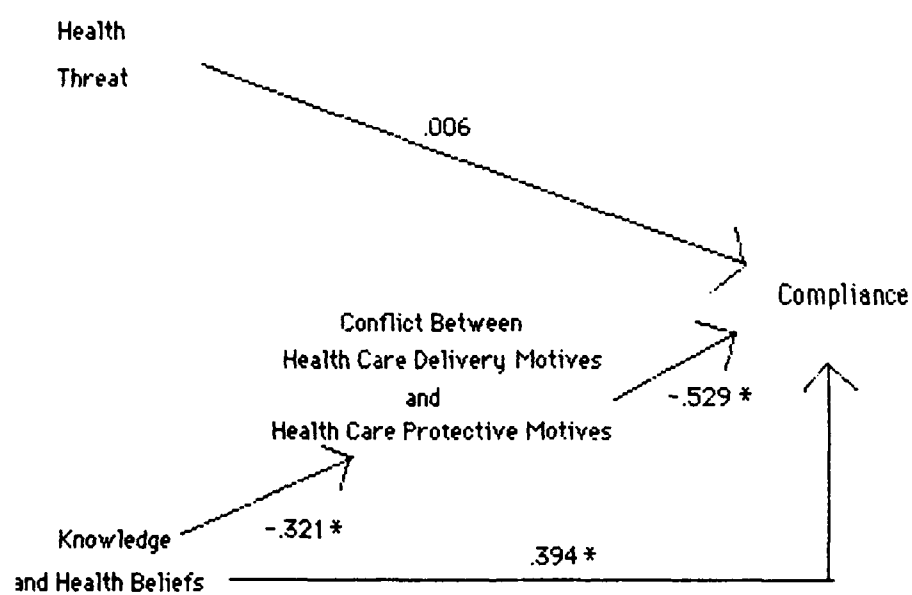


Figure 3. Correlations Among Hypothesized Relationships of the Modified Health Belief Model (*significant at .0001)

The correlational analyses addressed relationships hypothesized in the study. In the modified framework of the HBM it was proposed that higher levels of knowledge - health beliefs would be correlated with lower levels of conflict. Lower levels of conflict were predicted to be correlated with higher levels of compliance with universal precautions. Higher levels of perceived health threat were predicted to be associated with higher levels of compliance. Finally, higher levels of knowledge - health beliefs were predicted to be correlated with higher levels of compliance.

All hypothesized relationships were statistically significant with the exception of the correlation between perceived threat and compliance with universal precautions. No relationship between threat and compliance was detectable ($r = .006$, $p = .932$, one tailed). Table 6 displays the negative correlational relationship between knowledge - health beliefs and conflict ($r = -.321$, $p = .0001$, one tailed) and the positive relationship between knowledge - health beliefs and compliance ($r = .394$, $p = .0001$, one tailed). As hypothesized conflict and compliance were negatively correlated ($r = -.529$, $p = .0001$, one tailed). Additionally, one unhypothesized relationship was found. Knowledge - health beliefs was significantly negatively correlated with threat ($r = -.376$, $p = .001$, two tailed).

Other Correlational Relationships

An interesting finding in the correlational matrix between demographic variables was a negative relationship between perceived vulnerability and the number of AIDS patients for which the nurse had provided care ($r = -.205$, $p = .007$, two tailed). Table 7 displays the correlational relationships between the semantic differential estimating perceived

vulnerability, contained within second instrument of the questionnaire, with the knowledge and threat variables contained in the modified HBM and PPAT.

Other correlational relationships found included a negative correlation between the number of annual continuing education units obtained and compliance with universal precautions ($r = -.205$, $p = .006$, two tailed). Although weak, a negative relationship between vulnerability and marital status was also found ($r = -.135$, $p = .08$, two tailed).

Table 8 contains the reported degree of perceived vulnerability as measured by the semantic differential scale. Ten participants elected not to disclose their perceived level of vulnerability. The descriptive statistics presented in Table 8 are reflective of the 169 participants who responded.

Table 7

Pearson Product Moment Correlations Between Vulnerability, Knowledge - Health Beliefs, and Threat

Variable	Vulnerability
Knowledge Health Beliefs $r =$	-.364 .0001
Threat $r =$	.586 .0001

Table 8

Report of Perceived Vulnerability to AIDS

Score	N	%	M=3.79	S.D.=2.31
1	26	15.4		
2	34	20.1		
3	34	20.1		
4	18	10.7		
5	17	10.1		
6	17	10.1		
7	9	5.3		
8	7	4.1		
9	3	1.8		
10	4	2.4		

* (Score of 1 represents least perceived vulnerability and score of 10 represents greatest perceived vulnerability)

Table 9 contains the frequency of reported primary barriers to universal precautions. If participants listed one or more barriers the first reported barrier was considered to be the participant's primary barrier to following universal precautions. Only 129 participants disclosed what they perceived to be their primary barrier to following universal precautions. Table 10 presents the absolute frequency of all barriers reported. Barriers are presented in order of decreasing frequency. Percentages are not given in Tables 9 and 10 because the question was an open-ended item and the response does not reflect the entire sample as some participants elected not to answer the item.

Table 9

Frequency of Reported Primary Barriers to Universal Precautions

Characteristics	f
Improperly Fitting Gloves	26
Lack of Necessary Equipment	20
Inconveniently Placed Supplies	16
Emergencies	15
Decreased Efficiency with Use of gloves	12

Table 10

Absolute Frequency of Reported Barriers to Following Universal Precautions

Barrier	f
Improperly Fitting Gloves	37
Lack of Necessary Equipment	27
Time	21
Decreased Efficiency with Gloves	20
Emergencies	19
Inconveniently Placed Supplies	17
Poor Quality Gloves	15
Changing Established Practice and Behavior	5
Acuity	5
Unable to Anticipate Contaminating Episodes	4
Gowns	4
Lack of Convenient Sinks	3
Disagree with Precautions	3
Frequent Need to Recap Needles	3
Masks	3
Not Knowing Patient's Diagnosis	3
Goggles	3
Inadequate Staffing	3
Carelessness of Others	2
Distrust of Current Medical Knowledge	2

(table continued)

Table 10 Cont'd

Barrier	f
Reaction to gloves	2
Do not feel Universal Precautions Required	1
Not Washing hands Between gloves	1
Patient Concerns	1
Inconvenience	1

Additional Information Offered by Participants

Some participants disclosed concerns and opinions on issues related to issues pertaining to universal precautions, but which were not specifically addressed in the instruments utilized for data collection. Two participants expressed concern over the current level of knowledge regarding the HIV viruses and their modes of transmission. Four nurses expressed concern over not being notified of the patient's diagnosis when it includes HIV and AIDS. Another nurse commented that the 100% mortality rate associated with the AIDS increases fear. One nurse commented that gloves are no protection from needle sticks which can occur in situations other than just recapping needles. One participant commented that his/her greatest fear experienced was getting AIDS from an undiagnosed person.

CHAPTER 5

Discussion

The purpose of this study was to identify factors that affect nursing personnel compliance with the CDC's recommended precautions to prevent acquisition of HIV infections by HCW in the workplace. Relationships among the following variables were explored: knowledge - health beliefs, health threat, conflict, and compliance with universal precautions. This chapter is organized to discuss the results of data collected to (a) describe characteristics of the sample; (b) to test the relationship of the hypothesized modification of the HBM (see Figure 2), and discuss unhypothesized relationships found in the study; (c) describe the identified barriers to following universal precautions; (d) consider the meaning of the additional information volunteered by participants; and (e) present a new model describing the relationships among the variables investigated.

Demographic Characteristics of the Sample

The sample consisted of 179 participants (146 from a metropolitan VA hospital and 33 from a rural VA hospital) all employed as registered nurses and involved in direct patient care. The percentage of male nurses was markedly higher than would be anticipated in a noncivil-service setting with men representing 12.6% of the sample and females representing 87.4% of the sample. The age range of respondents was 24 to 64 and was essentially reflective of the American working age population, 18 to 64 (Treas, 1981) when one considers the additional years required for nursing education. The mean number of years of nursing practice was 18.1 reflecting a considerable amount of nursing experience on the part of participants.

The nursing education of the sample was not atypical. The majority of participants, 57.9% ($n = 102$), held a diploma or an associate degree, 34.1% ($n = 60$) held a bachelors degree, and 8% ($n = 14$), held a masters degree.

The incidence of inoculation with a contaminated needle was marked, with 81.5% ($n = 151$) of the sample reporting at least one occupational exposure to blood through a contaminated needle and 11.6% ($n = 20$) reporting more than 10 accidental sticks with a contaminated needle. The majority of participants, 59.5% ($n = 103$), reported between 1 and 5 accidental sticks with a contaminated needle. McCray (1986) who conducted a surveillance project of 966 HCW exposed to HIV found 68% of all exposures involved a needle-stick. The results of this study indicated that needle-sticks continue to be an important source of potential occupational exposures to AIDS by HCW.

Significantly, more than half of nurses, 51.4% ($n = 89$), reported having provided direct nursing care for 10 or more AIDS patients. Twenty-one (12.1%) reported having provided direct nursing care for more than 30 AIDS patients. These figures may be indicative of a low to moderate rate of exposure to specimens of AIDS patients. Kuhl et al. (1987) categorized HCW according to the intensity and frequency of their exposure to biological specimens of AIDS patients over a three year period. HCW who had greater than 50 specimen contacts over a three year period were placed in the high risk category. Those HCW with fewer than 50 exposures were placed in the low risk category. As exposure was not sufficiently operationally defined, it cannot be determined if exposure was the mere handling of a contained specimen of an AIDS patient or actual exposure to the skin or mucus

membranes of the HCW by a specimen containing HIV. It would seem that nurses reporting having only ever provided care for 30 or fewer AIDS patients would probably be in a low risk category as classified by Kuhl et al. (1987). However, the actual number of AIDS patients cared for may be higher as four nurses addressed concerns of not being informed of a patient's diagnosis when that diagnosis included AIDS or HIV positive blood test results. Policies withholding the knowledge of a diagnosis of AIDS from the nurse providing care for the patient could cause significant underestimation of the number of AIDS patients for which a nurse has provided care.

Correlations Among Variables of the Hypothesized Model

Knowledge - Health Beliefs; Conflict

As hypothesized, those nurses who scored higher on the construct knowledge - health beliefs experienced lower levels of conflict (health care delivery motives with health care protective motives) when following universal precautions. Rosenstock (1960) did not couple knowledge and health beliefs as in the hypothesized model. However, his model did postulate that when an individual believes that a course of action is likely to reduce the occurrence or seriousness of a problem, that individual will have less difficulty overcoming the barriers to that particular course of action. The knowledge construct was not separated from health beliefs because of difficulty in distinguishing between the nurses' knowledge of the effectiveness of universal precautions and the nurses' belief in the effectiveness of universal precautions in reducing occupational exposure to the AIDS virus.

Conflict: Compliance

Respondents who reported lower levels of conflict, reported higher levels of compliance with universal precautions. This relationship was also predicted in the modified HBM. The HBM (Rosenstock, 1960) addressed three types of conflict. These conflicts included: (a) conflict between two completing motives such as health care delivery motives and health care protective motives, (b) conflict encountered when the available course of action is intrinsically frustrating as may be experienced by nurses who are changing their practice to accommodate universal precautions, and (c) conflict occurring when an individual does not see any course of action to satisfy an existing motive. This type of conflict may be experienced by nurses who do not perceive universal precautions as efficacious in reducing the risk of occupational exposure to HIV. Each of these types of conflict are viewed as contributing to the overall conflict between the nurses' health care delivery motives and health care protective motives. Both the health care delivery motive (the nurses' desire to give the best quality and most efficient care of which the nurse is capable) and the health care protection motive (the nurses' motives to avoid putting self at risk of acquiring HIV during the process of health care delivery) are admirable motives for the practicing nurse, but can be in conflict with one another. Accurate knowledge about AIDS and a belief in the efficacy of universal precautions appear to assist the nurse to resolve these conflicts and promote behavior that is compliant with universal precautions and thereby reduce the risk of occupational exposure to AIDS.

Threat: Compliance

It was hypothesized that nurses perceiving a higher level of threat by AIDS, which included perceived personal susceptibility and perceived seriousness of the disease should it occur, would demonstrate higher levels of compliance. No relationship was observed between these variables. Rosenstock (1960) postulated that for an individual to take a course of action relative to a problem the individual must feel threatened by the health problem and must see an available, effective course of action. The relationship between threat and compliance may have been confounded by the observed relationship between knowledge - health beliefs and health threat. Knowledge - health beliefs was found to be negatively correlated with threat ($r = -.376$, $p = .0001$). This relationship had not been predicted in the modified HBM, but was found to be statistically significant. These findings indicate that higher levels of knowledge decrease threat and increase compliance. Additionally, it is conceivable that high levels of threat cannot lead to compliant behaviors unless the nurse is knowledgeable of universal precautions and AIDS. Rosenstock's (1960) postulation that the individual must not only be threatened, but see an available course of actions also indicates the necessity of both perceived threat and knowledge for the development of compliant behaviors.

These findings give support to those of Valenti and Anarella (1984) who found that HCW who scored greater than 80% on a knowledge questionnaire were more likely to indicate they had no concerns when caring for AIDS patients. The extensive education which has taken place in most institutions regarding AIDS and the changes involved in implementing universal precautions may have reduced the level of threat nurses perceive.

This interpretation is given some support by the negative correlation observed between health threat and the number of continuing education units obtained by the nurse ($r = -.205$, $p = .006$).

Knowledge and Health Beliefs: Compliance

As hypothesized, those nurses whose response indicated accurate knowledge and a belief in the efficacy of universal precautions reported higher levels of compliance with universal precautions. These findings may be reflective of the effectiveness of educational programs offered nurses regarding AIDS and universal precautions. Interestingly, no relationship was found between knowledge - health beliefs and the number of continuing education units taken by the nurse, however; the demographic instrument did not address continuing education units targeted at AIDS and universal precautions.

Vulnerability and the Hypothesized Model

The secondary instrument utilized in data collection contained a semantic differential in which nurses were requested to indicate on a scale of 1 to 10 their perceived vulnerability to acquiring AIDS, with 1 being not vulnerable at all and 10 being sure to get it. The mean score on the semantic differential vulnerability scale was 3.79 reflecting a moderate level of perceived vulnerability among respondents. The significant correlation found between vulnerability and health threat support the supposition by Rosenstock (1960) that perceived vulnerability to acquiring a disease is a component of health threat. Vulnerability was also found to be negatively correlated with knowledge - health beliefs ($r = -.364$, $p = .0001$) paralleling the relationship between health threat and Knowledge - health beliefs ($r = -.376$, $p = .0001$).

The negative correlation between the number of AIDS patients for which the nurse had provided care and vulnerability score was consistent with the findings of Valinis and Shortridge (1987) who investigated the use of protective clothing by nurses mixing and administering antineoplastic agents. They found statistically significant inverse correlations between with the use of protective clothing and both the number of doses handled per week and the number of years that the nurse had handled the drugs. In an earlier study Valanis and Brown (1985) reported that most nurses indicated that they did not use protective clothing when handling antineoplastic agents because they did not feel they were at any risk. These findings appear to indicate that nurses become comfortable over a period of time with the occupational hazards they encounter and that this leads to decreased use of protective measures. In this study no relationship was found between the number of AIDS patients for which the nurse had provided care and compliance with universal precautions. It is possible that this relationship is evolving into a negative one which might be identified in a future estimation.

Barriers to Following Universal Precautions

The most frequent barrier reported by nurses to following universal precautions was improperly fitting gloves accounting for 13% of the reports of barriers. Gloves techniques may potentially be related to as many as 61% ($n = 122$) of the barriers reported. If one considers the reported barriers of improperly fitting gloves, lack of necessary equipment, decreased efficiency with gloves, inconveniently placed supplies, poor quality gloves, not washing hands between gloves, and inconvenience to all be related to the

use of gloves. These reports of barrier may also be related to other aspects of following universal precautions.

Inconvenience and poor accessibility is a reoccurring theme of the above mentioned barriers relating to the use of gloves. Valanis and Shortridge (1987) reported that inconvenience of supplies was cited as a cause for nurses not using protective clothing when handling and administering antineoplastic agents. Kaplan and McGuckin (1986) found that compliance with handwashing was significantly increased ($p < .01$) with improved availability of sinks. Their findings may be applicable to improving nurses compliance with universal precautions by improving accessibility to the protective barriers required for implementation.

If one considers the reported barriers of time, acuity, and inadequate staffing together as a single category representing patient load this accounts for 14.5% ($n = 29$) of the reported barriers to following universal precautions. These barriers like those involving gloves are potentially limitable.

Emergency situations accounted for 9.5% ($n = 19$) of the reports of barriers. Although this category of barriers may not be completely limitable in the modern health care setting, it is however potentially reducible.

Only 3% ($n = 6$) of the reports of barriers indicated a lack of belief in the efficacy of universal precautions or distrust with the current level of medical knowledge surrounding the transmission of AIDS. This may be reflective of the intense educational process that has taken place regarding AIDS and universal precautions.

Surprisingly, only one barrier was mentioned resulting from patient concerns when following universal precautions. Valanis and Shortridge (1987) reported that psychological effect upon the patient was cited as a reason nurses administering antineoplastic agents did not utilize protective clothing. This may indicate that nurses feel they are effectively communicating to their patients the need for wearing protective gear.

Perhaps the most interesting finding is that of the five primary barriers to following universal precautions, no barriers specifically relating to the manipulation and disposal of sharp items were included. McCray (1986) found that of 938 exposures to HIV that 68% ($n = 637$) were related to needle-sticks. He further reported that had universal precautions been followed 30% ($n = 280$) of those exposures could have been prevented. Although the major area of exposure to HIV may be related to needle-sticks, nurses apparently did not perceive the manipulation and disposal of needles and contaminated sharps as a primary barrier or difficulty in following universal precautions. Only three nurses listed barriers that involved manipulation of contaminated needles. Although the occurrences of reported needle-sticks may have been well before the implementation of universal precautions, with 81.5% ($n = 151$) of the respondents reporting exposure to blood from a contaminated needle it is puzzling that of the total frequency of 200 reports of barriers only 3 involved the manipulation of needles and there were no reported barriers specifically addressing the disposal of needles. This may also indicate the apparent desensitization of nurses to the occupational hazards to which they are most persistently exposed as found by Valanis and Shortridge (1987).

Additional Information Offered by Participants

Four nurses expressed additional concerns regarding not being knowledgeable about the client's diagnosis. Two nurses mentioned this specifically as a barrier to following universal precautions. Many nurses are indicating that they have a right to know what is infectious or hazardous about their jobs. The interpretation of "right-to-know" or hazard communications laws is being argued to include knowledge of diagnosis. A recent poll of nurses leaving the profession obtained responses reflecting frustration with policies that withhold knowledge of the diagnosis of patients with AIDS ("Health Concerns", 1988).

Developing a New Model

Based upon the results of this investigation a new model is proposed as presented in Figure 4. This model reflects vulnerability as a separated and distinguishable component of health threat. Perceived seriousness of the disease is not presented as a separated component as it was not empirically addressed as a distinguishable entity in this study.

The negative correlational relationship discovered between health threat and knowledge - health beliefs is also reflected in the model. The model reflects that no relationship was found between threat and compliance and between threat and conflict. Familiarity with universal precautions and AIDS patients may be factors in the lack of correlation between these variables. If a negative relationship is in the process of forming between the number of AIDS patients cared for and the degree of perceived vulnerability, a similar relationship may be forming between threat and compliance as would be indicated by continued exposure to the threat of AIDS decreasing compliance. This may explain the phenomenon of

why nurses failed to see the manipulation and disposal of contaminated sharps as a difficulty to following universal precaution when research has indicated that needle injuries are the primary source of HIV exposures to HCW. The inservice education programs on these topic may have contributed to a reduction in the threat and the conflict experienced by nurses.

The model also illustrates that increased knowledge - health beliefs decreases conflicts with following universal precautions and increases compliance. Knowledge of AIDS and a health belief in the efficacy of universal precautions decreases the conflict the nurse experience when attempting to follow the CDC guidelines. Additionally, the decreased conflict is correlated with increased compliance with universal precautions indicating that when conflicts are removed or diminished there is an increase in compliance with the CDC guidelines.

Upon examination of the model it appears that there may be other variables which were not identified or investigated in this study which are impacting compliance by nurses with universal precautions. The HBM (Rosenstock, 1960) indicated that non-health related motives may at times determine health-related behaviors. The lack of a significant relationship between threat and compliance may indicate that threat is more indirectly affecting compliance. The highest level of threat without the appropriate knowledge base cannot lead to compliant behaviors. While the revised model illustrates the relationships among the variables studied it also indicates the need for further research and the identification of additional variables.

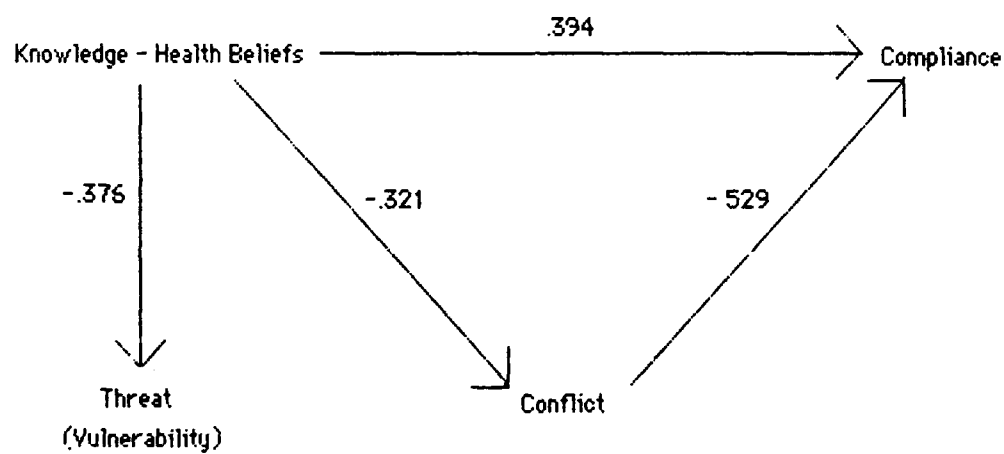


Figure 4. Revised Empirical Model (all relationships significant at .0001)

CHAPTER 6

Summary, Limitations, Implications, and Recommendations

In this chapter the purpose, design, and findings of this investigation will be summarized. The limitations of those findings will then be addressed followed by the implications of the study. This chapter will be conclude with recommendations for further research.

Summary

The purpose of this study was to identify factors that affect nursing personnel's compliance with the CDC's recommended precautions to prevent acquisition of HIV infections by HCW in the workplace. The study focused specifically on the CDC guidelines relating to the handling and disposing of sharp items, and techniques utilized in prevention of exposure to blood or other body fluids. The relationships among the following variables were explored: knowledge - health beliefs, health threat, and conflict as they explain compliance with universal precautions. In addition, demographic variables such as age, marital status, nursing education, continuing education hours, number of accidental needle sticks, and the number of AIDS patients for which the nurse had provided care were studied. Certain demographic variables were compared with those of the explanatory model. An estimate of vulnerability was made and participants were given the opportunity to identify barriers to following universal precautions. Stability of the instrument was estimated by test-retest procedures. Internal consistency was estimated by calculation of Chronbach's alpha. Subscale alpha's ranged from .73 to .90.

The sample consisted of 179 nurses employed at two VA hospitals in a southwestern state. The percentage of males was 12.6 and the percentage of females was 87.5. The sample reflected a substantial amount of nursing

experience ($M = 18.1$ years). The majority of participants (57.9%) held a diploma or associate degree as their highest level of nursing education. A large majority (81.5%) of the participants reported at least one incidence of inoculation with a contaminated needle and a smaller majority (59.5%) reporting between 1 and 5 occurrences.

Pearson's correlations were used to describe the relationships among the variables in the modified HBM. In the final model threat was negatively correlated with knowledge - health beliefs. Knowledge - health beliefs was negatively correlated with conflict and positively correlated with compliance. Conflict was negatively correlated with compliance. Vulnerability was also identified as a distinguishable component of threat.

An inverse correlation was found between the number of AIDS patients for which a nurse had provided care and the nurses' perceived vulnerability to acquiring AIDS. Nurses did not seem to express concern over the manipulation and disposal of contaminated needles even though the literature identified inappropriate manipulation and disposal of needles as the primary source of occupational exposure to HIV.

Among the reports of barriers to following universal precautions inconvenience and poor accessibility of equipment were reoccurring themes. Nurses additionally identified not being informed of the diagnosis of patients with AIDS or HIV positive blood tests as a concern.

The variables examined in the modified HBM and demographic data provide important information toward understanding of the factors that influence nurses towards compliance with universal precautions. The identification of barriers to following universal precautions provides

important information into understanding those factors that influence nurses away from compliance with universal precaution.

Limitations

The primary limitation of this study was the sample consisting of only nurses employed at VA hospitals. Although the PPAT did demonstrate promising reliability and validity any generalization beyond VA nurses must be limited.

This was the first use of the instrument. Further studies utilizing the PPAT would lend additional support to the quality of the instrument and thus the generalizability of the results obtained.

The modified HBM did not incorporate all of the components of the HBM as addressed by Rosenstock (1960). He addressed non-health related motivations as a potential cause or inhibitor of health related behaviors. Although incorporated into the concept health threat, the concept of perceived susceptibility was not tested as a distinguishable component of health threat in this investigations. Additionally, there may be other factors that were not addressed by either model that contributed to the relationships under investigation.

A social desirability scale was not included in the questionnaire. Subjects may have rated themselves higher on compliance with universal precautions in an effort to maintain social desirability.

Nursing Implications

The model investigated in this study was constructed to help determine the factors that impact nurses' compliance with universal precautions. The testing of the model provides greater order and definition of the concepts as they impact compliance among nurses. The mortality rates associated with

contracting AIDS make the protection of HCW from this occupational hazard of paramount importance.

The US government, hospitals, and health care educators are spending considerable money and time in researching and establishing guidelines and policies to protect HCW from AIDS and other occupational hazards. These guidelines are only truly efficacious when they are being incorporated into the practice of HCW. By identifying the factors that influence nurses' compliance with universal precautions educational, administrative policies, and work areas can be modified to facilitate compliance and reduce risks to HCW.

In this study knowledge - health beliefs were positively correlated with compliance. The number of continuing education units obtained was also positively correlated with compliance. These findings support the efficacy of programs designed to educate HCW on occupational hazards and the protective measures that can be taken to reduce those hazards.

This study along with Kaplan and McGuckin (1986), and Valanis and Shortridge (1987) indicate the importance of easy access to the necessary materials and protective clothing in improving compliance by nurses with various self-protective measures. Simple measures to improve access to these items could significantly impact compliance by nurses with self-protective guidelines.

The study also indicated that nurses did not perceive difficulty in present practice concerning the manipulation and disposal of contaminated needles even though this has been identified as a major source of exposure to HIV. An inverse relationship was found between the number of AIDS patients for which a nurse had provided care and the nurses perceived

vulnerability to acquiring AIDS. These results indicate the need for increased education on the disposal and manipulation of contaminated sharps, and for recurrent educational programs on those occupational hazards that are consistent in the health care environment to which HCW may become desensitized to, and fail to take protective measures.

Recommendations for Research

Several recommendations for further research can be made as a result of this study. First, the study should be replicated on a broader population of nurses to determine if these findings are representative of the larger population of nurses and for the purpose of establishing further estimates of the reliability of the data collection instrument.

The strongest correlational relationship found in the modified model was that of the inverse relationship between conflict and compliance. Further research is necessary to focus on the identification of other conflicts experienced by nurses in both the provision of patient care, and the implementation of self-protective measures to promote higher quality patient care and increased use of self-protective measures on the part of nurses.

The relationship of threat to compliance needs further investigation. Threat was not found in this study to be correlated with compliance. While threat alone cannot result in compliance the HBM indicates that perceived threat is necessary before an individual will seek a course of action to reduce the health threat. Statistical techniques of path analysis or multiple regressions might better identify this relationship.

Since this study showed no relationship between the number of AIDS patients cared for and compliance by nurses with universal precautions, and

others studies (Valanis & Shortridge, 1987) have shown that extended exposure to occupational hazards appears to result in decreased use of protective measures, compliance with universal precautions should be studied in a population of nurses who are providing care for only AIDS and HIV positive patients to determine if a negative correlational relationship is evolving. Similar studies should also be conducted on other occupational hazards to which nurses experience extended or continuous exposure.

Additionally, further research should investigate the non-health related motives that are impacting the use of self-protective measures by HCW. The HBM warrants further empirical testing as it may be a very viable framework for investigating the self-protective practices of both HCW and non-HCW who are exposed to occupational hazards.

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APPENDIX A
UNIVERSAL PRECAUTIONS

1. All health-care workers should routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patient is anticipated. Gloves should be worn for touching blood and body fluids, mucous membranes, or non-intact skin of all patients, for handling items or surfaces soiled with blood or body fluids, and for performing venipuncture and other vascular access procedures. Gloves should be changed after contact with each patient. Masks and protective eyewear or face shields should be worn during procedures that are likely to generate droplets of blood or other body fluids to prevent exposure of mucous membranes of the mouth, nose, and eyes. Gowns or aprons should be worn during procedures that are likely to generate splashes of blood or other body fluids.
2. Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood or other body fluids. Hands should be washed immediately after gloves are removed.
3. All health-care workers should take precautions to prevent injuries caused by needles, scalpels, and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments after procedures. To prevent needlestick injuries, needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable syringes and needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal; the puncture-resistant containers should be located as close as practical to the use area.

Large-bore reusable needles should be placed in a puncture-resistant container for transport to the processing area.

4. Although saliva has not been implicated in HIV transmission, to minimize the need for emergency mouth-to-mouth resuscitation, mouthpieces, resuscitation bags, or other ventilation devices should be available for use in areas in which the need for resuscitation is predictable.

5. Health-care workers who have exudative lesions or weeping dermatitis should refrain from all direct patient care and from handling patient-care equipment until the condition resolves.

6. Pregnant health-care workers are not known to be at greater risk of contracting HIV infection than health-care workers who are not pregnant; however, if a health-care worker develops HIV infection during pregnancy, the infant is at risk of infection resulting from perinatal transmission. Because of this risk, pregnant health-care workers should be especially familiar with and strictly adhere to precautions to minimize the risk of HIV transmission (CDC, 1987 p. 5S).

APPENDIX B
LETTER OF TRANSMITTAL

Dear Colleague,

I am an active duty Air Force nurse attending Arizona State University seeking a masters degree in Adult-Health Nursing. I have chosen the topic of "Universal Precautions" as my area of research. With the advent of AIDS there have been many changes suggested in our infection control practices. These changes have impacted upon us greatly as staff nurses providing direct patient care. To a great degree it is up to us to resolve the problems we encounter in following new guidelines designed to protect us from infectious diseases. This is an exploratory study to help us examine and define our strengths and the difficulties we encounter when implementing these changes in the practical day to day delivery of patient care.

Please assist me in this endeavor by taking the time to complete the enclosed questionnaire. Your response will be confidential and the information collected will be pooled and presented collectively.

This study includes three hospitals in the state of Arizona. Many questions in the questionnaire relate specifically to following universal precautions to prevent acquiring AIDS or hepatitis as the result of a workplace exposure. I am aware that your hospital may have adopted a similar type of blood and body fluid precautions that go beyond protection from AIDS and hepatitis. This should pose no difficulty in your completing the questionnaire.

Thank you for your valuable time and participation in this study. Please accept my appreciation and this decorative pencil supplied by Arizona Air Force Nurse Recruitment Office.

Sincerely,

Joel D. Ray, Capt
United States Air Force, Nurse Corps

APPENDIX C
AIDS KNOWLEDGE - HEALTH BELIEFS SCALE

The 20 items of this scale were administered to measure the closely related constructs of knowledge and beliefs. Knowledge was defined as an individual's understanding of AIDS including incidence, transmission and appropriate protective measures. Health beliefs were defined as the degree to which the nurse believes universal precautions are an effective measure in reducing the threat of acquiring AIDS from a work related incident. Answer options for items measuring knowledge included true, false and not sure. Answer options for items measuring beliefs were presented in a likert format and included strongly disagree (SD), disagree (D), neutral (N), agree (A) and strongly agree (SA).

- | | | | |
|---|------|-------|----------|
| 1. AIDS is caused by an airborne virus. | True | False | Not Sure |
| 2. Casual contact (shaking hands, touching) with AIDS patients should be avoided. | True | False | Not Sure |
| 3. Health care providers should follow careful procedures when handling any blood or tissue samples of AIDS patients. | True | False | Not Sure |
| 4. A major method of transmission of AIDS is through sexual contact. | True | False | Not Sure |
| 5. AIDS is a serious condition characterized by a specific defect in natural immunity against disease. | True | False | Not Sure |

- | | | | |
|---|------|-------|----------|
| 6. Numerous cases of AIDS have been reported among health care workers. | True | False | Not Sure |
| 7. Masks, gloves, and gowns are required for any contact with AIDS patients. | True | False | Not Sure |
| 8. Specimens, tissue, blood samples, etc., from persons with AIDS should be handled with the same precautions as hepatitis B. | True | False | Not Sure |
| 9. Use of common waiting areas by AIDS patients poses no health risk. | True | False | Not Sure |
| 10. The use of public bathroom facilities by AIDS patients poses no health risk. | True | False | Not Sure |
| 11. AIDS has been transmitted to patients receiving blood transfusions. | True | False | Not Sure |
| 12. AIDS has been transmitted to blood donors. | True | False | Not Sure |
| 13. By not recapping contaminated needles the risk of occupationally acquiring AIDS is decreased. | SD | D | N A SA |

- | | |
|--|---------------------|
| 14. Gloves are an effective measure in preventing exposure to the AIDS virus through possibly unnoticed breaks in the skin of the hands. | SD D N A SA |
| 15. The risk of occupationally acquired HIV infections can be decreased by disposing of syringes, needles, scalpel blades and other sharp items into puncture resistant containers located as close as practical to the area in which they are used. | SD D N A SA |
| 16. Washing hands immediately after they have become contaminated with blood can decrease the risk of obtaining an occupationally acquired HIV infection. | SD D N A SA |
| 17. Following universal precautions will effectively decrease any health care workers risk of acquiring AIDS from a work related incident. | SD D N A SA |

- | | |
|--|---------------------|
| 18. I know of no protective measures which I feel will adequately reduce my risk of acquiring AIDS from a work related exposure. | SD D N A SA |
| 19. More extraordinary precautions beyond universal precautions are required to adequately minimize the risk of transmission of AIDS to health care workers. | SD D N A SA |
| 20. I do not believe that wearing any type of protective gear as recommended by universal precautions offers adequate protection from a potential HIV infection. | SD D N A SA |

APPENDIX D
AIDS HEALTH THREAT SCALE

The 14 items of this scale were administered to estimate the perceived health threat of participants. Health threat was defined as the degree to which the nurse feels threatened by AIDS including personal susceptibility and the seriousness of acquiring AIDS should it occur. Items on this scale were administered in a likert format and included strongly disagree (SD), disagree (D), neutral (N), agree (A) and strongly agree (SA).

- | | |
|--|---------------------|
| 1. AIDS presents a serious occupational hazard to health care workers. | SD D N A SA |
| 2. My family and friends are seriously concerned about my risk of acquiring AIDS from a work related incident. | SD D N A SA |
| 3. AIDS is the greatest occupational health threat to a health care worker. | SD D N A SA |
| 4. The threat of acquiring AIDS from a work related incident is personally frightening. | SD D N A SA |
| 5. I do not feel at risk for acquiring AIDS from a work related incident. | SD D N A SA |

- | | | | | | |
|---|----|---|---|---|----|
| 6. I rarely think of the possibility of acquiring AIDS from a work related incident. | SD | D | N | A | SA |
| 7. To some degree I feel my health is threatened when I am caring for an AIDS or HIV positive patient. | SD | D | N | A | SA |
| 8. There are communicable diseases other than AIDS that I feel at greater risk of acquiring from a work related incident. | SD | D | N | A | SA |
| 9. I have expressed to my family and friends my concern over the risk of acquiring AIDS from a work related exposure. | SD | D | N | A | SA |
| 10. I feel at great risk of acquiring AIDS from an occupational exposure. | SD | D | N | A | SA |
| 11. AIDS is not a serious threat to any reasonably cautious health care worker. | SD | D | N | A | SA |
| 12. A diagnosis of AIDS would be devastating to me. | SD | D | N | A | SA |

13. I am more concerned about potential accidents and injuries in my workplace than occupationally acquired AIDS or HIV.

SD D N A SA

14. My concern over the possibility of occupationally acquiring AIDS is increasing as the number of patients with a clinical diagnosis of AIDS rises.

SD D N A SA

APPENDIX E
HEALTH CARE WORKER CONFLICT SCALE

The 19 items of this scale were administered to measure the conflict experienced by participants. Conflict was defined as the extent the nurses' health care delivery motives and health care protective motives are in conflict when following universal precautions. The items on this scale were presented in a Likert format and answer options included strongly disagree (SD), disagree (D), neutral (N), agree (A) and strongly agree (SA).

- | | |
|--|---------------------|
| 1. Following universal precautions
requires too much time and is
impractical in the setting of bedside
nursing. | SD D N A SA |
| 2. Following universal precautions
requires changing too many routine
practices to ever be practical for me. | SD D N A SA |
| 3. If gloves, goggles, or gowns that I
need for protection are not readily
available it becomes too frustrating to
use them on a routine basis for
protection against blood and body fluids. | SD D N A SA |

- | | | | | | |
|--|----|---|---|---|----|
| 4. With minimal planning it is easy to follow universal precautions to prevent exposure to HIV. | SD | D | N | A | SA |
| 5. Treating all blood as potentially infectious is too overwhelming to be practical in the patient care setting. | SD | D | N | A | SA |
| 6. When I am caring for a patient known to have AIDS or to be HIV positive, I find it easier to follow universal precautions. | SD | D | N | A | SA |
| 7. I feel nurses should take self-protective measures regardless of the feelings of the patient. | SD | D | N | A | SA |
| 8. A lack of conveniently located sharps containers encourages nurses to recap or otherwise manipulate syringes before their disposal. | SD | D | N | A | SA |
| 9. Wearing gloves while starting an IV is too much of a hassle to be practical. | SD | D | N | A | SA |

- | | | | | | |
|--|----|---|---|---|----|
| 10. It is difficult to determine which is most important, wearing gloves to protect myself from potential exposure to HIV and possibly missing an IV stick, or not wearing gloves and ensure greater accuracy. | SD | D | N | A | SA |
| 11. When the patient census and acuity levels are high it is more difficult to follow universal precautions. | SD | D | N | A | SA |
| 12. Following universal precautions slows down emergency interventions in situations such as a cardiac arrest. | SD | D | N | A | SA |
| 13. I find it distressing to wear gloves and other protective clothing when I am working with a patient who is struggling with an altered body image or decreased self-esteem. | SD | D | N | A | SA |
| 14. I am comfortable with the idea of wearing gloves when required for protection during patient care. | SD | D | N | A | SA |

- | | | | | | |
|---|----|---|---|---|----|
| 15. Gloves that do not fit my hands make it difficult to choose self-protection over no protection. | SD | D | N | A | SA |
| 16. When emergency interventions are required the idea of choosing to protect myself first is frustrating to me. | SD | D | N | A | SA |
| 17. The extra time required to put on and wear protective garments when indicated is not frustrating or annoying to me. | SD | D | N | A | SA |
| 18. I know I can always make my patient feel comfortable and accepted even when I am wearing gloves or other protective garments. | SD | D | N | A | SA |
| 19. Following universal precautions requires changing too many routine practices to ever be practical for me. | SD | D | N | A | SA |

APPENDIX F
HEALTH CARE WORKER COMPLIANCE SCALE

The 15 items on this scale were administered to estimate compliance by nurses with universal precautions. Compliance was defined as behaviors conforming to the guidelines of universal precautions. Items on this scale were administered in a likert format and answer options included strongly disagree (SD), disagree (D), neutral (N), agree (A) and strongly agree (SA).

- | | |
|---|---------------------|
| 1. I never recap needles prior to disposing
of them in a sharps container. | SD D N A SA |
| 2. I always wear gloves when starting
an IV. | SD D N A SA |
| 3. It is a very unusual circumstance when
I do not glove when having contact with
blood or other body fluids. | SD D N A SA |
| 4. I have never worn goggles even when
there was a risk of the splattering of
blood. | SD D N A SA |
| 5. I wear protective gear when there is a
risk of exposure to blood and encourage
my colleagues to do the same. | SD D N A SA |

- | | | | | | |
|---|----|---|---|---|----|
| 6. I handle all items soiled with blood as potentially infectious. | SD | D | N | A | SA |
| 7. I do not wear gloves for venipuncture. | SD | D | N | A | SA |
| 8. I frequently recap needles before I dispose of them. | SD | D | N | A | SA |
| 9. I wash my hands immediately after exposure to blood or other body fluids. | SD | D | N | A | SA |
| 10. I always wash my hands immediately after removing gloves. | SD | D | N | A | SA |
| 11. I always remove my gloves and wash my hands between contact with two separate patients. | SD | D | N | A | SA |
| 12. I do wear a mask or protective eyewear during procedures likely to generate droplets of blood or other body fluids. | SD | D | N | A | SA |
| 13. I do not always wash my hands after removing protective gloves. | SD | D | N | A | SA |

- | | | | | | |
|--|----|---|---|---|----|
| 14. I have worn the same pair of gloves
during multiple patient contacts. | SD | D | N | A | SA |
| | | | | | |
| 15. I encourage my peers to appropriately
wear gloves and other protective
garments. | SD | D | N | A | SA |

APPENDIX G
PROTECTIVE PRACTICE ASSESSMENT TOOL
WITH DEMOGRAPHIC QUESTIONS ATTACHED

The AIDS virus has brought about major changes in our infection control practices. In addition to the disease specific isolation system we are incorporating a system where many blood and many body fluids are treated as infectious. These guidelines recommended by the CDC have come to be known as universal precautions. The purpose of this questionnaire is to obtain information from practicing staff nurses on the effectiveness of these precautions and situations requiring their use.

Please choose the answers on the questionnaire that most accurately reflect your opinions, beliefs, knowledge, or practice. You may elect not to answer some of the questions. Any information obtained from this questionnaire will be available only to the researcher. All information will be pooled and averages will be used in reporting. Your participation in this study could positively effect change to decrease the occupational hazards nurses encounter while working in an environment containing infectious diseases. Please do not write your name in any place on the questionnaire.

The questionnaire should take approximately 20 minutes of your time. Thank you for your participation.

Section I

These questions concern knowledge of AIDS including transmission and appropriate protective measures. Please answer to the best of your ability. Circle: True, False, or Unsure.

- T F Not Sure AIDS is caused by an airborne virus.
- T F Not Sure Casual contact (shaking hands, touching) with AIDS patients should be avoided.
- T F Not Sure Health care providers should follow careful procedures when handling any blood or tissue samples of AIDS patients.
- T F Not Sure A major method of transmission of AIDS is through sexual contact.
- T F Not Sure AIDS is a serious condition characterized by a specific defect in natural immunity against disease.
- T F Not Sure Numerous cases of AIDS have been reported among health care workers.
- T F Not Sure Masks, gloves, and gowns are required for any contact with AIDS patients.
- T F Not Sure Specimens, tissue, blood samples, etc., from persons with AIDS should be handled with the same precautions as hepatitis B.

- T F Not Sure Use of common waiting areas by AIDS patients poses no health risk.
- T F Not Sure The use of public bathroom facilities by AIDS patients poses no health risk.
- T F Not Sure AIDS has been transmitted to patients receiving blood transfusions.
- T F Not Sure AIDS has been transmitted to blood donors.

Section II

This section contains questions concerning topics such as your perception of the risk to health care workers of acquiring AIDS or HIV and difficulties you might have in following universal precautions. Please choose the response that most appropriately reflects your thoughts or actions.

Check One:	S.D.	D.	N.	A.	S.A.
1. It is a very unusual circumstance when I do not glove when having contact with blood or other body fluids.					
2. Following universal precautions will effectively decrease any health care workers risk of acquiring AIDS from a work related incident.					
3. My concern over the possibility of occupationally acquiring AIDS is increasing as the number of patients with a clinical diagnosis of AIDS rises.					
4. It is difficult to determine which is most important, wearing gloves to protect myself from potential exposure to HIV and possibly missing an IV stick, or not wearing gloves and ensure greater accuracy.					
5. I know of no protective measures which I feel will adequately reduce my risk of acquiring AIDS from a work related exposure.					
6. Universal precautions require putting self-protection ahead of patient care.					

Check One:	SD	D	N	A	S.A
7. I always wear gloves when starting an IV.					
8. Following universal precautions requires changing too many routine practices to ever be practical for me.					
9. When I am caring for a patient known to have AIDS or to be HIV positive, I find it easier to follow universal precautions.					
10. I do not wear gloves for venipuncture.					
11. A diagnosis of AIDS would be devastating to me.					
12. I feel nurses should take self-protective measures regardless of the feelings of the patient.					
13. I have expressed to my family and friends my concern over the risk of acquiring AIDS from a work related exposure.					
14. I do wear a mask or protective eyewear during procedures likely to generate droplets of blood or other body fluids.					
15. I do not feel at risk for acquiring AIDS from a work related incident.					
16. By not recapping contaminated needles the risk of occupationally acquiring AIDS is decreased.					
17. Wearing gloves while starting an IV is too much of a hassle to be practical.					
18. There are communicable diseases other than AIDS that I feel at greater risk of acquiring from a work related incident.					
19. The threat of acquiring AIDS from a work related incident is personally frightening.					
20. I do not always wash my hands after removing protective gloves.					

Check One:	SD	D	N	A	SA
21. I am comfortable with the idea of wearing gloves when required for protection during patient care.					
22. I rarely think of the possibility of acquiring AIDS from a work related incident.					
23. To some degree I feel my health is threatened when I am caring for an AIDS or HIV positive patient.					
24. I wash my hands immediately after exposure to blood or other body fluids.					
25. I handle all items soiled with blood as potentially infectious.					
26. I never recap needles prior to disposing of them in a sharps container.					
27. I am more concerned about potential accidents and injuries in my workplace than occupationally acquired AIDS or HIV.					
28. Following universal precautions requires changing too many routine practices to ever be practical for me.					
29. I encourage my peers to appropriately wear gloves and other protective garments as needed to prevent exposure to HIV.					
30. With minimal planning it is easy to follow universal precautions to prevent exposure to HIV.					
31. I know I can always make my patient feel comfortable and accepted even when I am wearing gloves or other protective garments.					

Check One:	S.D.	D.	N.	A.	S.A.
32. More extraordinary precautions beyond universal precautions are required to adequately minimize the risk of transmission of AIDS to health care workers.					
33. AIDS is not a serious threat to any reasonably cautious health care worker.					
34. Following universal precautions slows down emergency interventions in situations such as cardiac arrest.					
35. The extra time required to put on and wear protective garments when indicated is not frustrating or annoying to me.					
36. Gloves that do not fit my hands make it difficult to choose self-protection over no protection.					
37. When emergency interventions are required the idea of choosing to protect myself first is frustrating to me.					
38. AIDS presents a serious occupational hazard to health care workers.					
39. If gloves, goggles, or gowns that I need for protection are not readily available it becomes too frustrating to use them on a routine basis for protection against blood and body fluids.					
40. I have worn the same pair of gloves during multiple patient contacts.					
41. When the patient census and acuity levels are high it is more difficult to follow universal precautions.					
42. I have never worn goggles even when there was a risk of the splattering of blood.					
43. Treating all blood as potentially infectious is too overwhelming to be practical in the patient care setting.					

Check One:	S.D.	D	N	A	S.A
44. I feel at great risk of acquiring AIDS from an occupational exposure.					
45. Washing hands immediately after they have become contaminated with blood can decrease the risk of obtaining an occupationally acquired HIV infection.					
46. I do not believe that wearing any type of protective gear as recommended by universal precautions offers adequate protection from a potential HIV infection.					
47. AIDS is the greatest occupational health threat to a health care worker.					
48. Gloves are an effective measure in preventing exposure to the AIDS virus through possible unnoticed breaks in the skin of the hands.					
49. I always remove my gloves and wash my hands between contact with two separate patients.					
50. A lack of conveniently located sharps containers encourages nurses to recap or otherwise manipulate syringes before their disposal.					
51. I find it distressing to wear gloves and other protective clothing when I am working with a patient who is struggling with an altered body image or decreased self-esteem.					
52. The risk of occupationally acquired HIV infections can be decreased by disposing of syringes, needles, scalpel blades and other sharp items into puncture resistant containers located as close as practical to the area in which they are used.					
53. My family and friends are seriously concerned about my risk of acquiring AIDS from a work related incident.					

Check One:	S.D	D	N	A	S.A
54. I frequently recap needles before I dispose of them.					
55. I wear protective gear when there is a risk of exposure to blood and encourage my colleagues to do the same.					
56. I always wash my hands immediately after removing gloves.					

Section III

Items in this section are included to obtain general information on those who are participating in this study. Please give the most appropriate response.

Age _____

Gender: Male / Female (circle one)

Number of Children in your home. _____

Marital Status: Single/Married or living together / Divorced/ widowed (circle one)

What was your first basic level of nursing education? LPN ____ A.D. ____
Diploma ____ BSN ____

What is your highest level of nursing education obtained? LPN ____
A.D. ____ Diploma ____ BSN ____ MSN ____ Doctorate ____

Date Graduated from last Nursing Program. _____

The average number of CEU's obtained per year for the last three years.

- () 30 or more
- () 10 to 20
- () 5 to 10
- () less than 5

During the past three years have you been enrolled any college or university courses to advance your nursing or general education?

- () Yes
- () No

In what type of area do you presently practice nursing?

- ☐ Surgical
☐ Medical
☐ Combination Medical/Surgical
☐ ICU/CCU
☐ Maternal/Child
☐ Specialty Area _____
☐ Other _____

Do you have experience in any specialty areas in nursing? If so how many years of experience in each area?

Specialty Areas	Years Experience
_____	_____
_____	_____
_____	_____

How many years have you practiced nursing? _____

How many years you have worked within the V.A. system? _____

How many years have you worked in the V.A. hospital in which you are presently employed? _____

How many AIDS patients have you taken care of?

- ☐ 50 or more
☐ 30 to 50
☐ 10 to 30
☐ less than 10

How many times in your nursing career have you been stuck by a contaminated needle or other sharp object?

- ☐ More than 15 times
☐ 11-15
☐ 6-10
☐ 1-5
☐ Never

On a scale of 1 to 10, with 1 being not vulnerable at all and 10 being sure to get it, how vulnerable do you feel to contracting AIDS?

/_/_/_/_/_/_/_/_/_/_/
 1 2 3 4 5 6 7 8 9 10

What for you are the biggest barriers to following universal precautions?

BIOGRAPHICAL SKETCH

Joel D. Ray was born [REDACTED] He received his elementary and secondary education in the Nettleton Public School System. In 1978 he entered Arkansas State University and was awarded his Bachelor of Science degree in May of 1982. In June of 1982 he was commissioned as an officer in the United States Air Force Nurse Corps. His initial active duty assignment was Wilford Hall Regional Medical Center, Lackland Air Force Base in San Antonio, Texas. While at Wilford Hall he was assigned to the Oncology-Hematology Unit and received the Air Force Achievement Medal and the Air Force Commendation Medal. In September of 1985 he was transferred to the United States Air Force Regional Hospital, Eglin Air Force Base in Fort Walton Beach, Florida. His duties at Eglin Air Force Base included staff nurse in the emergency room, assistant charge nurse of the general medicine unit, and evening and night nursing supervisor. While at Eglin he was promoted to the rank of Captain, selected to obtain a Masters of Science in Nursing through the Air Force Institute of Technology, and received the Air Force Meritorious Service Medal. Currently, he is attending Arizona State University as a full-time graduate student in the field of nursing, (Adult Health) on full scholarship sponsored by the Air Force Institute of Technology, commenced 1989. He is a member of Sigma Theta Tau.