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THE LEGAL PROSECUTION OF ADULT RAPE CASES
PROCESSED BY A
SEXUAL ASSAULT NURSE EXAMINER PROGRAM

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Debra Ann Patterson

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THE LEGAL PROSECUTION OF ADULT RAPE CASES
PROCESSED BY A
SEXUAL ASSAULT NURSE EXAMINER PROGRAM

By

Debra Ann Patterson

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ABSTRACT

THE LEGAL PROSECUTION OF ADULT RAPE CASES PROCESSED BY A SEXUAL ASSAULT NURSE EXAMINER PROGRAM

By

Debra Ann Patterson

Prior research has documented that many reported rapes are not prosecuted by the legal system (termed case attrition). Most of the research on rape case attrition was conducted in the 1980s. Since then, the advent of sexual assault nurse examiner (SANE) programs created significant changes in the way many communities throughout the country respond to rape including the treatment of victims, and collection of medical forensic evidence. The purpose of this study was to retrospectively examine case attrition in cases treated in a SANE program during a three-year period. Furthermore, this study examines whether the presence and type of forensic medical evidence collected by the SANEs predicts case attrition.

Results indicate that referral, prosecution, conviction, and prison sentencing rates were higher in the focal SANE program compared to published rates in non-SANE cases. Using logistic regression, the findings show forensic medical evidence primarily predicted police referring and prosecutors warranting cases.

For my parents, Lori Groppi and Richard Patterson for their love and support

This study is in memory of Dave Woodford, a dedicated champion of improving the criminal justice system

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OVERVIEW

Rape has been recognized as a national problem in need of governmental response (Bachar & Koss, 2001). Epidemiological data indicate that at least 17% of women will be raped in their adult lifetimes (Koss, Gidycz, & Wisniewski, 1987; Russell, 1984; Tjaden & Thoennes, 1998). Both the prevalence of rape and its debilitating psychological (e.g. posttraumatic stress) and physical health consequences (Herman, 1992; Koss, 1993; Burgess & Holmstrom, 1974; Koss & Heslet, 1992) emphasize the need to respond to this social problem. Although the psychological and physical health problem victims experience are largely attributable to the rape itself, some of this distress is also due to how the legal and medical systems respond to rape victims (Campbell, 1998; Campbell & Raja, 1999; Campbell et al., 1999; Campbell, Wasco, Ahrens, Sefl & Barnes, 2001; Madigan & Gamble, 1991; Martin & Powell, 1995). Rape victims often do not receive needed services and are treated by social system personnel in ways that they experience as upsetting and victim blaming (Campbell et al., 2001).

Studies estimate that only 18% to 44% of all reported rape cases are referred to prosecutors by police officials (Chandler & Torney, 1981; Crandall & Helitzer, 2003; Galvin & Polk, 1982; Frazier & Haney, 1996; LaFree, 1980). Of those cases referred by police, prosecutors warrant an estimated 46% to 72%. Overall, only 14% to 18% of all reported cases are prosecuted. However, these referral and prosecution rates were obtained in studies conducted in the 1980s, and since then, there have been significant changes in rape evidence collection and documentation procedures. In the past, rape victims were sent to hospital emergency rooms to have forensic evidence collected. The emergency department personnel often lacked training in forensic evidence collection,

which decreased their ability to collect and document all available forensic evidence (Littel, 2001). To address these problems, some communities have established Sexual Assault Nurse Examiner (SANE) programs (Lang, 1999). A SANE program is staffed by registered nurses who conduct forensic exams of rape victims (Lang, 1999). Nurses receive specialized training in forensic evidence collection, sexual assault trauma response, forensic techniques using specialized equipment, expert witness testimony, assessment and documentation of injuries, identifying patterned injury, and maintenance of chain-of-evidence (Cohen, Donahue, & Kovener, 1996; Ledray, 1998). The emergence of SANE programs may be changing how the criminal justice system processes and prosecutes reported rapes.

The first purpose of this study was to examine the referral and warranting rates, and case outcomes for rape cases examined in a SANE program. Previous studies on rape case attrition in the criminal justice system have typically examined later stages (e.g. warranting) or late stages (e.g. case outcomes) of case processing. This study offers a more refined analysis by focusing not only on these later stages, but also on earlier stages of processing, such as whether law enforcement refers cases for warranting. This step in the process of rape prosecution is essential to understand because it is one of the first opportunities for cases to be filtered out of the system. Because SANE programs have created significant changes in the way many communities respond to rape, new research is needed that re-examines the issue of case attrition within the context of these alternative reform programs. Preliminary evidence indicates that SANE programs may prevent case attrition and may increase the likelihood that cases will move further in the legal system (Crandall & Helitzer, 2003; Littel, 2001).

The second purpose of this study was to examine what factors predict whether a rape case will move forward in each step of legal prosecution (i.e., referring, warranting). Previous studies on the factors that predict case attrition have not focused on the nuances of forensic evidence (e.g., type of injury). Because SANE programs are especially detailed in the collection and documentation of evidence, this study was able to examine the role of specific types of physical and anogenital injury and other forensic evidence (e.g. trace evidence) on cases moving forward. In addition, this study explored whether the presence and type of forensic evidence collected by the SANE nurses affected case attrition. Drawing on previous literature, this study also examined whether victim characteristics (e.g. age, race) and case characteristics (e.g. victims' use of alcohol at the time of the assault) predicted whether rape cases moved forward in each step of the legal system. This study compared the predictive value of forensic medical evidence in cases moving forward relative to victim characteristics and case characteristics. This is important to examine because it is improbable that cases move forward based on only one particular victim, case, or evidentiary characteristic.

LITERATURE REVIEW

Rape or sexual assault is often legally defined as: “(1) any vaginal, anal, or oral penetration by a penis, object or other body part; (2) lack of consent, communicated with verbal or physical signs of resistance, or if the victim is unable to consent by means of incapacitation because of age, disability, or alcohol or drug intoxication; and (3) threat of or actual use of force” (Giardino, Datner & Asher, 2003, p.211). The process of reporting and prosecuting a rape in the United States criminal justice system is quite complicated and has been the focus of a substantial body of social science research since the 1980s. In this literature, the phrase “rape case processing” is used to refer to the actions of law enforcement, prosecutors and judicial systems to move rape cases through the multiple steps of the legal system (LaFree, 1980). This literature review begins with a description of the stages involved in rape case processing. Following this contextual information, the empirical literature on case attrition and factors that influence rape case processing in the legal system is critically examined. This research has consistently indicated that attrition is very high in cases of sexual assault, which has prompted many communities throughout the United States to explore options for improving the community response to rape. One such approach has been the formation of Sexual Assault Nurse Examiner (SANE) Programs whereby medical and legal professionals work together to document the evidence of sexual assaults. This literature review concludes with an exploration of how SANE programs may address the problems of rape case attrition.

Steps of Rape Case Processing

Rape victims come into contact with the legal or medical system through many different means. Some victims call or go directly to the police department and are subsequently referred to a medical facility. Other victims go directly to a hospital emergency room whereby medical personnel contact the police to make a report. Some victims contact a crisis hotline and then are referred to a medical facility or the police. While the first point of contact with these systems varies by jurisdiction and by victim, the following example depicts the typical steps involved in rape case processing. The victim's first contact is often with a dispatched road patrol officer who takes a report and secures any evidence of the crime. The victim is sent to the hospital for a rape evidence exam (Martin & Powell, 1995) or to a SANE program if available. The purpose of this exam is to identify and treat any injuries that the victim may have sustained in the assault and to collect forensic evidence from the victim's body. The evidence collection process includes a visual assessment of genital and body injury for evidence of the rape and specimen collection from the body surfaces for evidence of DNA (Lang, 1999).

At this stage in the process, a law enforcement investigator is typically assigned to the case and responsible for gathering evidence about the case by interviewing the victim, as well as the suspect (if known) (Galton, 1975-76). Drawing from the reports by the patrol officer and the forensic evidence, the investigator assesses the validity of the victim's story (Martin & Powell, 1995) and decides whether to treat the incident as a crime and, if so, how to classify the crime (Kerstetter, 1990). If the officer decides that there is probable cause that a rape occurred, the case is called "founded" (Martin &

Powell, 1995). If the officer decides probable cause is not warranted the case is reclassified as unfounded (Bouffard, 2000; Martin & Powell, 1995) and the case ceases to move forward in the system. Throughout this review and in the current study, founding will be called “referring” to clarify that it is only in the later stages of processing (e.g., trial or plea bargain) that a case is ultimately “founded.” At this stage in rape case processing, the critical issue is whether a case is referred (i.e., sent on) to the prosecutors for further consideration.

If the investigator makes the recommendation to refer the case, it must be approved by his/her supervisor and then sent to the prosecutor who considers the investigator’s advice in making a tentative filing decision before interviewing the victim (Frohmann, 1998). The prosecutor can either decide to have a warrant issued for the assailant (termed “warranting the case”), return the case for further investigation, or drop the case (Galton, 1975-76). If the prosecutor determines there is sufficient evidence documenting that a crime occurred, the case is warranted, charges are determined, and the offender is arrested and arraigned. Some jurisdictions convene a grand jury to determine if there is sufficient evidence for the case to go to trial. In other jurisdictions, the next court proceeding is the preliminary hearing at which a judge determines if the legal requirements of the crime have been met. The victim may provide brief testimony about the rape at the preliminary hearing. Based on the information presented at the hearing, the judge decides whether to “bound over” the case for trial or dismiss the case entirely. If the case is bound over for trial, the offender can plea-bargain with the prosecutor for lesser charges to avoid a trial. If the case does go to trial, the assailant will be either

found guilty or acquitted. Offenders who accept plea-bargains or are found guilty, receive a sentence of jail/prison time or other punishment (Giardino, Datner & Asher, 2003).

Attrition in Rape Case Processing

Given the complexity of the legal system, every rape case entering the system is not expected to be fully processed, which has generated a long-standing body of research on case attrition. The majority of studies focusing on attrition of rape cases in the legal system were conducted in the 1980s after many states had significantly reformed their rape laws. The intent behind these legal reforms was to streamline rape case processing and prevent case attrition. However, most studies ascertained that despite these reforms, few reported rapes are referred by investigators, and even fewer cases are warranted and prosecuted. For example, LaFree (1980) conducted one of the first comprehensive studies examining attrition of rape cases by examining police, prosecution and court records from 1970 to 1975. In addition, he observed and interviewed law enforcement and prosecutors to provide further context for his quantitative findings. In a sample of 881 forcible sex offense cases, he discovered that police referred 37% of the rape cases to the prosecutor, who warranted 47% of the referred cases. Of all the reported cases in his sample, only 14% were prosecuted.

Subsequent studies also conducted in the 1980s post-reform era also utilized secondary data to examine attrition rates in rape case processing and found similar results to LaFree's original analysis. These studies revealed that referring rates among investigators varied from 41% (Chandler & Torney, 1981) to 44% (Galvin & Polk, 1982). Of those cases referred by police, the rate that prosecutors warrant cases varied between 46% (Chandler & Torney, 1981) to 57 % (Galvin & Polk, 1982). Of cases prosecuted, the

rate at which they end with a guilty verdict or guilty plea bargain varied from 83% (LaFree, 1980), to 92% (Galvin & Polk, 1982), to 96% (Chandler & Torney, 1981). Of all reported cases, only 17% (Galvin & Polk, 1982) to 18% (Chandler & Torney, 1981) were prosecuted.

More recent studies have continued the methodological tradition of analyzing secondary data to examine attrition rates in rape case processing. Frazier and Haney (1996) conducted a study examining attrition of rape cases utilizing police and prosecution court records from 1991. With a sample of 569 criminal sexual conduct cases, they determined that investigators referred 22% of the rape cases to the prosecutor, who warranted 72% of the referred cases. Of all the reported cases in their sample, only 16% were prosecuted. Of the cases prosecuted, 76% ended with a guilty verdict or plea bargain. Although the warranting rate of 72% was higher than in previous studies (which were typically 46%-57%), the overall percentage of cases that were prosecuted was remarkably similar (near 16%). Subsequent studies have suggested the rates investigators refer rape cases vary from 18% (Bouffard, 2000) to 38% (Crandall & Helitzer, 2003). Among cases referred by police, Spears, Beichner, and Davis-Frenzel (2001) ascertained that prosecutors warranted 56% of the cases. Of the cases prosecuted in the Spears's et al. study, 97% ended with a guilty verdict or guilty plea bargain.

It appears from these studies that rape cases have a high probability of resulting in a conviction if they are warranted. That is, 83% (LaFree, 1980) to 97% (Spears et al., 2001) of prosecuted cases end in conviction. It also appears that more rape cases are being warranted. That is, studies from the 1980s reveal that 46% to 57% of cases were warranted compared to 56% to 72% of cases being warranted in more recent studies.

However, there appears to have been a decline in the percentage of cases being referred. Studies from the 1980s indicated that 37% to 44% of cases were being referred compared to 18% to 38% of cases being referred in more recent studies. Yet, when examining all cases reported, there has not been much change since the 1980s. For example, the 1980s studies show only 17% (Galvin & Polk, 1982) to 18% (Chandler & Torney, 1981) of all reported cases were prosecuted compared to 16% of reported cases being prosecuted in more recent studies (Frazier & Haney, 1996). Unfortunately, studies examining the attrition of rape cases through the entire legal system have not occurred since the mid-nineties.

To date, there has been only one study that has explicitly examined how rape case attrition impacts victims. Campbell, Wasco, Ahrens, Sefl, and Barnes (2001) interviewed a representative sample of rape victims in a major metropolitan area and found that victims who did not have their cases prosecuted were more likely to rate their contact with the legal system as hurtful. They also discovered that victims who rated their contact with the legal system as hurtful exhibited higher psychological and physical health distress. Given that the legal system is one of the few means of justice and protection for rape victims, and that there are distressful consequences to victims whose cases are not referred, it is important to examine this pattern of attrition in rape processing.

Factors Affecting Rape Case Processing

As many reported rape cases are not fully processed, researchers have begun examining what factors predict rape case attrition. To date, the literature has examined three main factors that could influence rape case attrition: 1) victim characteristics (e.g.

race, age); 2) case characteristics (e.g. relationship between the victim and offender); and 3) forensic medical evidence (e.g. injury, trace evidence).

Victim characteristics. Even if law enforcement personnel and prosecutors believe that a rape occurred, a case might still be rejected if officials do not think that the victim will make a credible witness. The perception that a victim will make a credible witness may be influenced by characteristics of the victim such as age, race and social status. For example, previous research suggests that victim age influences case outcomes. In studies that included victims of all ages, prosecutors were significantly less likely to file charges if the victim was a child (Rose & Randall, 1982; Spear & Spohn, 1996, 1997). For example, Spears and Spohn (1997) discovered that cases with adult victims were three times more likely to be prosecuted than cases with child victims. They also indicated that cases involving children were more likely to be dismissed due to lack of evidence while adult cases were more likely to be dismissed when victims delayed reporting, were engaged in behavior deemed risky, or their moral character was questioned by the prosecutor. Rose and Randall (1982) found that investigators view adolescents and younger women as more suspicious compared to children and elderly victims. The law enforcement investigators believed that adolescents and younger women are more likely to fabricate the rape in order to hide consensual sexuality activity from their parents. In addition, the investigators also viewed this age group as having instigated the assault. While younger women' motivations were questioned, children and the elderly were viewed as legitimate victims, but poor witnesses.

While some studies have included child victims in their samples, others have focused specifically on teen and adult victims and demonstrated mixed results. For

example, LaFree (1981) noted that cases involving victims under the age of 18 were less likely to be warranted. The detectives interviewed believed that date rape cases in which both the victim and offender were young should not result in felony prosecution. Other studies have shown that cases involving adolescent victims are more likely to be warranted. For example, Chandler and Torney (1981) indicated 78% of cases with adolescent victims were warranted compared to 53% of cases with victims in their twenties and 42% of cases with victims in their thirties. In a more recent study, Spears et al. (2001) determined that prosecutors were nearly four times as likely to warrant a case if the victim was between the age of thirteen and sixteen compared to victims over the age of sixteen.

Race of the victim is another element of rape cases that may have an impact on legal outcomes. Anecdotal literature suggests that the criminal justice system treats the rape of ethnic minority women less seriously than the rape of Caucasian women. Specifically, the literature suggests that one reason these cases are treated less seriously is that there is a lack of confidence by law enforcement in the veracity of African-American victims (Wriggins, 1983). The majority of studies examining the role of race on rape case outcomes have focused on the race of the offender or the racial composition of both the victim and offender. Half of the studies illustrate that race played an influential role on case outcomes (LaFree, 1980, 1981; Chandler & Torney, 1981; Rose & Randall, 1982; Bradmiller & Walters, 1985; Frohmann, 1997; Spears et al, 2001). For example, LaFree (1980) noted that cases involving African-American offenders assaulting Caucasian victims were more likely to be warranted. This racial composition accounted for 3% of the variance in warranting cases. Chandler and Torney (1981) discovered that cases were

more likely to be warranted if the victim was Caucasian or if the defendant was non-Caucasian. Of 260 cases, 61% of cases involving Caucasian victims were warranted compared to 48% of cases involving non-Caucasian victims and 31% of cases involving Hawaiian victims. More recent studies also suggest that race plays a role in prosecutorial decisions in warranting cases. Spears et al. (2001) found that prosecutors rejected cases more often when the victim was a racial minority. Similarly, Campbell et al. (2001) discovered that Caucasian women were more likely to have their cases prosecuted than minority women.

Nonetheless, the other half of the studies show that race did not have a significant effect on case outcomes (Kerstetter, 1990; Frazier & Haney, 1996; Spears & Spohn, 1996, 1997; Bouffard, 2000). For example, Frazier and Haney (1996) did not find a relationship between race and cases being referred. Bouffard (2000) examined if the dyad African-American offender and Caucasian victim played a role in case outcomes. His findings indicated that cases involving African-American offenders and Caucasian victims were no more, or less, likely to be referred. He also examined race for victims and offenders separately and did not find a significant relationship using both Logit and Probit models.

Another victim characteristic that could affect case processing is social class status. Although few studies have examined this variable, they consistently find that social class influences cases moving forward in the system. Rose and Randall's (1982) study revealed that investigators exhibited class prejudice toward those who hold lower as well as upper class status and held stereotypes about those who live in certain economically homogenous areas. The investigators tended to typify those living in low

socio-economic areas as having low morality. Despite this prejudice, the investigators tended to look for other indices of credibility. Therefore, a victim with lower socio-economic status who appears credible may be treated the same as a victim with middle class status. However, indices of credibility (e.g. seeking medical attention) are heavily class biased. In a more recent study, Frohmann (1997) found that prosecutors also hold class prejudices. Prosecutors were less likely to view cases involving victims with lower socio-economic status as prosecutable because they believe jurors would not view these victims as credible.

Finally, another under-studied issue in this literature is whether the victim's disability status affects case processing. Despite the fact that disabled women are ten times more likely to experience sexual victimization (Sobsey & Doe, 1991), the role of the victim's disability on legal outcomes has been absent in the research literature. Currently, it is unknown if the disabled population is treated differently than the non-disabled population by investigators when referring cases and prosecutors when warranting cases.

Case characteristics. Alcohol and drug use by the victim is one element of rape cases that may have an impact on legal outcomes. The majority of studies exploring the role of victim alcohol and drug use before or during the rape have shown that alcohol and drug use decreases the probability that a case moves forward in the legal system (Chandler & Torney, 1981; Spears & Spohn, 1996; Frohmann, 1997). For example, Chandler and Torney (1981) discovered that cases were more likely to be warranted if the victim had not used alcohol or drugs. In a sample of 260 cases, 60% of the dismissed cases involved victims who had been drinking whereas only 8% of the warranted cases

involved victims who had been drinking. Additional analyses showed that absence of alcohol or drug use by the victim was the second most important factor in prosecutorial decisions in warranting cases. Likewise, Spears and Spohn (1996) indicated that prosecutors were less willing to warrant cases in which the victim was drinking or using drugs at the time of the assault. Alcohol or drug use diminishes the victim's credibility in the eyes of many criminal justice system personnel. In fact, Kerstetter (1990) determined that victims who use alcohol or drugs are less likely to have their cases move forward for both stranger and acquaintance cases. Furthermore, Campbell (1998) discovered that victims who were drinking at the time of the rape were four times more likely to have their cases dropped early in the stages of the legal system. However, Frazier and Haney (1996) did not find a significant relationship between the victims' use of drugs and alcohol and cases being referred in a sample of 105 cases from police and court records.

Another element of rape cases that may impact legal outcomes is whether penetration occurred. In the 1980s most states' definition of rape were expanded to include anal and oral penetration in addition to vaginal penetration (Giardino et al., 2003). Studies examining the role of penetration have focused on the presence, but not the type of penetration in cases moving forward in the legal system, and results have been mixed. For instance, Bradmiller and Walters (1985) found that cases involving penetration were significantly correlated with warranting the case and accounted for 17% of the variance in predicting cases being warranted. Similarly, Frazier and Haney (1996) noted that cases involving penetration were somewhat more likely to be referred, but the effect was not significant. However, Bouffard (2000) employed logistic regression and determined that cases involving penetration decreased their probability of being referred.

Most of the debate in the literature regarding case characteristics has focused on victim-offender relationship. Prior research suggests that rape cases involving acquaintances may be assessed and treated differently than incidents involving strangers. The major investigative concern in stranger rape cases is identifying the assailant. Prosecutors' decisions to warrant stranger rape cases are determined primarily by evidentiary strength of the case. Conversely, decisions to warrant acquaintance rape cases are determined largely by assessing the lack of consent by and the credibility of the victim (Kerstetter & Van Winkle, 1990).

Studies exploring the role of the victim-offender relationship in rape processing have shown mixed results. The majority of studies and anecdotal literature suggest that if the offender is a stranger to the victim, there is a greater chance that the allegation will be taken seriously and referred than if the offender is an acquaintance (LeGrand, 1975; Chappel et al, 1977; Chandler & Torney, 1981; Rose and Randall, 1982; Bradmiller & Walters, 1985; Kerstetter, 1990). For example, Bradmiller and Walters (1985) conducted a secondary analysis on 89 cases from a court program and found that warranting cases was significantly related to the relationship between the victim-offender. Specifically, prosecutors were less likely to warrant cases in which the offender was a relative of the victim. Hierarchical multiple regression showed that the victim-offender relationship accounted for 4.2% of the variance. Similarly, Kerstetter (1990) indicated that stranger rape cases are more likely to be referred and warranted. In order to refer a case, investigators noted that they have to establish the identity of the offender, that sexual activity occurred, and that the victim did not consent. Because identifying the offender is not a concern in acquaintance rape cases, determining whether the victim consented

becomes a primary focus of the investigation. Because identifying the offender is often easier than determining lack of consent, stranger cases are more often prosecuted.

By contrast, Frazier and Haney (1996) suggest that overall, suspects in acquaintance rape cases are more likely to be referred than stranger rape cases. However, when comparing only stranger rapes with identified suspects to acquaintance rapes, stranger rape cases (66%) are more likely to be referred than acquaintance rape cases (41%). Although acquaintance rape cases have the advantage of an identified offender, their findings suggest they are viewed as less prosecutable. This study demonstrates that inclusion of unidentified offenders in the analyses regarding victim-offender relationship and case processing must be re-examined because it substantially and differentially affects the resulting findings. Because it is impossible for the investigator to refer a case when a suspect has not been identified, it is important to only compare stranger cases with identified suspects to acquaintances cases.

Some studies have shown that the victim-offender relationship had no effect on legal outcomes of rape cases (Bachman, 1998; Spohn & Horney, 1993; Spears & Spohn, 1996, 1997). For example, Bachman (1998) analyzed the National Crime Victimization Survey dataset from 1992 to 1994 with a sample size of 348 and indicated that there was not a statistically significant relationship between victim-offender relationship and referring cases. The study measured victim/offender relationship as a dichotomous variable: intimate offenders (spouse, ex-spouse, boyfriend/girlfriend and ex-boyfriend/ex-girlfriend) and all other offenders (family members, friends/acquaintances and strangers). Because investigators treat stranger and acquaintance cases differently, it is possible that including strangers in the same category as acquaintances led to the non-significant

finding. Spears and Spohn (1996) analyzed 321 cases from prosecutor files and also indicated that the victim-offender relationship did not influence the prosecutor's decision to warrant cases. It is unclear if their sample included unidentified stranger cases or only the cases in which the suspect was identified.

Other studies suggest that acquaintance cases are more likely to move forward in the system. Through interviews and analysis of prosecutor files, Spears, Beichner, and Davis-Frenzel (2001) found that prosecutors reject stranger cases more often than acquaintance cases. They noted that most of the victims of stranger rape in this sample engaged in behavior likely to be questioned by the prosecutors (e.g. delayed reporting, prostitution, walking alone at night). Interestingly, interviews conducted with prosecutors indicated that they would be less inclined to warrant acquaintance cases. Bouffard (2000) used logistic regression to analyze 326 cases collected from police records. He ascertained that cases were more likely to be referred to the prosecutor if a prior victim-offender relationship existed. However, the study also suggests a higher probability that the prosecutor would dismiss cases with a prior victim-offender relationship. Although it is impossible for a case to move forward with an unidentified suspect, these cases were still included in the analyses. Because police and prosecutors cannot refer or warrant cases without a suspect, it is possible that including cases without an identified suspect affected the results of the study.

Offender tactics is another important element of rape cases that may have an impact on legal outcomes. Sex offenders use various types of tactics to control victims (Cleveland, Harrington, Koss, & Lynons, 1999). Studies examining the role of offender tactics in legal outcomes have been limited to three types of tactics. The most common

tactic studied is weapon use. The majority of these studies have shown that the presence of a weapon increased the probability that a case would move forward in the legal system (Chandler & Torney, 1981; LaFree 1981; Rose & Randall, 1982; Kerstetter 1990; Campbell et al., 2001). For instance, Chandler and Torney (1981) indicated that cases were more likely to be warranted if a weapon was used. In a sample of 260 cases, 60% of the cases involving a weapon were warranted while only 5% of the cases involving a weapon were dismissed. Similarly, Rose and Randall (1982) found through observations of 610 police investigations that weapon use affected the investigators' judgment about victim credibility. Investigators were more likely to refer cases in which they doubted the victims' credibility if the case involved weapon use. Because victim credibility is often doubted in rape cases involving acquaintances, weapon use may be related to moving acquaintance rape cases through the legal system. In fact, Kerstetter (1990) revealed that weapon use was the sole significant factor in the prosecutorial decision in warranting acquaintance rape cases. Weapon use was particularly important to cases in which the offender claimed that the victim consented to the sexual activity. In a more recent study, Campbell et al. (2001) found through interviewing victims that rape cases involving weapons were significantly more likely to be prosecuted than rape cases that did not involve weapon use. However, Frazier and Haney's (1996) study revealed that weapon use had no effect on cases being referred by investigators. Similarly, Spears and Spohn (1997) indicated that weapon use did not affect the prosecutor's decision to charge or not.

The second type of perpetrator tactic that has been examined in the literature is the use of force. These studies show that the use of force increases the probability that a case will move forward in the legal system (Rose & Randall, 1982; Bradmiller &

Walters, 1985; Martin & Powell, 1995). For example, Rose and Randall (1982) found that the use of force was important in demonstrating to the investigators that the victim did not consent. Correspondingly, Bradmiller and Walters (1985) discovered that the amount of force was significantly correlated with warranting cases. In addition, amount of force along with the age of the victim accounted for 32.7% of the variance. They determined that amount of force was a more powerful predictor than age of the victim.

A less commonly studied tactic is the use of threats. Frazier and Haney (1996) noted that cases were more likely to be referred if the offender threatened the victims. However, Spears and Spohn (1997) ascertained that both threats and force did not significantly affect prosecutorial decisions on warranting.

Finally, another under-studied issue in this literature is whether the length of time between the rape and exam affects case processing. Currently, it is unknown if cases in which the victim immediately seeks a forensic medical exam are more likely to be forwarded than cases in which the victim waits a couple of days before seeking a forensic medical exam.

Medical evidence. The term “medical evidence” is often used to encompass evidence that can be collected from or observed on the body of the victim, including injury, and trace evidence. Medical evidence includes the identification and documentation of injury such as physical and anogenital injury. Although the law no longer requires proof of resistance, many judges and jurors still view injury as necessary proof the victim did not consent (Giardino et al., 2003). Finally, medical evidence also includes trace evidence such as foreign material found on the victim’s body. Trace evidence may place the offender at the crime scene or corroborate the victim’s story. The

presence or absence of medical evidence could impact the chance of cases moving forward in the system.

Most studies suggest that medical evidence, in particular documented injuries, is predictive of cases moving further through the criminal justice system (Chandler & Torney, 1981; Feldman-Summers & Palmers, 1980; Frazier & Haney, 1996; Galton, 1976; Kerstetter, 1990; Martin & Powell, 1995; Rose & Randall, 1982; Spohn & Spears, 1997; Spohn, Beichner, & Davis-Frenzal, 2001). For example, Galton (1976) provided investigators with a questionnaire focusing on six hypothetical rape cases that were based on actual reports. The investigators were asked to suggest a disposition of the cases and indicate the facts most significant to the case. The investigators noted that they expected to see bruises or lacerations on the victims' body, which indicated to them that she resisted. However, mere surface scratches were not enough for the investigators to suggest referring the cases. Similarly, Feldman-Summers and Palmer (1980) surveyed prosecutors, judges and staff of two rape crisis centers and revealed that rape-processing officials characterize false complaints as those that lack physical injury.

The majority of studies examining medical evidence have analyzed police, prosecutor or court records. For example, Rose and Randall (1982) analyzed 610 police reports received by one police department during a six-month period. They found that investigators perceived legitimate rape cases as having corroborating physical evidence such as injury or torn clothing. Further, if the victim's credibility was questioned, the case had a higher chance of being referred if corroborating physical evidence existed. Evidence of physical force helped to demonstrate non-consent to investigators. These findings suggest that physical evidence plays an important role in referring acquaintance

rape cases in which lack of consent is often questioned. In addition, they discovered that the more severe the injury, the more serious the investigators perceived the crime. Other researchers have shown similar evidence regarding medical evidence. For example, cases were more likely to be warranted if the victim sustained injury (Chandler & Torney, 1981; Spears et al., 2001) or when any physical evidence was present (Frazier & Haney, 1996). However, Spears and Spohn (1997) found that prosecutors were somewhat more likely to warrant cases when physical evidence was present although their findings did not reach statistical significance; the trend was in the expected direction.

Other studies in this body of literature have used observations and interviews with social system personnel to examine the role of medical evidence in moving cases forward. For example, Kerstetter (1990) interviewed and observed twenty detectives and discovered that the police are more likely to refer and treat the case seriously if the victim suffered injuries to her sex organs. Using similar methodology, Martin and Powell (1995) determined that prosecutors prosecuted cases more aggressively if the victim was physically injured and/or force could be demonstrated. They also discovered that law enforcement concentrate on building their cases by collecting and verifying evidence rather than accepting victims' accounts. This suggests that evidence has more weight in moving cases forward than the victim's testimony of the rape.

Finally, an under-studied area in the literature is whether the identification of trace evidence affects case processing. Presently, it is unknown if identifying and documenting trace evidence from the victim's body or clothing increases the probability of cases being referred and warranted.

An Intervention to Address the Problems of Rape Case Attrition: SANE Programs

As noted previously, many of the studies on rape case processing were conducted in the 1980s and early 1990s. Since that time, there have been significant changes in the way many communities throughout the United States respond to rape victims. The advent of sexual assault nurse examiner (SANE) programs created a fundamental shift in many aspects of rape processing including the response to victims, the collection and documentation of forensic medical evidence, preservation of chain of custody, availability of expert witnesses for trial and consultation, and increased collaboration, communication and cross training among key agents in rape case processing. In seeking new ways to treat victims and collect evidence with more sensitivity and effectiveness, some communities have established sexual assault nurse examiner (SANE) programs (Lang, 1999). A SANE program is staffed by registered nurses or nurse practitioners who conduct a forensic exam of the sexual assault victim (Lang, 1999). The clinician receives specialized training in forensic evidence collection, sexual assault trauma response, forensic techniques using specialized equipment, expert witness testimony, assessment of injuries, identifying patterned injury, documentation of injuries, and maintenance of chain-of-evidence (Cohen et al., 1996; Ledray, 1998).

The goal of SANE programs is to provide supportive care to victims while improving prosecution of suspects (Arndt, 1988). SANE programs attempt to improve prosecution by: 1) providing better-quality forensic evidence collection with specially trained personnel and specialized forensic equipment; 2) providing expert witness testimony by personnel trained in providing this testimony; and 3) providing training and

case consultation for law enforcement officials to increase their understanding of medical evidence findings (Littel, 2001).

Forensic evidence exams conducted by SANE programs include a medical history of the victim that guides the evidence collection, properly packaging the victim's clothing, conducting a head to toe assessment and specimen collection from the body surfaces (e.g., hair), visual assessment of genital trauma, body fluid and orifice specimen collection (Lang 1999) (see Appendix A for a detailed comparison of exam procedures for hospitals and SANE programs). Unlike hospitals, most SANE programs utilize specialized forensic equipment and techniques, such as a colposcope, which is a lighted magnifying instrument that greatly increases the identification of anogenital trauma (Slaughter & Brown, 1992). With a colposcope, a medical practitioner is three times more likely to detect microlacerations, bruises and other injuries in rape victims (Voelker, 1996). A camera can be attached to the colposcope to photodocument genital injuries (Lang, 1999). Some SANE programs also use Toluidine Blue dye in the detection of genital trauma by enhancing the visualization of microlacerations (Cohen et al., 1996; Ledray, 1998). Toluidine Blue dye is a nuclear stain that adheres to cellular material and enhances the identification of injury. The dye causes the injured area to darken significantly, making visualization of an injury much easier (Giardino, 2003). McCauley, Guzinski, Welch, Gorman, and Osmers (1987) found tears in only 4% of cases using gross visualization, but after Toluidine Blue was applied, the rate increased to 58%. Some SANE programs utilize an alternative light source which can detect bodily fluids that may not be detected with visual inspection alone (Giardino, 2003).

Studies have shown that the quality of the forensic medical evidence collected by SANE nurses is significantly more complete than that obtained by hospital personnel and that the documentation of injury and maintenance of chain of custody were better in SANE-collected kits compared to non-SANE kits (Ledray & Simmelink, 1997; Sievers, Murphy & Miller, 2003). Sievers et al. (2003) determined that 92 % of SANE-collected cases had preserved the chain of evidence compared to 81% by hospital personnel. Derhammer, Lucente, Reed, and Young (2000) indicated that 92% of SANE cases preserved the chain of evidence compared to 68% percent. Ledray and Simmelink (1997) discovered that SANE preserved the chain of evidence 100 percent of the time while the hospital only properly sealed 97% of the kits, only documented the appropriate information on 73% of the rape kit boxes, and only properly stored the victims' clothing in 88% of the cases.

With respect to the completeness of rape evidence kits, Derhammer et al. (2000) revealed that 95% of the SANE cases had complete evidence collection compared to 71% of hospital cases. Ledray and Simmelink (1997) noted that SANE programs were more likely to collect swabs that matched the documented orifice penetration (96% of SANE compared to 85% by the hospital). Kits were more likely to contain an extra tube of blood for alcohol and/or drug analysis (100% of SANE cases compared to 15% of hospital cases). In addition, SANE programs included proper documentation in the rape kit (100% compared to 79% in hospital cases). Sievers et al. (2003) found that the rape evidence kits processed by SANE programs contained the right amount of swabs, pubic hair and head hair. In addition they discovered that the rape evidence kits processed by SANE

were more likely to have complete documentation (e.g. specimen envelopes were labeled).

To date, research on how SANE programs may impact rape case processing has focused on these issues of evidentiary completeness and there has only been one study that examined attrition of rape cases before and after the implementation of a SANE program. Crandall and Helitzer (2003) examined 247 rape cases that were processed by the hospital and noted that 38% of the cases were referred for warranting. They also examined 715 rape cases processed by the SANE program and revealed that 50 percent of the rape cases were referred. In addition, they ascertained through interviews that prosecution and law enforcement believed that the SANE program had significantly improved evidence collection, storage, and chain of custody. Law enforcement indicated that communication and collaboration had improved with medical personnel after the advent of SANE. Law enforcement noted that SANE contributed to an increased efficiency of their work environment which allowed law enforcement more time to investigate cases. For example, law enforcement obtained medical records quicker and less time was spent waiting for the completion of the exam so they could transport the rape kit. Prosecution personnel believed that the evidence collection by the SANE program was more reliable, easier to read, and more effective in court. Furthermore, they felt that the SANE program was more conducive to cooperation with law enforcement. That is, victims examined at SANE were more willing to talk to law enforcement because they had been treated with sensitivity and respect. In fact, the study found that more victims reported to police when examined at a SANE compared to the hospital (67% vs. 46%, $p < 0.0001$). This preliminary evidence suggests that SANE programs may be an

effective intervention in addressing the problems of rape case attrition. However, it remains unknown if SANE programs are an effective intervention for all rape cases or those with injuries or certain types of injuries.

CURRENT STUDY

Project Aims and Research Questions

The first aim of the proposed project was to examine the rates of referral, warranting, and case outcomes for rape cases examined in a SANE program. Most prior research on rape case attrition in rape cases was conducted in the 1980s and reported that only 16% (Frazier & Haney, 1996) to 18 % (Chandler & Torney, 1981) of all reported cases were prosecuted. Previous studies focusing on case attrition have largely examined later stages (e.g. warranting) or late stages (e.g. case outcomes) of case processing. This study offers a more refined analysis by focusing on earlier stages of processing, such as police referring cases. This step in the process of rape prosecution is important to understand because it represents one of the first instances for cases to be filtered out of the system. Since the earlier studies were conducted, the advent of sexual assault nurse examiner (SANE) programs has created significant changes in the way many communities throughout the United States respond to rape. Therefore, new research is needed that re-examines the issue of case attrition within the context of these alternative reform programs. Anecdotal evidence suggests that SANE programs may prevent case attrition and may increase the likelihood that cases will move further in the legal system (Littel, 2001). One empirical study of a SANE program provided empirical evidence that cases were significantly more likely to be warranted and prosecuted after implementation of the SANE program (Crandall & Helitzer, 2003).

Question #1: To what extent do rape cases processed by a SANE program move forward in the legal system?

Objective #1a: Patient/victim names, and assault date were obtained from one large SANE program in Michigan (Turning Point in Macomb County). This information was needed to track whether cases examined at Turning Point's SANE program were later pursued by the legal system. Program records were obtained for the period of time from 1999 to 2002.

Objective #1b: Obtained the rate at which rape cases examined at Turning Point's SANE program were actually referred by law enforcement, warranted by prosecutors, and the final legal outcomes. The Macomb County Prosecutor's Office maintains a database of all cases referred to the prosecutor's office and another database of all legal outcomes for referred cases (e.g. warranting decisions, final disposition) , which can be searched by victim name, assault date, and complaint numbers. Descriptive data was collected to document how many cases were referred by the police, warranted by the prosecutor's office, prosecuted and resulted in conviction.

The second aim of this study was to examine whether the presence and type of forensic evidence collected by the SANE nurses predicts case attrition. Previous studies on the factors that predict case attrition have not examined the nuances of forensic evidence (e.g. type of injury). Because SANE programs are particularly detailed in the collection and documentation of evidence, this study can examine the role of specific types of physical and anogenital injury and other forensic evidence (e.g. trace evidence) on cases moving forward. Previous literature has also suggested that forensic medical evidence is one of many factors that influence whether cases move forward. Drawing on previous literature, this study also examined whether victim characteristics (e.g. age, race) and case characteristics (e.g. victims' use of alcohol at time of assault) predict

whether rape cases move forward in each step of the legal system (warranting, prosecution, and case outcome). This aspect of the study compared the relative predictive value of forensic medical evidence in cases being referred and warranted compared to victim characteristics and case characteristics. This is important because it is unlikely that cases move forward based on only one particular evidentiary, victim, or case characteristic.

Question #2: What factors predict case attrition? What is the predictive value of forensic medical evidence in charging decisions relative to victim characteristics and case characteristics?

Objective #2a: Obtained injury findings of the forensic exams such as the type and number of specific physical and anogenital injuries from Turning Point’s SANE program patient records (see Appendix B for a complete list of all evidence/injury types coded).

Objective #2c: Obtained descriptive data about the victims (age, gender, race/ethnicity, disability status, address [proxy for household income]) and the rape (type of rape such as vaginal, oral or anal, victim-offender relationship, tactic used by the offender to control or coerce the victim, alcohol or drug use by the victim before or during the rape) (see Appendix B for a complete list of all victim and case characteristics coded). All of these variables are consistently documented in the SANE patient record except victim-offender relationship and race of the victim. Victim/offender relationship and victim race were obtained from Turning Point’s “Sexual Assault Survivor Profile” database. This database was searched using the victim’s name, case number and date of assault.

Objective #2c: Conducted a series of logistic regression analyses predicting investigator referral decisions (referred/not referred), prosecutor warranting decisions and

(warranted/not warranted) from three sets of independent variables: victim characteristics, case characteristics, and forensic medical evidence. Odds ratios were examined to determine relative importance of each predictor within each model.

Research Setting and Context

The setting for this study was Turning Point's SANE program located in Macomb County. This program was established in 1997 through a community task force that sought to address the problem of low reporting and conviction rates for rape as well as inadequate forensic evidence collection and a victim blaming response by emergency room personnel. The task force determined that a SANE program was needed in the community and Turning Point was selected as the host for the program because of their 10 year history of providing comprehensive services to sexual assault victims. In September 1999, Turning Point opened the first SANE program in Southeastern Michigan with established agreements with all Macomb County hospitals and law enforcement jurisdictions to transfer rape victims for evidence collection unless they need urgent medical care. A complete forensic exam is conducted by specially trained SANE's for victims within 96 hours of the assault. Services are accessible 24 hours a day 7 days a week through Turning Point's 24-hour crisis line. A team comprised of a nurse and an advocate is dispatched to the site by request of law enforcement, hospital or the victim. Medical treatment, crisis intervention and follow-up services are also offered. The program setting, based at a medical office facility, aims to meet the needs of victims by providing a separate interview and examine rooms, a waiting area for family and friends, and a private bathroom with shower. The facility is also equipped with state-of the-art medical forensic equipment not generally available at hospitals.

The program has provided over 800 forensic exams for victims since the program began. Analysis of agency records revealed that 97% of the victims were female and 3% were male; 68% of the victims were Caucasian, 25% were African American, 2% were multiracial, 1% was Hispanic, and 4% were unknown; 8% of the victims were 0-12 years old, 34% were 13-18 years old, 36% were 19-29 years old, 16% were 30-44 years old, 5% were 45-64 years old, and 1% were 65 years old or older. The racial demographics of the sample are consistent with the 2000 Macomb County census data. Most victims were residents of Macomb County (71%) and 78% of the rape cases occurred in Macomb County.

Turning Point's SANE program was an ideal site for addressing the research questions for several reasons. First, Turning Point's SANE program is consistent with national standards for training and supervising forensic nurse examiners, which makes them typical among other SANE programs (IAFN, 2004). Therefore, the findings are expected to be generalizable to other communities throughout the country. Second, the program has been in existence long enough so that examining a substantial number of closed cases is now possible. Third, Turning Point's SANE program examines the highest number of victims annually in Michigan, providing a large sample size (Patterson, 2004). Finally, Turning Point conducts multiple quality assurance procedures to assure that the nurses are collecting and documenting evidence in a standard manner, providing high reliability of records.

To assess further the appropriateness of this site for research purposes, key informant interviews were conducted with legal personnel in Macomb County to determine how rape cases have been processed during the timeframe of the study. There

have been no significant policy or personnel changes within the Macomb County Prosecutors' Office from 1999 to 2002 that would directly impact the processing of rape cases. Furthermore, there have been no significant changes in the way the State of Michigan Crime Lab processes evidence kits during the timeframe of the study. Additionally, the training and technology used by Turning Point's SANE program did not significantly change during the study timeframe.

METHODS

Sample

Adult rape victims treated in Turning Point's SANE program from September 1999 to December 2002 were the target sample for this study. Cases were sampled that fit the following criteria: 1) the victim is at least 18 years old currently; 2) the victim was age 18 or older at the time of the assault; 3) the victim was victimized in Macomb County; 4) the victim reported the rape to a law enforcement agency in Macomb County; and 5) the victim received a complete exam by Turning Point's SANE program. The focal program provided forensic services to 514 people during the timeframe of the study, and 205 cases met the study's eligibility criteria (see Figure 1 for reasons of case exclusion). Of the 205 cases sampled, 20 more cases were eliminated from the sample for multiple reasons (see Figure 2) resulting in a final sample size of 185 cases.

Descriptive information about the sample is provided in Table 1-3. In each of these tables, descriptive information is presented for: 1) the entire sample (all reported cases, on which police made referring decisions) (N=185); 2) the subsample of cases police referred to the prosecutors, on which prosecutors made warranting decisions (N=90); and 3) the subsample of cases that were warranted by prosecutors (N=57). Table 1 summarizes victim demographics. Of all reported cases, the mean age was 29.72 years, with a range of 18 years to 89 years old (no missing data). The majority of the sample was Caucasian (83%) (3% of missing data), and 80% did not have a disability (no missing data).

Figure 1

Case Excluded from Sample Based on the Eligibility Criteria

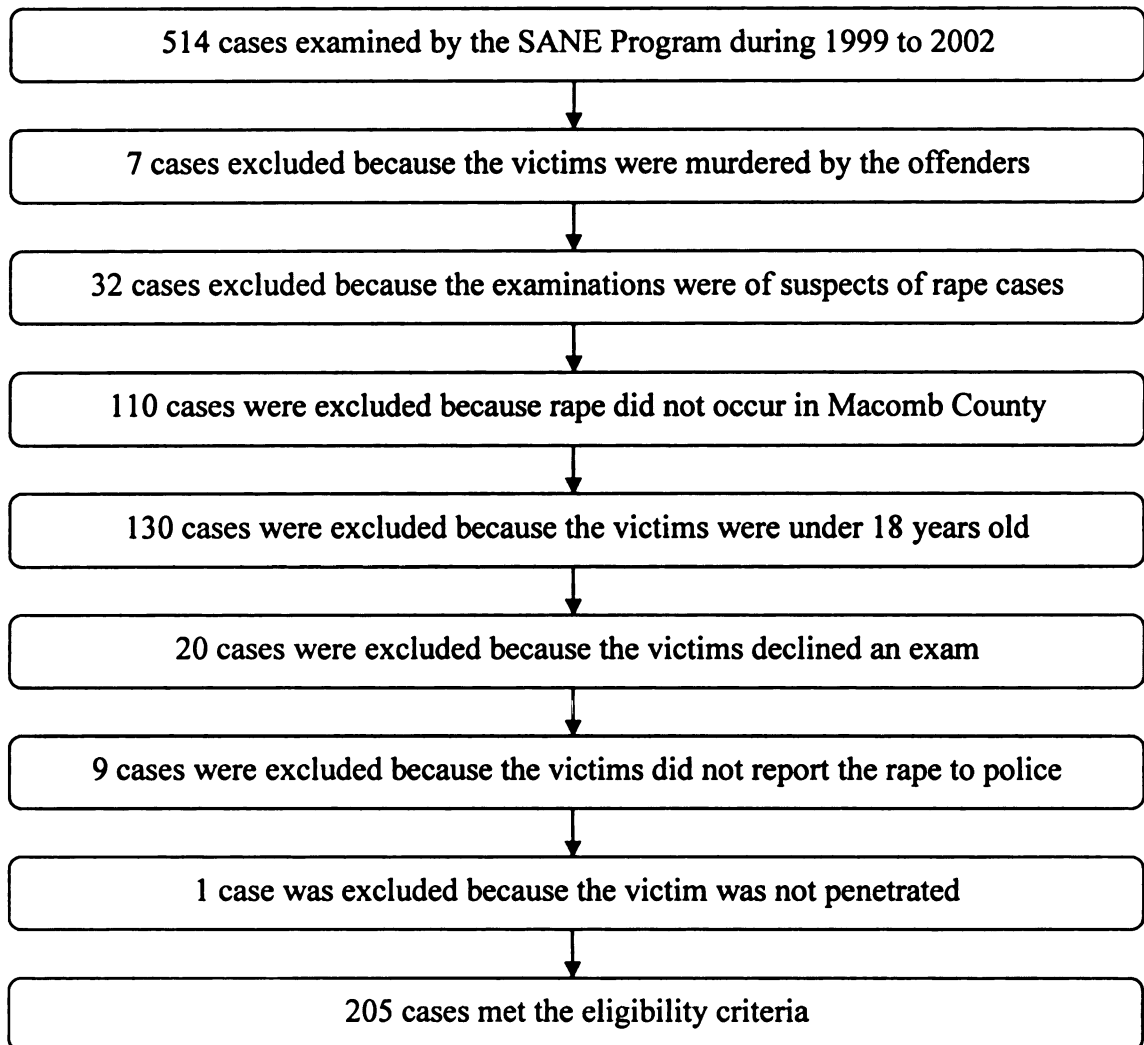
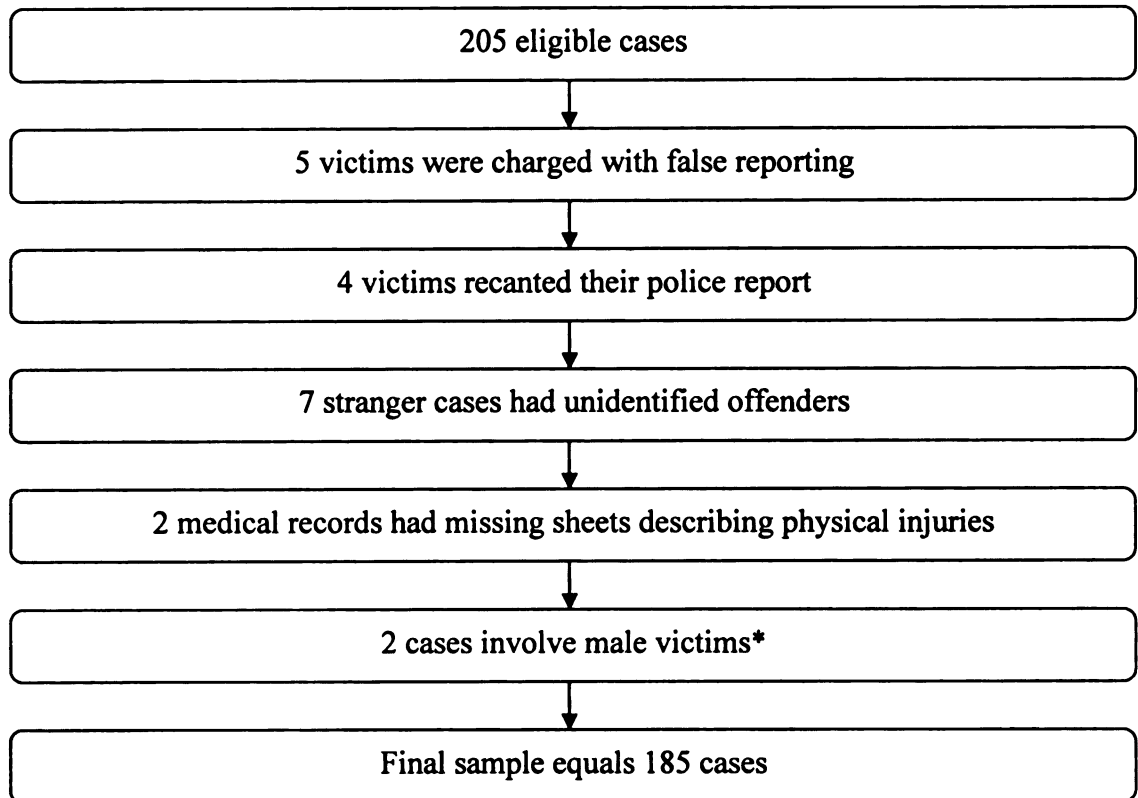


Figure 2

Reasons Cases were Excluded from Eligibility Sample



* Charging decisions for cases involving male victims may differ than cases with female victims. Because only two cases involve male victims, analyses exploring this issue would be impossible and may serve as a confounding variable if left in the sample. Therefore, the two male cases were removed.

Of the victims with a disability, 58% had a cognitive or psychiatric disability, 11% had a physical disability (e.g. hearing impaired), 8% had both a physical disability and a cognitive or psychiatric disability, and 22% were unknown. The mean household income was \$45,710, with a range of no income (e.g. homeless) to \$111,114 (four percent of data missing).

Table 1

Demographics of Victims (Percentage or Mean)

Demographics of Victims	All Reported Cases (N=185)	Referred Cases (N=90)	Warranted Cases (N=57)
Age in years (mean)	28.72 (11.70)	29 (12.61)	28.82 (10.20)
Race/Ethnicity			
Caucasian	83%	82%	78%
Minority	17%	18%	22%
Has a disability	20%	19%	16%
Income (mean in thousands)	\$45.71 (17.46)	\$45.64 (16.44)	\$43.28 (15.9)

Note: Standard deviation in parentheses

Table 2 displays case (i.e. assault) characteristics for all reported cases, cases referred by the police, and cases warranted by the prosecutors. The majority of victims were raped by someone they knew, with 23% being raped by their partners (e.g. dating partner, spouse, life-time partner) or family member (e.g. sibling, uncle), and 55% being raped by acquaintances (e.g. friends, coworker) (no missing data). Fifty-four percent of the victims had consumed drugs or alcohol before or during the rape (11% of data

missing). Interestingly, 16% of the victims were unaware of what happened to them, or whether they were penetrated (no missing data on type of penetration). For example, some victims woke up with sore genitals and their underwear removed from their bodies. These cases may be related to the increased use of “date-rape” drugs in the community. Force was used by the offender (e.g. physically controlled victim such as holding victim down) in 72% of the cases (16% of data missing). The time between the assault and the victim receiving an exam ranged from 2.17 hours to 97.62 hours, with an average of 17.02 hours (13% of the cases missing).

Table 2

Demographics of Case Characteristics (Percentages and Means)

Demographics of Case Characteristics	All Reported Cases (N=185)	Referred Cases (N=90)	Warranted Cases (N=57)
Consumed drugs or alcohol before/ during assault	54%	42%	36%
Type of penetration			
Single	43%	40%	46%
Multiple	41%	54%	53%
Unknown by victim	16%	6%	2%
Victim/offender relationship			
Stranger	22%	17%	21%
Intimate/Familial	23%	32%	35%
Acquaintance	55%	51%	44%
Force was used by the offender	72%	81%	86%
Time between assault and exam (hours)	17.02 (18.20)	15.54 (17.37)	15.82 (17.67)

Note: Standard deviation in parentheses

Table 3 presents the characteristics of the forensic medical evidence documented in the medical records. The majority (71%) of victims had documented physical injury, with a mean of 4.72 injuries, and a range of 0 to 32 physical injuries. Of the subtypes of physical injuries, more victims had bruises (54%), while fewer had tearing (3%). Fifty-four percent of victims had documented anogenital injury, with a mean of 1.35 anogenital

injuries, and a range of 0 to 11 anogenital injuries. Of the subtypes of anogenital injuries, more victims had redness (29%), followed by abrasions (22%), while fewer had anogenital bruises (10%) (no data was missing on physical or anogenital injuries). Twelve percent of the victims had documented trace evidence found on their body (no missing data).

Table3

Demographics of Forensic Medical Evidence (Percentages and Means)

Demographics of Forensic Medical Evidence	All Reported Cases (N=185)	Referred Cases (N=90)	Warranted Cases (N=57)
Number of physical injuries	4.72 (6.27)	4.99 (6.03)	4.91 (6.00)
Type of physical injury			
Redness	22%	23%	28%
Tears	3%	2%	2%
Bruises	54%	58%	53%
Abrasions	43%	46%	49%
Other	18%	20%	25%
Number of anogenital injuries	1.35 (2.04)	1.66 (2.27)	1.49 (2.32)
Type of anogenital injury			
Redness	29%	33%	30%
Tears	14%	14%	12%
Bruises	10%	13%	12%
Abrasions	22%	33%	28%
Other	8%	9%	9%
Trace evidence	12%	14%	11%

Note: Standard deviation in parentheses

Procedures

To assess the reliability of the sampling procedures, 30% of the cases from September 1999 to December 2002 were randomly selected and reviewed by a Turning Point employee to determine if the same cases were selected for inclusion based on the five criteria for eligibility (see Sample section for discussion on the five eligibility criteria for sample inclusion). The program's employee was asked to conduct the reliability assessment in order to limit access of patients' identities exclusively to the principal investigator. The program employee and investigator had 100% agreement on cases that were sampled for inclusion based on the five eligibility criteria. For the sampled cases, the victims' names, complaint numbers, and date of assault were recorded; this information was required to search the Macomb County Prosecutors' Office's database for information regarding referring and warranting decisions. A new and unique ID number was also assigned to the case for the researcher's records. The list linking the research ID number and victims' names and complaint numbers was destroyed after all data were collected and reliability and validity assessment were complete.

The prosecutor's database for referring was searched using complaint numbers. In this database, a record was created for all cases referred by law enforcement to the prosecutor's office. In order to assess the reliability of these data, 30% of cases that were referred, but not warranted were randomly selected and verified against law enforcement records to verify that the case was referred. Kappa was computed to assess the degree of agreement between the "referral" database, and law enforcement records: $\kappa = .52$. Because this low kappa value calls into question the reliability of the data, all cases were checked for accuracy using law enforcement records. Kappa was computed again to

assess the degree of agreement between the “referral” database, and law enforcement records for all cases: $\kappa=.60$. To resolve the discrepancy between the prosecutor’s database and the law enforcement records, it was decided to use the information from the law enforcement records as they were likely more accurate for several reasons. First, the “referring” database could only be searched using complaint numbers. It may be possible that data entry errors occurred while complaint numbers were entered into the “referring” database. Second, the prosecutor’s office does not have a mechanism to track cases that were not referred to their office. Thus, the “referral” database only contained cases that were referred to the prosecutor’s office. So the absence of cases in the “referral” database indicates that they were not referred. The types of disagreements between the “referring” database and law enforcement records were examined. All but one disagreement involved cases in which there was no record of referral in the “referring” databases but the law enforcement record indicated that the case had been referred. Based on the limitations of the “referring” database, law enforcement records were used to code the referral variable.

The Macomb County Prosecutor’s database was searched for warranting and final case outcomes using victims’ names and date of assault. In this database, a record is created on whether the cases were warranted and its final outcome. In order to assess the reliability of the information from this database, warranting and final outcome data were compared against court case files for 30% of the warranted cases. There was 100% agreement on warranting and case outcomes between the “warranting/ outcome” database and court records.

To assess the reliability of coding for referral, warranting, and final case outcome, 30% of the cases were randomly selected and independently coded from the law enforcement records and prosecutor's databases by a second coder. An employee from the prosecutor's office was chosen as a second coder for the prosecutor's database, and a Turning Point employee was chosen as a second coder for the law enforcement records in order to limit access of victims' identities exclusively to the principal investigator. The investigator and second coders had 100% agreement on referral, warranting, and the final outcome. That is, the investigator and second coders agreed if a case was referred or not (based on law enforcement records), if a case was warranted or not, and on the final outcome of the case (based on prosecutor database).

Turning Point patient records were searched by victim name and date of assault to obtain information about victim characteristics, case characteristics, and forensic medical evidence. To assess the reliability of the coding, the investigator and a research assistant independently coded victim characteristics, case characteristics, and forensic medical evidence documented in the patient record for 67% of the total cases. Coding was consistently monitored throughout the project to maintain kappas $>.80$. Kappas were computed to assess the degree of agreement between the two coders on each variable: trace evidence, kappa=.98; time of the exam, kappa=.92; alcohol/drug use, kappa=.98; physical bruises, kappa=.98; anogenital abrasions, kappa=.98; physical injuries, kappa=.96; and other types of physical injury, kappa=.98. All other variables had 100% agreement. Turning Point patient database was searched by victim name and date of assault to obtain information for victim and case characteristics (e.g. race, disability, and victim/offender relationship) that were not systematically documented in the patient

records. To assess the reliability of the coding, the investigator and a Turning Point employee independently coded victim race, disability, and victim/offender relationship documented in the database for 30% of the total cases. Coding was consistently monitored throughout the project to maintain kappas $>.80$. Kappas were computed to assess the degree of agreement between the two coders on each variable: race, kappa=.98. Disability, and victim/offender relationship had 100% agreement. There were no secondary sources against which to compare the accuracy of the forensic medical evidence, victim characteristics and case characteristics, so no validity assessments were conducted for these variables.

Measures

The first research question focused on rape case attrition rates, therefore, law enforcement referral rates, prosecutors' warranting rates, and case outcomes were coded from law enforcement records, and the prosecutor's database (Operational definitions and coding for each variable are located in Appendix C). In order to determine attrition rates, law enforcement referral outcomes were coded (was the case referred, yes/no), warranting outcomes were coded (was the case warranted, yes/no); and final case outcomes were coded (case charged, but later dropped, plea bargain/trial resulting in conviction, trial resulting in acquittal) for each case.

The second research question focused on predicting rape case attrition. In order to determine factors that predict case attrition, information regarding victim characteristics, case characteristics, and forensic medical evidence were coded for each case. Specifically, these independent variables included: 1) Victim characteristics: a) age; b) race/ethnicity (coding: Caucasian/Minority); c) disability status (coding: no disability/

disability); d) median household income; 2) Case characteristics: a) alcohol or drug use by victim (coding: no/yes); b) type of rape/ penetration (coding: single/multiple/unknown penetration); c) victim-offender relationship (coding: stranger/nonstranger); d) offender tactics (coding: unconscious/coercion/force)¹; the time between the assault and exam (coding: actual time in hours); and 3) Forensic medical evidence: a) physical injury subtypes² (coding: no/yes) including redness, bruises, abrasions, and other types of injuries; b) anogenital injury subtypes (coding: no/yes) including redness, tears, bruises, abrasions, and other types of anogenital injury; trace evidence (coding: no/yes) (see Appendix B for a complete list of all injuries/evidence coded, and Appendix D for a complete list of the refined coding used for the analyses). Table 4 presents the intercorrelations among the predictor variables using all 185 cases in the study (i.e. all reported cases); and Table 5 presents the intercorrelations among variables in the subsampled cases that were referred to the prosecutor for a warranting decision (N=90). The predictors were not highly correlated with each other for either model, with the exception of the dummy coded variables (type of penetration, and victim/offender relationship). Because these dummy coded variables were entered into the model as a set, the correlations among the variables within the set should not pose a problem.

¹ Sixteen percent of the data for offender tactics was missing, therefore not included in the multivariate analyses.

² Only 3% of the sample had tears (physical injury) and thus, were not included in the multivariate analyses.

Table 4

Correlations of the Predictor Variables and Outcome for the Referring Model

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Refer	1.00																						
2. Age	.02	1.00																					
3. Race	-.04	.15*	1.00																				
4. Disability	-.01	.22*	.15	1.00																			
5. Income	-.01	.05	.16*	-.02	1.00																		
6. Drug/alcohol	-.23	-.20*	.22*	-.12	.03	1.00																	
7. Single pen	-.08	-.10	-.03	-.12	.13	-.03	1.00																
8. Multi pen	.28*	.02	-.06	.10	-.16*	-.10	-.71*	1.00															
9. Unkn pen	-.26	.11	.12	.04	.04	.17*	-.39*	-.37*	1.00														
10. Stranger	-.11	.07	.02	-.09	-.08	-.05	-.07	-.08	.21*	1.00													
11. Intim/Fam	.20*	.12	-.21*	-.04	-.05	-.25*	-.02	.13	-.15*	-.29*	1.00												
12. Acquain	-.09	-.16*	.13	.10	.09	.26*	.09	-.05	-.05	-.56*	-.62*	1.00											
13. Delay	-.10	.02	.10	.08	.21*	.07	-.01	-.09	.13	.13	-.10	-.03	1.00										
14. PH Redness	.04	.13	-.03	.04	-.21*	-.01	-.03	.07	-.06	.19*	.13	-.27*	-.02	1.00									
15. PH Bruises	.08	.10	.06	.08	-.03	-.04	-.03	-.03	.07	-.08	.04	.04	.11	.10	1.00								
16. PH Abrasion	.06	.13	.01	.07	-.03	.10	-.08	.04	.05	.03	.17	-.12	-.00	.34*	.37*	1.00							
17. PH Other	.04	.06	-.10	-.09	-.17*	-.10	.01	.01	-.03	.10	.15*	-.22*	.01	.47*	.05	.15*	1.00						
18. AG Redness	.11	.11	.21*	.02	-.07	.02	-.02	.01	.01	.03	.73	-.01	.07	.10	.06	.03	.04	1.00					
19. AG Tears	.01	.03	-.03	.08	-.03	-.15	-.04	.08	-.06	.06	.05	-.10	-.06	.20*	.00	.060	.05	.02	1.00				
20. AG Bruises	.10	.10	.05	-.08	-.06	-.09	-.08	.05	.04	.19*	-.05	-.11	.08	-.01	.03	.140	.07	.14	.07	1.00			
21. AG Abrasions	.18*	.01	-.08	.03	-.07	-.07	.04	-.02	-.03	.03	.10	-.12	.08	.04	.11	.14	.08	.12	.05	.12	1.00		
22. AG Other	.03	.14	.09	.00	.17*	-.06	.03	-.05	.02	-.01	.14	-.12	.01	-.06	.07	.08	-.09	.12	.22*	.16*	.22*	1.00	
23. Trace evidence	.06	-.01	.07	-.06	.07	.12	.01	.06	-.08	-.06	-.03	.07	-.05	.00	-.04	.07	-.01	-.02	.08	-.02	.08	.13	1.00

1. Warrant (0=no), 3. Race (0=Minority); 4. Disability (0=no disability); 6. Drugs/alcohol (0=no drugs/alcohol used); 7. Single penetration (0=no single penetration); 8. Multiple penetration (0=no multiple penetration); 9. Penetration unknown to victim (used as reference in dummy code with single & multiple penetration as a set); 10. Raped by stranger (0=not raped by stranger); 11. Raped by intimate/familial (0=not raped by intimate/family); 12. Raped by acquaintance (reference in dummy code with stranger & intimate/familial as a set); 14-17. PH=physical injury; 18-22. AG=anogenital injury (0=no injury for all subtypes of injury); 23. Trace evidence (0=no trace evidence)

Table 5

Correlations of the Predictor Variables and Outcome for the Warranting Model

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Warrant	1.00																						
2. Age	.02	1.00																					
3. Race	-.12	.19	1.00																				
4. Disability	-.10	-.01	.16	1.00																			
5. Income	-.18	.17	.12	-.11	1.00																		
6. Drug/alcohol	-.17	-.20	.28*	-.03	.15	1.00																	
7. Single pen	.18	.05	-.06	-.04	.19	.03	1.00																
8. Multi pen	-.05	-.07	.05	.04	-.26*	-.10	-.87*	1.00															
9. Unknown pen	-.26*	.04	.01	-.02	.15	.14	-.21*	-.29*	1.00														
10. Stranger	.15	.05	-.01	-.06	-.06	-.10	-.11	.04	.15	1.00													
11. Intim/Famil	.10	.11	-.01	-.07	-.10	-.17	.06	-.08	.04	-.31*	1.00												
12. Acquaint	-.20	-.14	.01	.11	.13	.24*	.03	.04	-.15	-.46*	-.70*	1.00											
13. Exam Delay	-.02	-.02	-.09	-.01	.25*	.25*	.05	-.13	.16	.09	-.06	-.02	1.00										
14. PH Redness	.15	.15	.04	.07	-.22*	-.05	.05	-.02	-.04	.19	.10	-.23*	-.19	1.00									
15. PH Bruises	-.14	.14	.13	.07	-.10	-.14	-.06	-.01	.14	-.15	.15	-.03	.28*	.15	1.00								
16. PH Abrasion	.09	.18	.06	.07	-.06	.11	.05	-.06	.02	.01	.16	-.16	-.01	.39*	.47*	1.00							
17. PH Other	.15	.04	-.14	-.10	-.20	-.13	.00	.01	-.02	.08	.10	-.16	.06	.25*	.15	.27*	1.00						
18. AG Redness	-.10	.02	.33	-.22*	-.03	.28*	.02	-.06	.09	.06	-.08	.03	-.09	.06	-.06	.02	.00	1.00					
19. AG Tears	-.08	.18	.03	-.04	-.04	-.37*	-.07	-.01	.14	.17	.08	-.21	-.19	.22*	.10	.13	.19	.11	1.00				
20. AG Bruises	-.04	.23*	.02	-.11	-.16	-.14	-.05	.03	.03	.26*	-.13	-.08	.02	.02	.07	.17	.05	.14	.12	1.00			
21. AG Abrasion	-.06	-.04	-.13	-.13	-.01	.09	.03	-.13	.21*	.12	.06	-.14	.12	-.02	.12	.18	.10	-.10	.08	.17	1.00		
22. AG Other	.00	.22*	.05	-.06	.08	-.11	.00	-.12	.23*	.17	.12	-.24*	.01	.02	.10	.27*	-.06	.11	.43*	.22*	.13	1.00	
23. Trace evid	-.15	.08	.12	.05	.06	.10	-.07	.12	-.11	.08	-.06	-.01	-.06	-.08	-.16	-.06	-.05	-.02	.10	-.07	.08	.09	1.00

1. Warrant (0=no), 3. Race (0=Minority); 4. Disability (0=no disability); 6. Drugs/alcohol (0=no drugs/alcohol used); 7. Single penetration (0=no single penetration); 8. Multiple penetration (0=no multiple penetration); 9. Penetration unknown to victim (used as reference in dummy code with single & multiple penetration as a set); 10. Raped by stranger (0=not raped by stranger); 11. Raped by intimate/familial (0=not raped by intimate/family); 12. Raped by acquaintance (reference in dummy code with stranger & intimate/familial as a set); 14-17. PH =physical injury; 18-22. AG=anogenital injury (0=no injury for all subtypes of injury); 23. Trace evidence (0=no trace evidence)

Data Analyses Plan

Raw data were statistically and graphically explored for quality of the data, potential outliers, and distributional problems prior to conducting data analysis (see Results section). In addition, potential threats to validity were assessed (see Results section). For Question #1, descriptive analyses were used to examine the extent that rape cases move forward in the legal system. For Question #2, given that the dependent variables were dichotomous (referred/not referred; warranted/not warranted), logistic regression was used to examine the strength and direction of relationships between processing decisions, and victim characteristics, case characteristics, and forensic medical evidence (Hosmer & Lemeshow, 2000). The analysis was approached from a hierarchical perspective, with predictors organized into conceptually meaningful blocks to be entered sequentially, with the order planned to facilitate examination of the contribution of variables in later blocks, controlling for the effects of variables in earlier blocks. This analysis allowed tests of: 1) the effects of victim and case characteristics on rape case processing decisions, controlling for the effects of law enforcement agencies; 2) the influence of forensic evidence on rape case processing decisions, controlling for the effects of victim (e.g., race) and case characteristics (e.g., victim/offender relationship); 3) the significance and relative unique contribution of variables in each conceptual block to the prediction of rape case processing decisions; and 4) the overall predictability of rape case processing decisions. Hierarchical approaches to logistic regression have been utilized effectively with comparable conditions. Power was estimated, using PASS software (Heintze, 2001) for the referring and warranting models. For the analysis of referrals, power to detect a single predictor with an odds ratio of 2.50 was .99 for a

continuous predictor, and .70 for a dichotomous predictor with a 50% baserate. These estimates assume $N=141$, a baserate of .49 for referrals, $p < .05$, and that the analysis controls for the effects of other independent variables that accounted for an estimated 10% of the variance in the predictor of interest (Hosmer & Lemeshow, 2000). For the analysis of warranting, power to detect a single predictor with an odds ratio of 2.50 was .96 for a continuous predictor, and .39 for a dichotomous predictor with a 50% baserate. These estimates assume $N=79$, a baserate of .63 for warranting, $p < .05$, and that the analysis controls for the effects of other independent variables that accounted for an estimated 10% of the variance in the predictor of interest (Hosmer & Lemeshow, 2000).

The number of predictors included in these logistic regression equations was evaluated relative to the available sample size. Green (1991) recommends a sample size equal to or greater than 104 plus the number of predictors for linear regression. To examine the predictive utility of victim characteristics, case characteristics, and forensic medical evidence (plus controlling for the effects of law enforcement agencies), 21 predictors were selected for the model. The sample size for the current study ($N=185$) is greater than 104 plus 21 predictors. Based on Green's recommendation (1991), the sample size, and number of predictors used in the model should be able to detect a medium to large effect.

RESULTS

Univariate and Multivariate Data Screening

Prior to conducting the substantive quantitative data analysis, raw data were statistically and graphically examined to verify data quality, potential outliers, and distributional problems that may require transformations or alternative methods. First, the data were assessed for multivariate outliers. By using Mahalanobis distance with $p < .001$, two cases were identified as multivariate outliers. Analyses were conducted for the referring and warranting models with and without the multivariate outliers included in the model. Including the multivariate outlier cases did not impact the results; and thus, they were included in the models. Second, while missing data were not a problem for most of the variables, there were a few variables that had proportionally more data missing. The exact time between the assault and exam had missing information for 24 cases. While the date of the assault and exam were available for all cases except one, the time of the assault was either unknown or missing in the file for 23 cases. An imputation was created for these cases by using a mid-cutoff point of the days between the assault and exam. For example, if the victim came in for an exam on the same day as the assault, the missing cases would be coded as 12 hours. If the victim came in one day after the assault, the missing cases would be coded as 36 hours. Additionally, income was missing for seven cases. An imputation was created for the missing data by substituting the seven cases with the median of household income (\$41,859). Offender tactics (e.g. weapon use) had missing data for 30 cases. Imputations were not possible for this variable, and it was not included in the model.

Distributions for each variable were assessed for any potential problems. First, lowess graphs were used to explore whether there were curvilinear relationships between the continuous independent variables (e.g. age, time between exam and assault, and income) and the dependent variables. The lowess graphs showed that curvilinear relationships did not exist between the continuous independent and the dependent variables. Second, histograms and skew statistics were examined, and indicated distributional problems for two variables: age, and time between assault and exam. The skew for age was 2.317, and had kurtosis of 7.795. A log transformation was applied to age, which improved the skew (1.035), and kurtosis (1.001). The skew for time between assault and exam was 2.082, and had kurtosis of 4.294. A log transformation was applied to this variable, which improved the skew (.503) and kurtosis (-.537). Histograms and lowess graphs of the transformed variables were examined, and also indicated improvement in the distributions. After transforming the two variables, the data were assessed again for multivariate outliers. Using Mahalanobis distance with $p < .001$, one case was no longer a multivariate outlier, while one case remained a multivariate outlier. Again, analyses were conducted for the referring and warranting models with and without the remaining multivariate outlier case included in the models. Including the multivariate outlier case did not impact the results, and thus, the case remained in the models.

Research Question #1: Rates of Case Attrition

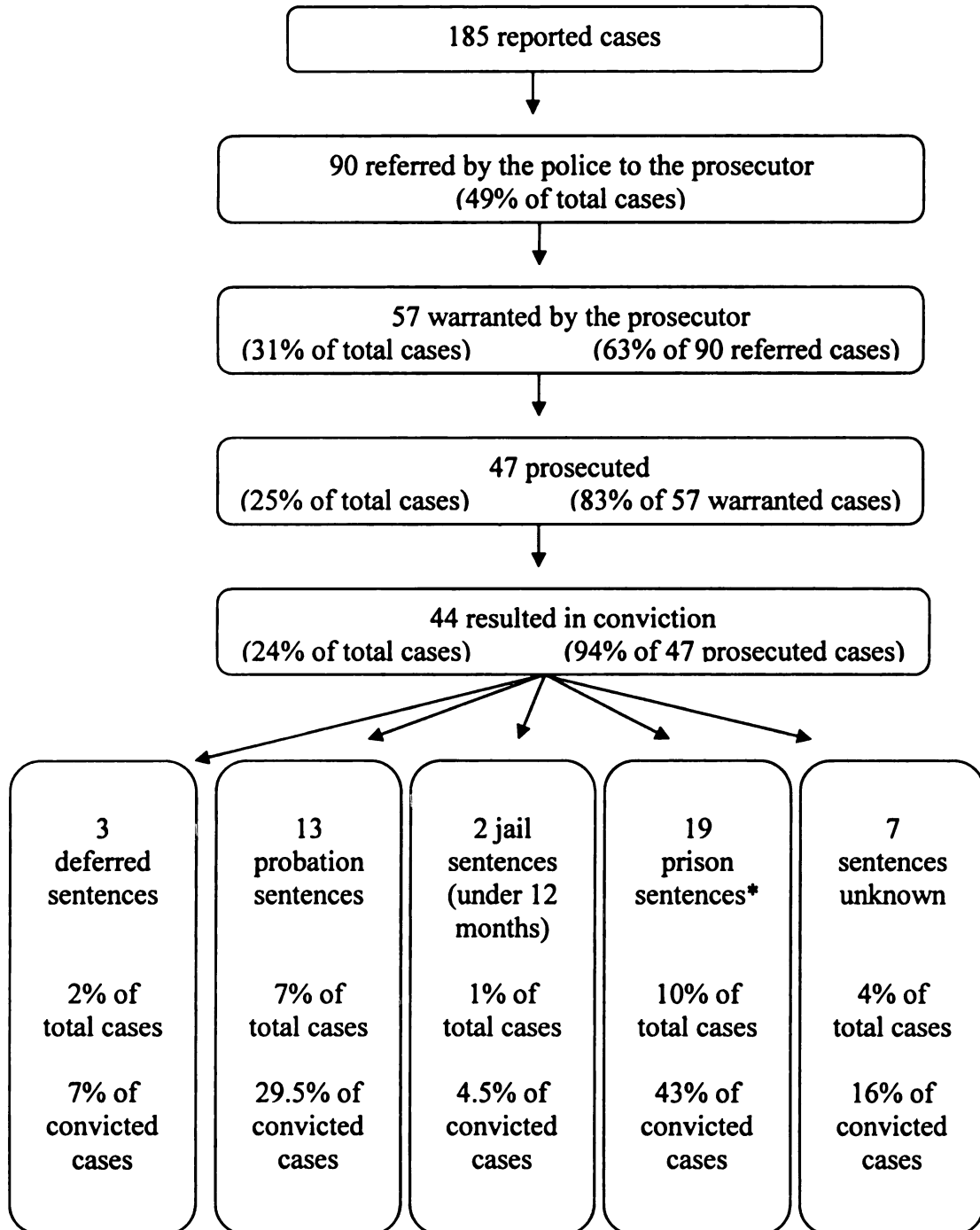
The first research question in this study was: To what extent do rape cases processed by a SANE program move forward in the legal system? Specifically, this study examined the rates of referral, warranting, and case outcomes for rape cases examined in a SANE program. Descriptive data were collected to document how many cases were 1)

referred by the police; 2) warranted by prosecutors; 3) prosecuted; and 4) resulted in conviction.

Of the 185 reported cases examined in this study, less than half were referred by the police, and only 25% were prosecuted (see Figure 3 for case attrition at each stage of the legal system).

Figure 3

Case Attrition at Each Stage of the Legal System



*The average prison sentences ranged from 18 to 34 years.

Research Question #2: Factors Predicting Case Attrition

The second question in this study was: What factors predict case attrition? Specifically, this study explored the extent to which the victim characteristics, case characteristics, or the presence and type of forensic evidence collected by the SANE nurses predicted case attrition at each stage of the legal system. Furthermore, this phase of the study examined the predictive value of forensic medical evidence in charging decisions relative to victim characteristics and case characteristics. Specifically, this research compared the predictive value of forensic medical evidence relative to victim characteristics and case characteristics in whether a case moved forward in the legal system. To answer these questions, a series of logistic regression analyses were conducted predicting two dependent variables (police referral decisions, and prosecutor warranting decisions) from three sets of independent variables: victim characteristics; case characteristics; and forensic medical evidence. Odds ratios were examined to determine relative importance of each predictor within each model.

Referring Model. Prior to analyzing the police referring model, three potential threats to validity were evaluated. In other words, are there other factors besides victim, case, and forensic medical evidence characteristics that influence whether the case is referred? For example, do cases have the same probability of being referred if a nurse with little experience collects evidence compared to a nurse with more experience? Do cases have the same probability of being referred regardless of the law enforcement agency handling the case? To assess whether maturation of nursing skills was a potential confounding variable, the nurse assigned to each case was coded by the number of exams performed during the timeframe of the study. Case experience ranged from one to 129

examinations conducted, with a median of 49 exams. A t-test was used to examine the relationship between referring cases (yes/no), and the number of exams the nurse conducted during the timeframe of the study. The t-test was non-significant indicating there was no relationship between police referring and examination experience of the nurses ($t = [183] -.75, p=.46$). Thus, maturation of nurses' skills was not included in the model. Second, there has been one high profile rape case in Macomb County that involved a sheriff as the offender and garnered substantial media attention. This may introduce a historical threat that could influence referral decisions. This possibility was assessed by examining police referring decisions before and after the high profile case occurred. A dichotomous variable (before high profile case/after high profile case) was created. Chi-Square analyses were used to assess whether there was a significant relationship between case referral and time of the high profile case; this test was non-significant ($\chi^2 = [1] .549, p=.46$). The third potential threat to validity was examined by exploring differences between individual law enforcement agencies and case referral. Nineteen law enforcement agencies made referral decisions for rape cases, ranging from 1 to 39 reported cases per agency. Three characteristics of law enforcement agencies were examined: reported rape case volume; reported crime volume; and the communities' median household income of the law enforcement agencies. Agencies with fewer reported rape cases may have less experience to hone their investigation skills. On the other hand, agencies with a high volume of rape cases may have more barriers to providing quality investigations, such as investigator burnout, or lack of resources (Kerstetter & Van Winkle, 1990). To assess rape case volume, the law enforcement agencies were dichotomized by the median number of rapes reported to Macomb County

law enforcement agencies. This information was obtained from the 2001 Uniform Crime Report from Michigan State Police. Reported rapes ranged from 0 to 143, with a median of 36. Law enforcement agencies that had low volume of reported rapes (36 or less) were coded zero, and those that had high volume of reported rapes (more than 36) were coded one. Chi-Square analysis was used to examine the relationship between police referring, and rape case volume. No significant relationships were found among these variables ($\chi^2 = [1, N=183] .01, p=.92$). Similarly, reported crime volume of the law enforcement agencies was also examined. To assess the volume of reported crimes, the law enforcement agencies were dichotomized by the median number of crimes reported in Macomb County law enforcement agencies. This information was obtained from the 2001 Uniform Crime Report from Michigan State Police. Reported crimes ranged from 21 to 5346, with a median of 866. Law enforcement agencies that had low volume of reported crimes (866 or less) were coded as zero, and those that had high volume of reported crimes (more than 866) were coded one. Chi-Square analysis was used to examine the relationship between police referring, and reported crime volume. No significant relationships were found among these variables ($\chi^2 [1, N=183] .08, p=.78$).

Case attrition may also be influenced by the available resources within the law enforcement agency (Frazier & Haney, 1996). Because law enforcement agency budgets were unavailable, resources for the law enforcement agencies were characterized by the median household income for their city/ township. The median household income for each city or township was obtained from the United States 2000 Census. Median household income ranged from \$32,000 to \$69,000, with a median of \$49,000. Law enforcement agencies that had communities with low household income (\$49,000 or less)

were coded as zero, and those that had communities with high household income (more \$49,000) were coded one. Chi-Square analysis was used to examine the relationship between police referring cases, and the communities' median household of the law enforcement agencies. The Chi-Square Statistic was significant, indicating that cases from communities with lower household incomes were more likely to be referred ($\chi^2 [1, N=184] = 4.823, p<.05$). Thus, law enforcement agencies (as defined by their community's median household income) may predict police referrals, and was included in the referring model.

Table 6 features the results summary for the referring model. The predictor variables were entered into blocks organized by victim characteristics, case characteristics, and forensic medical evidence. The first column displays the outcome variable and the predictor variables. The second column (with the heading B) features the logistic coefficient, which represents the change in the logit (natural log of the odds) of the outcome variable associated with a one-unit difference in the predictor variable (Fields, 2000; Tabachnick & Fidell, 2001). The third column represents the Wald statistic, which is a z-test on the regression weight (B), and has a Chi-Square distribution. The fourth column displays the odds ratio, which can be interpreted as the multiplicative change in the odds of being in one outcome category verses the other when the value of the predictor increases by one unit (Tabachnick & Fidell, 2001). The fifth column shows the 95% confidence interval of the odds ratio. The last line of each block features the Chi-Square Difference test, which evaluates if significant improvement in equation fit to the data occurred in the present block compared to the last block.

Predictors were organized into conceptually meaningful blocks including victim characteristics, case characteristics, and forensic medical evidence. However, univariate analyses showed a potential threat to validity existed between individual law enforcement agencies and case referral. Thus, the first block only included law enforcement agencies (from low-income communities/high-income communities) in order to control for the effect of this variable in future blocks. The Wald Statistic indicated that law enforcement agencies did not significantly predict police referring cases. The Model-Chi-Square was not significant in this equation, meaning that overall the model was not predicting police referral significantly better than it was with only the constant included.

The second block includes all victim characteristics expected to predict police referring cases. Controlling for the effects of law enforcement agencies, the Wald Statistic indicates that victims' age, race, disability status, and median household income do not significantly predict police referring cases. The Model-Chi-Square was not significant in this equation meaning this set of predictors did not significantly predict police referral.

The third block includes all case characteristics expected to predict police referring cases. Controlling for the effects of law enforcement agencies and victim characteristics, the Wald Statistic indicates that some case characteristic significantly predicted police referring cases including alcohol/drug use by victims, and the type of penetration. The results of the odds ratio indicated that cases in which victims were consuming alcohol or drugs before or during the assault decreased the odds of the case being referred by 34%. Cases in which the offender penetrated more than one orifice of the victim were 5.56 times more likely to be referred than cases in which the victim did

not know what occurred during the rape (e.g. victim was unconscious). In addition, cases in which the offender was an intimate partner or family member were somewhat more likely to be referred than when the offender was an acquaintance (2.41 times as likely, $p=.08$). The Model-Chi-Square was significant (Model $\chi^2=35.977$, $p<.01$) in this block, meaning that this set of predictors was able to significantly predict police referral. In addition, this group of predictors was overall able to correctly classify police referral for 65% of the cases.

The fourth block includes all forensic medical evidence expected to predict police referring cases. Controlling for the effects of law enforcement agencies, and victim and case characteristics, the Wald Statistic indicates two types of forensic medical evidence significantly predicted police referring cases: anogenital bruises and abrasions. The results of the odds ratio indicated that cases with documented anogenital bruises were 6.27 times more likely to be referred. Cases with documented anogenital abrasions were 5.11 times more likely to be referred. The Model-Chi-Square was significant (Model $\chi^2=60.484$, $p<.01$) in this block meaning that this set of predictors was able to significantly predict police referral. With the addition of the forensic medical evidence predictors, the model was overall able to classify correctly police referral for 74% of the cases.

Table 6

Logistic Regression Analyses Predicting Police Referring Cases to Prosecutor, N=141

Predictor	Block One				Block Two				Block Three				Block Four			
	B	Wald	Odds Ratio	95% CI	β	Wald	Odds Ratio	95% CI	β	Wald	Odds Ratio	95% CI	β	Wald	Odds Ratio	95% CI
Law Enforcement Agency	-0.52	2.43	0.59	0.31-1.14	-0.57	2.66	0.56	0.28-1.12	-0.83	4.34*	0.44	0.20-0.95	-0.77	2.84†	.46	.19-1.14
Victim Characteristics																
Age					0.21	.15	1.23	0.43-3.58	-0.16	0.06	0.85	0.25-2.95	-.48	.44	.62	.15-2.54
Race					-0.42	.86	0.66	0.27-1.60	0.24	0.21	1.28	0.45-3.61	.14	.05	1.15	.35-3.76
Median household income					-0.40	.81	0.67	0.28-1.60	-0.69	1.83	0.50	0.19-1.36	-.75	1.70	.47	.15-1.46
Disability status					0.00	.12	1.00	0.98-1.02	0.01	1.22	1.01	0.99-1.04	.03	3.75†	1.03	1.00-1.06
Case characteristics																
Victim used drugs/alcohol									-1.08	6.78**	0.34	0.15-0.77	-1.40	8.55**	.25	.10-.63
Single penetration									0.60	0.93	1.82	0.54-6.11	.38	.30	1.46	.38-5.63
Multiple penetration									1.72		5.56	1.64-18.81	1.89	6.83**	6.62	1.60-27.33
Raped by stranger									-0.14	0.08	0.87	0.34-2.23	-.15	.06	.86	.28-2.71
Raped by intimate/familial									0.88	3.09†	2.41	0.90-6.42	1.00	3.28†	2.73	.92-8.09
Delay in exam									-0.22	1.07	0.80	0.52-1.22	-.61	5.53*	.54	.33-.90
Physical injury																
Redness													.04	.01	1.04	.30-3.65
Bruises													.41	.71	1.50	.58-3.89
Abrasions													.30	.36	1.35	.50-3.66
Other													.03	.00	1.03	.32-3.31
Anogenital injury																
Redness													.80	2.60	2.23	.84-5.89
Tears													-.94	1.98	.39	.11-1.45
Bruises													1.84	5.11*	6.27	1.28-30.81
Abrasions													1.63	8.19**	5.11	1.67-15.60
Other													-1.07	1.83	.34	.07-1.62
Trace evidence													1.25	2.35	3.51	.71-17.43
χ^2 Difference		2.45				1.95				31.58**				24.507**		

* $p < .05$, ** $p < .01$, † $p < .10$

Chi-Square differences tests were used to evaluate the predictive value of forensic medical evidence in charging decisions relative to victim characteristics and case characteristics. Do police place more emphasis on forensic medical evidence in their decisions to refer cases than victim and case characteristics? Table 7 displays the value of -2 log likelihood the differences in the Chi-Square among each set of predictors entered into logistic regression (Fields, 2000). Lower values of -2 log-likelihood indicate that the model is predicting the outcome variable more accurately. The Chi-Square difference statistic indicates the improvement in the predictive power of the model since the last stage. As shown in Table 7, the value of the -2 log-likelihood for the constant model was only 206.55, which was reduced to 204.102 when law enforcement agencies was added, then reduced to 202.149 when victim characteristics were introduced, then reduced to 170.574 when case characteristics were added, and finally reduced to 146.068 with the addition of forensic medical evidence in the model. Based on the -2 log-likelihood test, the model is better at predicting police referral with the addition of forensic medical evidence predictors. In evaluating the Chi-Square difference, the addition of law enforcement agencies, and victim characteristics did not significantly improve the predictive power of the model. The addition of case characteristics significantly improved the predictive power of the model (χ^2 difference = 31.575, $p < .01$). Furthermore, the addition of forensic medical evidence also significantly improved the predictive power of the model (χ^2 difference = 24.507, $p < .01$). Thus, forensic medical evidence provides more predictive value in referring cases than victim and case characteristics.

Table 7

Chi-Square Difference Test for Types of Predictors for Police Decisions

Predictors	-2 Log likelihood	χ^2 Difference
Law Enforcement Agencies	204.102	2.449
Victims Characteristics	202.149	1.953
Age		
Race		
Disability status		
Median household income		
Case Characteristics	170.574	31.575**
Alcohol/drugs used before/after the rape		
Type of penetration		
Victim/offender relationship		
Delay in exam		
Forensic Medical Evidence	146.068	24.507**
Physical redness		
Physical bruises		
Physical abrasions		
Physical other		
Anogenital redness		
Anogenital tears		
Anogenital bruises		
Anogenital abrasions		
Anogenital other		
Trace evidence		

** p<.01

In hierarchical regression, the significance of each predictor is typically evaluated in the block in which it was entered into the equation. However, when new predictors are added in subsequent blocks, the significance of previous predictors may change (i.e. some variables that are non-significant become significant and vice versa). Therefore, it is necessary to examine the previous predictors in greater detail as new predictors are

added to the model. For example, when case characteristics were added to the model, the significance of law enforcement agencies changed. While law enforcement agencies were not significant in earlier blocks, adding case characteristics changed law enforcement agencies to become significant. Specifically, higher income law enforcement agencies had 44% lower odds of being referred relative to cases from lower income agencies. To examine why the addition of case characteristics would change the significance of the law enforcement agencies, univariate analyses were conducted to examine the relationship between law enforcement agencies and case characteristics. These analyses did not find any significant relationships between these predictors (see Table 8). Yet, when forensic medical evidence was added to the model, the significance of law enforcement agencies changed to a trend ($p=.09$). The addition of forensic medical evidence also changed the significance of two other predictors. First, the addition of forensic medical evidence influenced the median household of victims to become a trend, which was originally non-significant. However, the results of the odds ratio indicated that there was virtually no effect (odds ratio = 1.027). Second, the addition of forensic medical evidence influenced time between the assault and exam to become significant. Specifically, for every unit (transformed hour) between the assault and exam, the odds of the case being referred decreased by 54%. To examine why the addition of forensic medical evidence would change the significance of time between the assault and exam, t-tests were conducted to examine the relationship between injuries and time between the assault and the exam. These analyses did not find any significant relationships between these predictors.

Relationship between Law Enforcement Agencies and Case Characteristics of Referred Cases

exam

Further analyses were conducted to examine if a *combination* of case characteristic predictors changed the significance of law enforcement agencies. The logistic regression equation was reanalyzed by adding different combinations of case characteristic into the block to determine which combination of predictors changed the significance level of law enforcement agencies. The effect of law enforcement agencies increased and became significant ($p=.02$) when type of penetration and victim/offender relationship were entered into the case characteristic block. Analyses were also conducted to examine if a combination of forensic medical evidence predictors changed the significance of law enforcement agencies. Again, several different combinations of forensic medical evidence predictors were entered into the forensic medical evidence block to assess which combination of predictors changed the significance level of law enforcement agencies. The analyses showed that the effect of law enforcement agencies became significant ($p=.04$) when only physical redness, other types of physical injury, anogenital tears, anogenital bruises, other types of anogenital injury, and trace evidence were added to the forensic medical evidence block. To examine why the addition of forensic medical evidence would change the significance of time between the assault and exam, several combinations of forensic medical evidence predictors were entered into the forensic medical evidence block. The effect of time between assault and exam became significant ($p=.04$) when only physical abrasion, physical redness, anogenital redness, and anogenital abrasion were entered into the forensic medical evidence block.

Warranting model. Another series of logistic regression equations were performed to explore whether victim characteristics, case characteristics, or the presence and type of forensic medical evidence collected by the SANE nurses predicts prosecutors warranting

cases. Only 90 cases were referred to the prosecutors, which drastically reduced the sample size of the warranting model. The sample size of the warranting model exceeds the rules for events (i.e. predictors) to subjects ratio. With a sample size of 90, the number of predictors needed to be decreased to 8 to achieve stability for detecting a large effect (Green, 1991). Hosmer and Lemshow (2000) suggest dropping variables that have no predictive value. Therefore, variables that did not show a significant relationship with police referral were dropped (age, race, disability status, median household income, physical redness, other types of physical injury, anogenital redness, other types of anogenital injury, and trace evidence found on victims' body) with one exception. Discussions with key informants reported that prosecutors were more likely to warrant cases in which the victim had documented physical injury. Although none of the physical injury subtypes were significant in the police referring model, two of them were included in the warranting model. Because the key informants suggested that physical bruises and abrasions were important in prosecution, these two physical injury subtypes were included in the warranting model. One final predictor was dropped from the warranting model. Dummy coding was used to examine type of penetration: single penetration, multiple penetration, and penetration unknown by the victim due to being unconscious (served as reference). In the referring model, 17% of cases involved penetration unknown by the victim. However, the warranting model only contained 7% of cases involving unknown penetration. A preliminary analysis showed that type of penetration had large unstable parameters when added to the warranting model due to the low number of cases involving unknown penetration, and therefore this variable was dropped from the model. The final predictors included in the warranting model included: alcohol/drugs used before

or during the assault, victim offender relationship, time between assault and exam, physical bruises and abrasions, and anogenital bruises and abrasions.

Prior to analyses, three potential threats to validity were evaluated for the warranting model. The purpose of this exploration was to determine if there are other factors besides victim characteristics, case characteristics, and forensic medical evidence that influenced warranting decisions. For example, do cases have the same probability of being warranted regardless of the prosecutor handling the case? First, to assess validity of maturation of nursing skills as a confounding variable, the nurse assigned to each case was coded by the number of exams performed during the timeframe of the study. A t-test was used to examine the relationship between warranting cases, and the number of exams conducted by the nurses. The t-test did not show a significant relationship between warranting, and examination experience of the nurses ($t = [88] -.98, p = .33$). Thus, maturation of nursing skills was not included in the model. Second, to examine whether the high profile rape case in Macomb County introduced a historical threat, warranting decisions before and after the high profile case were compared. A dichotomous variable (before high profile case/after high profile case) was created. Chi-Square analysis was used to assess this threat, and did not find a significant relationship between the high profile case with warranting cases ($\chi^2 [1, N=90] = 1.188, p = .28$).

The third potential threat to validity existed between individual prosecutors and warranting decisions. Three prosecutors made warranting decisions for all referred rape cases in the county during the timeframe of the study. The county is divided into three sections, and each prosecutor makes warranting decisions for rapes occurring in their assigned section. Thus, investigators within the same law enforcement agency refer cases

to the same prosecutor with one exception. One large law enforcement agency is assigned to two prosecutors due to a high volume of cases. Unfortunately, it was not possible to determine the assigned prosecutor for this law enforcement agency. Thus, 24% of the cases for this variable were missing. A code with three categories was created to distinguish cases processed in these three sections (e.g. area one, area two, area three). Cramér's V was used to examine the relationship between the three prosecutors, and warranting cases. Cramér's V is useful in exploring the strength of association between two variables when one of the variables has more than two categorical levels (Pett, 1997). Cramér's V did not show a significant relationship between assigned prosecutors and warranting cases ($\chi^2 = 2.366$, $p = .19$, Cramér's V = .19).

An additional analysis was conducted examining the relationship between prosecutors and warranting cases. Key informants reported that they expected one particular prosecutor to warrant more cases, and to make warranting decisions based on different criteria than the other two prosecutors. In particular, they noted that this prosecutor was more likely to warrant cases even if there was no documented injury. Key informants believed that this prosecutor made decisions unique to the other prosecutors because of having more experience prosecuting rape cases, receiving more specialized training, and engaging in collaborations with the local rape crisis center as well as the local sexual assault nurse examiner program. Therefore, a dichotomous variable (experienced prosecutor/less experienced prosecutors) was created to examine the relationship between the experienced prosecutor and warranting cases. Fortunately, the section assigned to the experienced prosecutor does not involve the large law enforcement agency split among two prosecutors. Thus, this new variable did not have

missing data. Using Chi-Square analysis, a significant relationship between the experience of the prosecutors and warranting was not found. Based on these univariate analyses, assigned prosecutors and the prosecutor experience variable were not included in the model ($\chi^2 [1, N=90] = .627, p=.43$).

Predictors were organized into conceptually meaningful blocks including case characteristics, and forensic medical evidence. The first block included case characteristics expected to predict prosecutors warranting cases (see Table 9). The Wald Statistic indicates that none of the case characteristic significantly predicted prosecutors warranting cases. The Model-Chi-Square was not significant in this equation meaning that this set of predictors was not able to significantly predict warranting.

Table 9

Logistic Regression Analyses Predicting Prosecutor Warranting Cases for Prosecution, N=90

Predictor	Block One				Block Two			
	B	Wald	Odds Ratio	95% CI	B	Wald	Odds Ratio	95% CI
Case characteristics								
Victim used drugs/alcohol	-0.76	2.26	0.47	0.17-1.26	-1.49	5.56*	0.23	0.07-0.79
Raped by stranger	0.93	1.56	2.54	0.59-10.91	0.69	0.71	2.00	0.40-9.99
Raped by intimate/familial	0.51	0.80	1.66	0.55-5.07	0.51	0.62	1.66	0.47-5.80
Delay in exam	-0.01	0.00	0.99	0.57-1.73	0.47	1.65	1.60	0.78-3.30
Physical injury								
Bruises					-2.09	6.44*	0.12	0.02-0.62
Abrasions					1.49	4.41*	4.45	1.10-17.93
Anogenital injury								
Bruises					-1.10	1.89	0.33	0.07-1.60
Abrasions					-0.23	0.14	0.80	0.24-2.63
χ ² difference			5.36				10.00*	
*p<.05, **p<.01, †p<.10								

*p<.05, **p<.01, †p<.10

The second block includes forensic medical evidence expected to predict prosecutors warranting cases. The Wald Statistic indicates two types of forensic medical evidence significantly predicting prosecutors warranting cases: physical bruises and abrasions. The results of the odds ratio indicated that documented physical bruises decreased the odds of the case being warranted by 12%. Cases with documented physical abrasions were 4.45 times more likely to be warranted. The Model-Chi-Square was marginally significant (Model $\chi^2=15.357$, $p=.05$) in this block meaning that this set of predictors was somewhat able to predict prosecutors warranting cases. Furthermore, this group of predictors was overall able to correctly classify prosecutors warranting for 75% of the cases.

Chi-Square differences among each set of predictors was used to evaluate the predictive value of forensic medical evidence in warranting decisions relative to case characteristics. Do prosecutors place more emphasis on forensic medical evidence in their decisions to warrant cases than case characteristics? Table 10 displays the value of -2 log likelihood and the differences in the Chi-Square among each set of predictors entered into logistic regression. As shown in Table 10, the value of the -2 log-likelihood for the constant was 100.101, which was reduced to 94.742 when case characteristics were added, and finally reduced to 84.744 with the addition of forensic medical evidence in the model. Based on the -2 log-likelihood test, the model is better at predicting prosecutors warranting with the addition of forensic medical evidence predictors. In evaluating the Chi-Square difference, the addition of case characteristics did not significantly improve the predictive power of the model. The addition of forensic medical evidence significantly improved the predictive power of the model (χ^2 difference = 10.00, $p<.05$).

Thus, forensic medical evidence provided more predictive value for warranting than did case characteristics.

Table 10

Chi-Square Difference Test for Types of Predictors for Prosecutor Decisions

Predictors	-2 Log likelihood	χ^2 Difference
Case Characteristics	94.742	5.359
Alcohol/drugs used before/after the rape		
Victim/offender relationship		
Delay in exam		
Forensic Medical Evidence	84.744	9.998*
Physical bruises		
Physical abrasions		
Anogenital bruises		
Anogenital abrasions		

* $p < .05$

As previously mentioned, the significance of predictors is typically evaluated in the block in which they were entered into the equation. However, when new predictors are added in subsequent blocks, the significance of previous predictors may change. Therefore, previous predictors were examined in greater detail as new predictors were added to the model. The addition of forensic medical evidence to the model influenced one case characteristic to become significant. While alcohol/drugs used by the victim was not a significant predictor in the first block (case characteristics), it became significant when forensic medical evidence was added to the model. The results of the odds ratio indicated that victim's consumption of alcohol/drugs before or during the assault decreased the odds of the case being warranted by 23%. Univariate analyses were conducted to examine the relationship between alcohol and forensic medical evidence

(e.g. physical and anogenital injuries) to help explain this finding. Chi-Square Statistic found a significant relationship between physical bruises, and alcohol/drug use. Cases in which the victim was using alcohol/drugs had significantly less injury than cases in which the victim was not using alcohol/drugs ($\chi^2 [1, N=53] = 4.44, p<.05$). This relationship may have influenced alcohol/drug use to become significant when forensic medical evidence was added to the model. Further analyses were conducted to examine if a combination of forensic medical evidence predictors changed the significance of alcohol/drug use. The logistic regression equation was reanalyzed by adding various combinations of forensic medical evidence into the block to determine which combination of predictors changed the significance level of alcohol and drug use by the victim. Alcohol/drug use became significant ($p=.02$) when type of physical bruise, physical abrasion, anogenital bruise, and anogenital abrasion were entered into the forensic medical evidence block.

One unexpected finding also required further analyses. Previous research indicates that cases are more likely to be warranted if the victim sustained injury (Chandler & Torney, 1981; Spears et al., 2001). However, cases with documented physical bruises were significantly less likely to be warranted in the model. Interviews with key informants reported that one particular prosecutor was more likely to warrant cases even when there was no documented injury. Therefore, univariate analyses were conducted to examine the relationship between physical bruises, and experience of prosecutors. Did the experienced prosecutor warrant cases with significantly more/less physical bruises? Chi-Square Statistic did not find any significant relationships or trends between these variables ($\chi^2 = [1, N=90] 1.688, p=.19$).

Further analyses were conducted to explore the relationship between all three prosecutors, and physical bruises. First, univariate analyses were conducted to examine the relationships between the three prosecutors and warranted cases with physical bruises. Did any of the prosecutors warrant cases with significantly more/less physical bruises? Cramér's V was chosen for this analysis because of its usefulness in exploring the strength of association between two variables when one of the variables has more than two categorical levels (Pett, 1997). A trend ($p=.11$) was found between the three prosecutors and physical bruises. In particular, 80% of the cases warranted by one prosecutor had physical bruises but only 41% and 44% of cases warranted by the other prosecutors had physical bruises ($\chi^2=4.442$, $p=.11$, Cramér's $V=.33$). A second univariate analysis was conducted to examine the relationships between prosecutors and physical bruises for all referred cases received by the prosecutors. The purpose of this analysis was to evaluate significant difference in the number of documented physical bruises among the cases received by the three prosecutors. Did any of the individual prosecutors receive significantly more cases with physical bruises than their colleagues? The analysis showed no significant difference in the number of cases with physical bruises received by the three prosecutors ($\chi^2=3.946$, $p=.14$, Cramér's $V=.16$). This suggests that no significant differences existed in the number of received cases with physical bruises among the three prosecutors. However, there was a slight difference in the number of cases warranted with physical bruises among the three prosecutors. Overall, one prosecutor tended to warrant a smaller proportion of assigned cases than the other prosecutors, and the majority of the warranted cases by this prosecutor had documented bruises. Thus, it may

be possible that this combination of the lower warrant rate and greater reliance on bruises may have produced the decreased odds in cases with bruises being warranted.

DISCUSSION

The first goal of this research was to examine the rates of referral, warranting, and case outcomes for rape cases examined in a SANE program. Most prior research on rape case attrition was conducted in the 1980s, and has primarily examined later stages (e.g. warranting) of case processing. This study offered a more refined analysis by focusing on earlier stages of processing when cases are likely to be filtered out of the legal system. Furthermore, this research expanded the literature by focusing on cases processed through a SANE program, which in other studies have been found to create significant changes in the way communities respond to rape.

The second goal of this research was to examine whether the presence and type of forensic medical evidence collected by the SANE nurses predicts case attrition. Previous studies on the factors that predict case attrition have not examined the nuances of forensic evidence (e.g. type of injury). This study expanded the literature by examining how the presence of specific types of physical and anogenital injury predicted whether cases move forward in the legal system. Previous literature has also found that victim and case characteristics predict whether rape cases move forward in each step of the legal system. This study expanded the literature by comparing the predictive value of forensic medical evidence in cases being referred or warranted relative to victim characteristics and case characteristics. This is important because it is unlikely that cases are referred or warranted based on only one particular evidentiary, victim, or case characteristic.

Summary of Major Findings

Case attrition. The first focus of the study explored the extent to which rape cases processed by a SANE program moved forward in the legal system. The results showed

that 49% of reported cases processed by the SANE program were referred by the police. This finding is somewhat higher than previous studies examining rape case attrition in cases not processed by SANE programs (see Appendix E for comparison between published attrition rates and attrition rates of current study). The literature suggests that only 41% (Chandler & Torney, 1981) to 44% (Galvin & Polk, 1982) of rape cases were referred in the 1980s, while more recent studies found that only 18% (Bouffard, 2000) to 22% (Frazier & Haney, 1996) of rape cases were referred. In this study of the reported cases processed by the SANE program, 25% were prosecuted. This result is also slightly higher than past studies examining rape case attrition of non-SANE cases. For example, previous literature found that only 16% (Frazier & Haney, 1996) to 18% (Chandler & Torney, 1981) of all reported cases were prosecuted. In addition, the findings of this study indicated that 24% of the reported cases resulted in conviction (i.e. plea-bargain or guilty verdict). This rate is higher than past studies that found that only 7% (Galvin & Polk, 1982) to 17% (Chandler & Torney, 1981) of reported (non-SANE) cases resulted in conviction. The current study also showed that only 11% of reported cases ended with prison sentences. This sentencing rate is slightly greater than previous studies, which found that only 6% (Galvin & Polk, 1982) to 9% (LaFree, 1980) of the reported cases resulted in prison sentences. The results of this study suggest that referral, prosecution, conviction, and prison sentencing rates are somewhat higher in the focal SANE program compared to published rates in non-SANE cases.

There have been few studies that have examined rape case attrition rates in cases processed by SANE programs. Ledray (1992) documented attrition rates for SANE cases processed in Minneapolis, and found attrition rates similar to the current study. Of all

reported cases processed in the Minneapolis SANE program, 46% were referred by police, and 32% were prosecuted. The referral rate in the current study was also similar to the referral rate found in the only empirical study to date that has examined attrition rates before and after the implementation of a SANE program. Crandall and Helitzer (2003) found that only 38% of the rapes cases were referred prior to implementing the SANE program, while 50% of the rape cases were referred for warranting after the implementation of the SANE program. However, the prosecution rates in Crandall and Helitzer's (2003) study were higher than the current study. They found that 25% of the reported cases were prosecuted before the implementation of the SANE program, while 34% of the reported SANE cases were prosecuted after the implementation of the SANE program. The referral rates for the current study (49%) are similar to the published rates for referral of cases processed by SANE programs (42% & 50%). However, the prosecution rates of the current study (25%) are less than the published rates for prosecution of SANE cases (32% & 34%).

Police referring. The second focus of the study examined the factors that predict police referring rape cases to prosecutors, and the relative predictive value of forensic medical evidence, victim characteristics, and case characteristics in police referral decisions. With respect to victim characteristics, this study found that age, race, and household income did not predict police referral. This is consistent with previous studies that did not find a relationship between race of victims and cases being referred (Frazier & Haney, 1996; Bouffard, 2000), but is inconsistent with previous findings regarding victim age and income. Previous studies suggested that police were less likely to refer cases with younger women because they view them as more suspicious and believed that

younger victims were likely to fabricate or instigate the rape (Rose & Randall, 1982). Furthermore, prior literature indicated that police display class prejudice for victims who hold lower class status as well as victims who hold upper class status and hold stereotypes towards those who live in particular economically homogenous areas (Rose & Randall, 1982). Prior research to date has never examined the role of the victim's disability on legal outcomes. The current study showed that victims with disabilities were no more, or less, likely to have their cases referred by the police.

The second set of predictors examined was case characteristics. The length of time between the assault and exam did not predict police referral. However, some case characteristics significantly predicted police referral. First, drug or alcohol use by the victim before or during the assault significantly decreased police referral by 34%. This finding was consistent with the majority of studies examining the relationship between alcohol and drug use and police referral (Kerstetter, 1990; Campbell, 1998). Second, cases in which offenders penetrated more than one orifice of the victim were six times more likely to be referred than cases in which victims were unaware of what occurred due to being unconscious or blacking out. While previous literature has focused on the presence or absence of penetration, this study is the first to date that explored how the type of penetration may affect case attrition. Third, cases in which the offender was an intimate partner or family member were somewhat more likely to be referred than when the offender was an acquaintance. To date, prior studies have not examined referral rates between intimate/familial relationships and acquaintances. Past research has focused mainly on comparing rapes committed by strangers to rapes committed by all offenders known to victims (i.e. combining intimate, familial, and acquaintances into one group).

These studies had mixed results with some studies indicating that stranger cases were more likely to be referred (Kerstetter, 1990; Frazier & Haney, 1996), while other studies indicated that cases in which the offenders knew the victims were more likely to be referred (Bouffard, 2000). The current study did not find stranger cases referred significantly more or less often than acquaintance cases.

The third set of predictors examined was forensic medical evidence. The findings suggest that physical injuries do not predict police referral. However, two types of anogenital injuries did predict police referring cases. First, cases with documented anogenital bruises were six times more likely to be referred. Second, cases with documented anogenital abrasions were five times more likely to be referred. While other research has examined the relationship between the presence of injury and referral, those studies did not examine the nature of the injuries (e.g. physical, anogenital). Prior research has suggested that police refer cases more often if victims were injured (Galton, 1976; Rose & Randall, 1982); but only one study has explored anogenital injury and referring. Kerstetter (1990) interviewed twenty detectives and found that they were more likely to refer cases if the victim endured injuries to her sex organs. The current study also supported the finding that anogenital injury was an important factor in police officers' decision-making on referring cases. Furthermore, the current study expanded this finding by showing that the subtypes of anogenital injury (e.g. abrasion) also were important factors in referring cases. The current study also explored the predictive value of forensic medical evidence in police referral decisions relative to victim and case characteristics. The findings show that forensic medical evidence provided more predictive value in referring cases than victim and case characteristics. This finding is

similar to that of a prior study that indicated that cases with physical evidence had a higher probability of referral even when the victim's credibility was questioned (Rose & Randall, 1982).

Warranting. The third focus of the study examined the factors that predict whether cases are warranted for prosecution. The first set of predictors examined was case characteristics. The findings suggest alcohol or drug use by the victim, the relationship between the victim and offender, and the length of time between the assault and exam did not predict prosecutors warranting rape cases. These findings were inconsistent with prior studies that showed that the role of victim alcohol and drug use before or during the rape decreases the probability that cases are warranted (Chandler & Torney, 1981; Spears & Spohn, 1996; Frohmann, 1997). Prior studies have yielded mixed findings on warranting cases and the relationship between the victim and offender. This study is consistent with the majority of studies that did not find a significant relationship between warranting and the victim offender relationship (Bachman, 1998; Spohn & Horney, 1993; Spears & Spohn, 1996, 1997). However, other studies have indicated that prosecutors were less likely to warrant cases when the victim was a relative of the offender (Bradmillar & Walters, 1985), and more likely to warrant cases when the victim and offender were acquaintances (Spears, Beichner, and Davis-Frenzel, 2001).

The final set of predictors examined was forensic medical evidence. The findings suggest that anogenital injuries do not predict warranting. However, two types of physical injuries did predict warranting. First, cases with documented physical abrasions were four times more likely to be warranted. This finding is consistent with prior research that suggest that documented injuries is predictive of cases moving further through the

criminal justice system (Chandler & Torney, 1981; Feldman-Summers & Palmers, 1980; Frazier & Haney, 1996; Martin & Powell, 1995; Spohn & Spears, 1997; Spohn, Beichner, & Davis-Frenzal, 2001). However, the current study found that documented physical bruises decreased the odds of the case being warranted by 12%, which is not consistent with prior research. Further univariate analyses were conducted to examine the relationship between physical bruises, and the three prosecutors assigned to the cases. Findings suggested that while one prosecutor tended to warrant mostly cases with documented physical bruises, the other two prosecutors warranted cases both with and without physical bruises. This finding suggests that warranting may be influenced by characteristics of the prosecutors making the decisions in addition to evidentiary characteristics. This study also explored the predictive value of forensic medical evidence in warranting decisions relative to case characteristics. The findings show that forensic medical evidence significantly provides more value in predicting warranting than case characteristics. That is, prosecutors base their warranting decisions more on forensic medical evidence than the characteristics of the case.

Implication of Findings

Results from this study indicate that rates of referral, prosecution, conviction, and prison sentences were somewhat higher in the focal SANE program compared to published rates in non-SANE cases. These findings imply that SANE programs may reduce case attrition. There are several components of SANE programs that may contribute to cases moving further in the system. First, sexual assault nurse examiners receive specialized training in assessment of injuries, identifying patterned injury, documentation of injuries, and using specialized equipment to assess injuries (Cohen et

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al., 1996; Ledray, 1998). This training may increase the probability of injuries being detected and properly documented, and thus, increases the probability of cases moving forward in the legal system. In addition, the quality of the medical report may affect case attrition. Crandall and Helitzer (2003) interviewed law enforcement and prosecutors and found that the SANE forensic medical reports were more reliable, easier to read, more efficiently transferred to their office, and more effective in court than the forensic medical records prior to the implementation of SANE. Thus, increased accessibility of the forensic medical report and trust of the documented evidentiary findings may have reduced case attrition.

Second, nurse examiners are trained to provide expert witness testimony to explain the documented injuries or normalize the absence of injury during the trial. It may be possible that police and prosecutors are more willing to forward cases when expert witness testimony is available to explain the medical findings to jurors and judges. This may be particularly true in cases in which it is anticipated that jurors may not deem the victim to be a credible witness.

Third, previous research has suggested that SANE programs improve collaboration between the legal and medical system (Crandall & Helitzer, 2003). Specifically, nurse examiners provide training and case consultation for police and prosecutors to increase their understanding of medical evidence findings (Littel, 2001). Furthermore, training and consultation is also an opportunity to normalize the absence of injuries. That is, the absence of injuries does not indicate that the rape was fabricated.

Fourth, prior research suggests that the time police spend waiting for the evidence collection to be completed was greatly reduced because SANE programs only provide

services to rape victims (Crandall & Helitzer, 2003). Reduced waiting time provides officers with more time to investigate cases. This is important because previous studies have found that time constraints may influence police to refer only cases most likely to result in conviction (Frazier & Haney, 1996; Kerstetter & Van Winkle 1990; Madigan & Gamble, 1991; Martin & Powell, 1995). For example, one study found that officers sympathized with victims but their obligation to build a case, establish probable cause, prepare a victim for court along with their time and energy constraints discouraged them from referring the case (Martin & Powell, 1995). Thus, this extra time to investigate cases may have increased the number of cases referred.

Fifth, the goal of SANE programs is to provide supportive care to victims (Arndt, 1988). Anecdotal evidence suggests that SANEs provide more compassionate treatment of victims than traditional emergency room personnel. Providing compassionate care to victims may increase the number of victims continuing to participate in the prosecution of their case. However, it remains unknown if SANE programs truly provide more compassionate care of victims than traditional emergency room personnel, and how this compassionate care influences attrition rates. Further research is needed to understand if and how these components of SANE programs affect case attrition and the decision-making process of police and prosecutors.

Prior research has indicated that police base their referring decisions in part on characteristics of the victim. In particular, police have rejected cases if they did not think the victim would make a credible witness, even if they believed the rape occurred (Frohmann, 1997; Spears & Spohn, 1997). The literature further suggests that the perception of victim credibility is partially based on characteristics of the victim such as

age, race, and social status. However, findings from the current study suggest that victim characteristics do not predict police referring cases. These findings imply that police are determining their referral decisions based on factors other than victim characteristics. While these indices of victim credibility did not predict police referral, some of the case characteristics that predicted police referral could be considered indicators of victim credibility. For example, alcohol and drug use by the victim significantly predicted police referral. Schuller and Stewart (2000) surveyed law enforcement officers, and found that they perceived intoxicated victims as less credible, more interested in sexual intercourse, more likely to communicate interest in sex, and more responsible for how far things had progressed. It appears that alcohol and drug use still diminishes the victim's credibility in the eyes of many law enforcement personnel. Furthermore, police were somewhat more likely to refer cases in which the offender and victim were intimate partners or family members than when the offender and victim were acquaintances (e.g. friend, date). In other words, police are referring cases in which the victim is/was engaged in a serious relationship with or related to the offender but not when the offender is a friend, co-worker, date, etc. The literature suggests that decisions to refer acquaintance rape cases are determined largely by assessing the credibility of victims (Kerstetter & Van Winkle, 1990). Through interviews and observations, Kerstetter (1990) found that police were less likely to refer cases when there was sexually discrediting information about the victim. Furthermore, that study noted that police were less likely to refer the case if the victim violated sex-role norms prior to the rape (e.g. being at home alone with a date; leaving a party with the offender). Thus, it may be possible that police focus more on the behavior of the victim rather than the offender for acquaintance rape cases. Taken

together, the findings on victim and case characteristics for this study imply that while police are focusing less on types of victims (e.g. young, lower economic social status), they are still basing their decisions in part on the credibility of the victim. However, case referral was primarily predicted by forensic medical evidence (e.g. anogenital abrasion) rather than victim or case characteristics. Overall, these results imply that police are relying less on indices of credibility (e.g. age, relationship to offender), and more on evidentiary factors (e.g. injuries).

Prior research has indicated that prosecutors base their warranting decisions in part on case characteristics, specifically those that judge the credibility of the victim (e.g. alcohol or drug use by the victim) (Spears & Spohn, 1996; Frohmann, 1997). However, the results from this study indicated that case characteristics did not influence warranting. These findings imply that prosecutors are making warranting decisions on factors other than case characteristics. Previous studies indicate that injuries increase the probability of cases being warranting. The current study also supported that finding. In fact, warranting cases was primarily predicted by forensic medical evidence (e.g. physical abrasion) rather than case characteristics. Similar to police, these results suggest that prosecutors are focusing less on indices of credibility (e.g. alcohol or drug use, relationship to offender), and more on evidentiary factors (e.g. injuries).

There was one unexpected finding when examining the predictors of prosecutors warranting cases. The study found documented bruises only influenced one prosecutor to warrant cases. This finding suggests that warranting decisions may be influenced by traits of the individual prosecutors making the decisions in addition to evidentiary characteristics. For example, the prosecutor who warranted a high volume of cases with

bruises may believe that the absence of injury indicates fabrication, or perhaps feels less confident in “winning” the cases without documented bruises. On the other hand, the prosecutors who warranted cases with less bruises may have more experience prosecuting cases without injuries, and more willing to risk “losing” cases in trial. Furthermore, this differential decision-making could have affected the number of SANE cases being prosecuted. While the prosecution rates of the current study were higher than the published rates of non-SANE cases, the rates were less than the published norms for prosecution of SANE cases. Thus, it may be possible that having one prosecutor base decisions heavily on the presence of injury may have led to a smaller number of cases being prosecuted. This finding illustrates that a great deal of control rests in the hands of individual prosecutors without clear mechanisms to provide oversight of their decisions. Further studies should examine potential factors that may or may not influence individual prosecutors in their warranting decisions such as training, case experience, knowledge of forensic medical evidence, pressure to have high conviction rates, and organizational policies.

To date, this is the first study focusing on predictors of case attrition specifically with assaults processed by a SANE program. In addition to reducing case attrition, the findings of this study also imply that police and prosecutors are focusing more on evidentiary factors of the case than factors regarding the victim’s credibility. It is also important to note that the improved case attrition or a decreased focus on victim’s credibility may result from historical effects not accounted for in this study. The majority of case attrition studies occurred one to two decades ago. During the past decade, the Violence against Women Act was instituted that changed laws regarding prosecution of

rape, and increased funding to change the legal system's response to rape throughout the United States. This funding was aimed to increase training of law enforcement officers and prosecutors to more effectively identify and respond to rape, develop or expand units of law enforcement and prosecutors specifically focusing on rape, and develop and implement more effective police and prosecution policies and protocols in handling rape cases (OJP, 2005). These efforts were specifically aimed to improve the response to rape, increase reporting, and reduce case attrition. Therefore, the Violence against Women Act may have contributed to the improvement in case attrition, and may have impacted police and prosecutors focusing less on the credibility of victims and more on evidentiary factors.

Limitations of this study

Several methodological limitations of this study may mitigate the strength of the conclusions that can be drawn from this work. First, this study did not have a comparison group of cases not processed by a SANE program to examine the unique contribution of SANE programs in improving case attrition. Therefore, there may be other factors related to improving case attrition not accounted for in this study. Comparative studies should be conducted to examine the unique contribution of SANE programs on case attrition relative to non-SANE cases (e.g. those examined by traditional emergency room personnel). Second, attrition rates and the predictors of case attrition can only be generalized to rape cases that were processed through a SANE program. Attrition rates and predictors of case attrition may be different for those cases processed in traditional emergency rooms, or those cases in which the victim did not seek medical assistance.

Third, there may be some methodological reasons why some of the variables did not significantly predict charging decisions. In the analyses for referral decisions, the power for a continuous predictor was adequate to detect a small effect, but the power for a dichotomous predictor was only adequate to detect a medium effect. Therefore, dichotomous variables with small effects on referring would not have been found in this study. In the analyses for warranting decisions, the power for a continuous predictor was adequate to detect even a small effect, but the power for a dichotomous predictor was only sufficient to detect a large effect. Therefore, dichotomous variables with small to medium effects on warranting would not have been discovered in this study. Fourth, because secondary data analysis was used in this study, the conditions under which the data were originally collected cannot be controlled. Assessing the consistency of the documentation and data entry among the original data collectors (e.g. SANE nurses) cannot be assessed. Although selective recording is a threat to secondary data analysis, the SANE patient chart requires responses to all parts of their medical forms. For example, leaving the section on injury blank is unacceptable in SANE practice; the nurses are required to document that no injury is noted. However, a limitation of their database existed in consistently tracking offender tactics. Because 30 cases had missing data on offender tactics, it was excluded from the study. Thus, this study was not able to examine the role of offender tactics on cases moving forward in the legal system, which previous studies have shown to impact case attrition (Kerstetter 1990; Campbell et al., 2001). A final limitation of this study is that only a small group of all the possible factors that could affect charging decisions were studied. There may be other variables that were not examined in this model that may impact charging decisions. For example, organizational

characteristics (e.g. available resources) of law enforcement agencies may influence referring decisions but were not included in this study. Furthermore, characteristics of the offenders may have influenced cases being referred and warranted.

Implications for Research and Practice

This study can serve as a catalyst for several research projects. First, this study indicates that case attrition of rape case has improved in the last 25 years. However, the reasons for attrition improvement remain unknown. Comparative studies should be conducted to examine the unique contribution of SANE programs on case attrition relative to traditional emergency rooms, as well as cases in which the victim did not seek medical assistance. If future studies do find that SANE programs significantly improve case attrition, a second line of research would examine the components of SANE programs that improve rape case attrition. For example, does collaboration between the SANE program and law enforcement agencies increase cases being referred by the police? If so, why does collaboration increase case referral? Another key research issue raised by these results is why injuries play a more important role in decisions of some prosecutors, and less of a role for others. A third line of research that stems from these findings would involve exploring individual factors (e.g. experience) of prosecutors that influence their decision-making process for warranting rape cases.

The findings of this study also have several practice implications for SANE programs. First, specific types of injury increased the probability of cases being forwarded through the legal system. Thus, SANE programs should continue to place strong emphasis in training nurses in accurate assessment and documentation of injury. However, some types of injury did not predict cases going forward in the legal system.

For example, anogenital tearing and the injuries listed under “other types of injuries” such as petechiae did not predict referring. It may be possible that law enforcement officers did not understand the nature of these injuries. Thus, consultation with police may be necessary when cases have these types of injuries. It is important to note that while forensic medical evidence primarily predicted referral, some indicators of victim credibility also predicted referral. Therefore, SANE programs that provide training to law enforcement should include topics on the dynamics of rape (e.g. victim/offender relationships; role of alcohol in rape) to decrease any harmful preconceived beliefs about rape and rape victims. Furthermore, because police also base their decisions on other factors regarding the victim’s credibility (e.g. alcohol use), SANE programs should be cautious in basing the success of their programs on their rates of prosecution. Instead, SANE programs should evaluate program impact in domains such as service delivery to victims and quality of forensic evidence collection. These aspects of SANE programs are more directly within programmatic control and reflect the work of the nurses. By contrast, the results of this study suggest that legal case outcomes reflect the decisions and actions of *multiple* stakeholders, both in and outside SANE programs.

APPENDIX A

A Comparison of SANE and Hospital Evidence Collection Methods

Training	
Traditional Hospital Care	Sexual Assault Nurse Examiner (SANE) Programs
No training/educational requirements or guidelines exist for hospital personnel (see APRI, 2004; Giardino et al., 2003; Littel, 2001)	International Association of Forensic Nurses (IAFN) Educational Guidelines: Part I: Didactic content: Multidisciplinary team concept Forensic nursing SANE roles and responsibilities Dynamics of sexual assault Sexual assault forensic evaluation • Communication skills • History taking • Physical assessment • Detailed genital assessment • Physical evidence collection • Forensic photo documentation • Documentation Evidence Evaluation Nursing Management Criminal Justice System Ethics Evaluation Part II: Clinical Preceptorship Component Clinical skills to be completed with instruction by a Registered Nurse or physician: • Detailed genital inspection

	• Speculum examination • Visualization with techniques and equipment Sexual assault forensic examinations including evidence kit collection to be reviewed by a practicing SANE or physician. The SANE candidate must perform the required clinical skills until proficiency is demonstrated. Observation of criminal trial proceedings.
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Specialized Techniques and Equipment	
Traditional Hospital Care	Sexual Assault Nurse Examiner (SANE) Programs
Hospitals usually do not have access to specialized forensic equipment and lack training in the use of the equipment. (see APRI, 2004; Giardino et al., 2003; Littel, 2001)	<u>Colposcope</u>—A lighted magnifying instrument used for examination of the anogenital area. A camera is attached to the colposcope to photodocument anogenital injuries. Using a colposcope when assessing for genital trauma greatly increases the identification of genital trauma (Slaughter & Brown, 1992). With a colposcope, a FNE is three times as likely to detect microlacerations, bruises and other injuries in sexual assault victims (Voelker, 1996). <u>Foley catheter technique</u>—A foley catheter may be used with pubertal victims to examine the hymenal structure by inserting the catheter into the vagina, and inflating the catheter balloon with air and gently pulling back to delineate the hymenal structure (Giardino et al., 2003). <u>Touilidine Blue dye</u>—A nuclear stain that adheres to cellular material and enhances the identification of injury. The dye causes the injured area to darken significantly,

	making visualization of an injury much easier (Giardino, 2003). McCauley, Guzinski , Welch, Gorman, and Osmers (1987) found tears in only 4% using gross visualization, but after toluidine blue was applied, the rate increased to 58%. <u>Alternative light source</u>—A special light that can detect bodily fluids that may not be detected with visual inspection alone. All stains that are detected on the victim are swabbed by rolling a saline-dampened swab over the area (Giardino, 2003).
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Forensic Medical Exam and Evidence Collection Procedures	
Traditional Hospital Care	Sexual Assault Nurse Examiner (SANE) Programs
Emergency room physicians follow the instructions in the rape evidence kit as they perform the exam. During 1999 to 2002, hospitals in Michigan used the following instructions: The instructions direct the nurse/physician to document pertinent medical history and history of the assault in the victim's own words. The itemized clothing is placed in containers separately and tagged for evidence.	Turning Point's FNE Program follows the guidelines of the American College of Emergency Physicians in conducting exams: An advocate meets with the victim to attend to the victim's emotional needs by providing crisis intervention and emotional support and the victim's physical needs. When the victim is ready, the nurse begins taking a patient history. This history includes relevant medical information, an open-ended question that documents an account of the rape in the victim's words and direct questions about the types of contact (e.g. vaginal penetration). After the history taking, the victim is escorted to the exam room. The FNE nurse places a barrier (e.g. sheet) on the floor or exam table and then places paper on top of the barrier. In order to preserve any evidence that may fall off the victim's clothing, the victim undresses while on the paper. The FNE nurse bags each piece of the victim's clothing into separate bags and

Not included in the instructions Traditional emergency room care does not have access to an alternative light source. Not included in the instructions The victim's oral cavity is swabbed using two swabs. Using both swabs, the nurse makes two smears. Allow swabs and smears to dry. The victim's head hair is combed and the combings are placed in a labeled envelope. Then 12 head hairs are pulled at the root using gloved hands and placed in a labeled envelope. If applicable, the nurse combs the pubic hairs and places the combings in a labeled envelope and 6-8 pulled pubic hairs are saved in another envelope. The victim's vaginal tract is swabbed using two swabs. Then using two more swabs, the nurse swabs the vaginal tract for DNA. Using both swabs, the nurse makes two smears. Allow swabs and smears to dry.	seals the bags properly with evidence tape to preserve the chain of custody. The paper is also bagged and sealed. The clothing serves an important source for the suspect's hair, fibers, semen and other items that may have been transferred during the assault. Depending on the history and consent of the victim, the nurse scans the alternate light source over the victim's body looking for blood, saliva or semen. The alternative light source is a special light that can detect bodily fluids that may not be detected with visual inspection alone. The FNE nurse swabs all stains that are detected or based on victim history by rolling a sterile water-dampened swab over the area. The nurse does a head-to-toe exam assessing for tenderness, redness, bruises, cuts or abrasions. If injury is found, the nurse measures, photographs and documents the injury on a body diagram. The victim's oral cavity is inspected for signs of trauma, which includes bruises around the mouth, torn frenulum of the lower lip or beneath the tongue. Two oral swabs are taken and air-dried. The nurse checks the victim's hair for any trace evidence. The victim's head hair is combed and the combings are placed in a labeled envelope. Then 25-30 head hairs are pulled at the root using gloved hands and placed in a labeled envelope. If applicable, the nurse combs the pubic hairs and places the combings in a labeled envelope and 25-30 pulled pubic hairs are saved in another envelope. The nurse then does a visual exam of the vulva including the inner and outer labia with gentle labia traction. The nurse looks for any signs of tearing, lacerations or other trauma to the area sometimes employing Toluidine blue dye to the area to detect
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The victim's rectal area is swabbed using two swabs. Using both swabs, the nurse makes two smears. Allow swabs and smears to dry. Documentation of injury: the kit contains a body diagram with instructions to "describe presence of trauma". For DNA, a blood sample is drawn. To determine the victim's blood group and secretor status, a paper disk is placed under the victim's mouth and thoroughly saturated with saliva. The paper disk is air dried and placed in the envelope. The nurse packs all of the evidence into the rape kit, and seals it. The kit may be turned over to the police department immediately. The instructions do not provide guidelines for kit storage if the kit is not picked up immediately. The victim is referred to their physician for follow-up and handed a list of rape crisis centers in Michigan for counseling. An advocate may speak with the victim, family or significant others if the hospital requests an advocate from the local rape crisis center.	microlacerations. The colposcope may be used at this point in the exam. A colposcope is a lighted magnifying instrument used for examination of the vulva. A camera is attached to the colposcope to digitally document genital injuries. The posterior fourchette is swabbed twice with a cotton swab and smeared on a glass slide. If the victim is menarche, the vaginal orifice is swabbed with four swabs at one time. All swabs are air dried before placing them in the proper envelopes. The nurse then examines the rectal area. There are four swabs of the anal opening and then two slides are prepared and then two slides are prepared. Documentation - if injury is found, the nurse measures and photographs the injury and documents the injury on a body diagram. For DNA, the nurse uses buccal swabs. The nurse brushes the buccal mucosa in the victim's mouth using the collector end of the swabs for 5-10 seconds. The swabs is air dried before placing it in the proper envelopes The nurse packs all of the evidence into the rape kit, and seals it. The kit is either turned over to the police department immediately or locked in a fridge until the police pick the kit up. The advocate meets with the victim and significant others if present to discuss their concerns, provide information about next steps in the legal system and help prepare them for possible trauma reactions. The victim is referred to their physician for
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(Michigan State Police Rape Kit Instructions, 1994)	follow-up and to Turning Point for free counseling. (Turning Point's Forensic Nurse Training Manual)
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APPENDIX B

Adult Sexual Assault Case Coding Sheet

ID Number _____

Data Collector _____

Data Sources _____

	Victim Characteristics:	Circle Code/Enter Data	Comments
1a	Age (Actual age in years) 99=unknown		
1b	Gender	1=male 0=female 99=unknown	
1c	Race/ethnicity	1=White/Caucasian 2=African American 3=Latino/a 4=Native American 5=Multi-racial 6=Other 99=unknown	
1d	Disability	1=yes 2=no 99=unknown	
1e	Income 99999=unknown		
	Case Characteristics:	Circle Code/Enter Data	Comments
2a	Time between assault and medical exam (hours) 9.99=unknown		
2b	Offender tactics	1= Fear 2= Verbal 3= Alcohol/drugs 4= Authority figure 5=Physical 6= Weapon used 7= Tied up/Bondage 8= Kidnapped 9= Unconscious	

		10=Other 99=unknown	
2c	Victim relationship to offender	1=stranger 2=acquaintance 3=friend 4=authority figure 5=parent/guardian 6=step-parent 7=sibling 8=non-related care giver 9=other relative 10=partner 11=ex-partner 12=spouse/life-time partner 13=ex-spouse/ex-LTP 14=employer/coworker 15=other (specify) 16=multiple (specify) 99=unknown	
2d	Victim consumed alcohol before or during the sexual assault	1=yes 0=no 99=unknown	
2e	Victim consumed drugs before or during the sexual assault	1=yes 0=no 99=unknown	
2f	Type of sexual assault	1=vaginal penetration 2=oral penetration 3=anal penetration 4=multiple penetration 99=unknown	
2g	Nurse Examiner	1=Ballinger 2=Barton 3=Bohach 4=Boni 5=Brooks 6=Burton 7=Creger 8=Dean-Mahan 9=Deboer 10=Diegel 11=Geiman 12=Gentile/pena	

		13=Glover 14=Halleck 15=Hejza 16=Henley 17=Hovan 18=Hunwick 19=Hurst 20=Johnson 21=Khalife 22=Korenek 23=Lamb 24=Lippert 25=Marchesi 26=Matheny-Lane 27=Meshinski 28=Moore 29=Scott 30=Spears 31=Starke 32=Tobin 33=Troszak 34=Webster 35=Zawacki	
2h	Law Enforcement Agency	1=Centerline 2=Chesterfield Twp 3=Clay Twp 4=Clinton Twp 5=Eastpointe 6=Fraser 7=Mount Clemens 8=Macomb County Sheriff 9=Michigan State Police 10=New Baltimore 11=New Haven 12=Richmond 13=Romeo 14=Roseville 15=St. Clair Shores 16=Selfridge 17=Shelby 18=Sterling Heights 19=Utica 20=Warren 99=Unknown	

	Evidence:	Circle Code/Enter Data	Number of injuries	Comments
3a	Physical injury	1=yes 0=no 99=unknown		
3b	Redness (erythema)	1=yes 0=no		
3c	Tear/laceration	1=yes 0=no		
3d	Bruising/hematoma	1=yes 0=no		
3e	Abrasions	1=yes 0=no		
3f	Bleeding	1=yes 0=no		
3g	Oozing injury	1=yes 2=no		
4a	Anogenital injury	1=yes 0=no 99=unknown		
4b	Redness (erythema)	1=yes 0=no		
4c	Tear/laceration	1=yes 0=no		
4d	Bruising/hematoma	1=yes 0=no		
4e	Abrasions	1=yes 0=no		
4f	Bleeding	1=yes 0=no		
4g	Oozing injury	1=yes 2=no		
4h	Other injury (write type of injury in comment box)	1=yes 0=no		

	Evidence continued:	Circle Code/Enter Data	Comments
5a	Trace evidence	1=yes 0=no 99=unknown	
5b	Type of trace evidence		

	Case decisions:	Circle Code/Enter Data	Comments
6a	Police Referred case	1=yes, referred 0=no, not referred	
6b	Prosecutor warranting decision	1=yes, warranted 0=no, not warranted	
6c	Case outcome	1=case warranted, but later dropped 2=plea bargain 3=trial, conviction 4=trial, acquittal 99=unknown	

	Non-referred Stranger Cases	Circle Code/Enter Data	Comments
9a	Was the stranger in this case identified?	1=yes, offender was identified 0=no, offender was not identified 99-not applicable	

APPENDIX C

Operational and Coding Definitions

Victim Characteristics:	Operational Definition:	Coded as:
Age	Age of the victim on the day of the exam	Actual age in years
Race/ethnicity	Racial/ethnic group that the victim identifies as their own.	<u>Caucasian</u> – the victim identifies as Caucasian <u>Non-Caucasian</u> – the victim identifies as anything besides Caucasian including bi-racial and multi-racial.
Disability	The victim has at least one of the following disabilities: physical (e.g. hearing impaired), psychiatric (e.g. bipolar) and cognitive disabilities (e.g. Down syndrome).	<u>No</u> – the victim does not have at least one disability. <u>Yes</u> – the victim has at least one disability
Median household income	Address of where the victim resides was used to search the median household income in the 2000 census tract block. Income was searched by an employee of the focal program to limit access to the victims' addresses. The median household income will then serve as a proxy for the victim income.	Median household income from 2000 census data
Case Characteristic	Operational Definition:	Coded as:
Offender tactics	The most severe tactic used by the offender before or during the assault to carry out the assault.	<u>Fear</u> – the victim acquiesced out of fear <u>Verbal</u> - the offender made threats to the victim <u>Alcohol/drugs</u> - offender intentionally drugged them or coerced them into drinking in order to rape the victim

		<u>Authority figure</u> - the offender had an authoritative role to the victim (e.g. teacher, boss, and police officers) <u>Physical</u> – the offender uses force such as hitting, holding victim down, pushing the victim, etc. <u>Weapon used</u> – A weapon (e.g. gun, knife, club, etc) was present or used before or during the assault <u>Tied up/Bondage</u> - offender tied up the victim or used other means to constrain the victim <u>Kidnapped</u> - offender abducted the victim <u>Unconscious</u> – the victim is not conscious due to being asleep, or passed out <u>Other</u> - any other type of tactic but a list isn't available <u>Unknown</u> – SANE did not get this information from the history
Victim relationship to offender	The relationship between the victim and offender at the time of the assault.	<u>Stranger</u> – victim did not know the offender at the time of the rape <u>Nonstranger</u> – victim knew the offender at the time of the rape
Alcohol or drugs use by victim	Victim consumed any amount of alcohol or drugs before or during the sexual assault.	<u>No</u> – the victim did not consume alcohol or drugs (except prescribed drugs)

		before or during the assault <u>Yes</u> – the victim did consume alcohol or nonprescribed drugs before or during the assault
Type of sexual assault	The orifice of the victim that was penetrated by the offender.	<u>Vaginal penetration</u> – the offender penetrated the victim’s vagina <u>Oral penetration</u> – the offender penetrated the victim’s mouth with offender’s genitals <u>Anal penetration</u> – the offender penetrated the victim’s anus <u>Multiple penetration</u> – the offender penetrated more than one orifice of the victim
Medical Forensic Evidence:	Operational definition:	Coded as: Number of injuries
Physical injury	An injury (redness, tear/laceration, bruising/hematoma, abrasion) on the victim’s body except the anogenital area.	Total number of physical injuries
Redness (erythema)	An area that is only red without additional injury located on a nongenital part of the body..	Total number of areas noted as red
Tear/laceration	Continuity of skin is broken and disrupted by force and located on a nongenital part of the body.	Total number of tears
Bruising/hematoma	Collection of blood below the intact epidermis that leaked from ruptured capillaries or blood vessels and located on a nongenital part of the body (Giardino et al., 2003).	Total number of bruises
Abrasions	Superficial injuries limited to the epidermis or superficial dermis and	Total number of abrasions

	located on a nongenital part of the body (Giardino et al., 2003).	
Bleeding	Any injury described as bleeding located on a nongenital part of the body.	Total number of injuries described as bleeding
Oozing injury	Any injury described as oozing located on a nongenital part of the body.	Total number of injuries described as oozing
Anogenital injury	An injury (redness, tear/laceration, bruising/hematoma, abrasion) on the anogenital area.	Total number of anogenital injuries
Redness (erythema)	An area that is only red without additional injury located on an anogenital part of the body.	Total number of areas noted as red
Tear/laceration	Continuity of skin is broken and disrupted by force and located on an anogenital part of the body (Giardino et al., 2003).	Total number of tears
Bruising/hematoma	Collection of blood below the intact epidermis that leaked from ruptured capillaries or blood vessels and located an anogenital part of the body (Giardino et al., 2003).	Total number of bruises
Abrasions	Superficial injuries limited to the epidermis or superficial dermis and located on an anogenital part of the body (Giardino et al., 2003).	Total number of abrasions
Bleeding	Any injury described as bleeding located on an anogenital part of the body.	Total number of injuries described as bleeding
Oozing injury	Any injury described as oozing located on an anogenital part of the body.	Total number of injuries described as oozing
Other injury	Any other injury not listed.	Total number of other injuries
Trace evidence	A material (e.g. condom) not normally found on the body is identified by the nurse examiner.	<u>Yes</u> – trace evidence was noted on the victim's body <u>No</u> – trace evidence was not noted on the victim's body Type of trace evidence will be recorded

Case Processing Decisions:	Operational Definition	Coded as:
Police Referral decision	Law enforcement referred the case to the prosecutor's office.	<u>Yes</u> – case was referred to the prosecutor's office <u>No</u> – case was not referred to the prosecutor's office
Prosecutor warranting decision	The prosecutor warranted the case.	<u>Yes</u> – case was warranted by the prosecutor's office <u>No</u> – case was not warranted by the prosecutor's office
Case outcome	The final disposition of the case in the legal system.	<u>Case charged, but later dropped</u> – case was originally warranted by the prosecutor but subsequently dropped before ending in a disposition <u>Plea bargain</u> – the offender pled guilty to the original charges or less charges <u>Trial, conviction</u>– the case went to trial and the offender was found guilty by a judge or jury <u>Trial, acquittal</u> – the case went to trial and the offender was found not guilty by a judge or jury

APPENDIX D

Comparison of Original Coding of Variables vs. Coding of Variables for Analyses

	Victim Characteristics:	Original Coding	Coding Used for Analyses
1a	Age	Actual age in years	Age was log transformed
1b	Gender	1=male 0=female	1=male 0=female
1c	Race/ethnicity	1=White/Caucasian 2=African American 3=Latino/a 4=Native American 5=Multi-racial 6=Other	1=White/Caucasian 2=Minority
1d	Disability	1=yes 2=no	1=yes 2=no
1e	Income	Median household income	Median household income (<i>presented in thousands</i>)
	Case Characteristics:	Original Coding	Coding Used for Analyses
2a	Time between assault and medical exam	Time between assault and medical exam <i>in hours</i>	Time between assault and medical exam was <i>log transformed</i>
2b	Offender tactics	1= Fear 2= Verbal 3= Alcohol/drugs 4= Authority figure 5=Physical 6= Weapon used 7= Tied up/Bondage 8= Kidnapped 9= Unconscious 10=Other 99=unknown	0=unconscious (originally 9) 1=coercion (originally 1-4) 2=force (originally 5-8) -other and unknown coded as missing -because 16% of the data was missing, offender tactics was excluded from the model
2c	Victim relationship to offender	1=stranger 2=acquaintance 3=friend 4=authority figure 5=parent/guardian	0=acquaintance (originally 2-4;8, 14) 1=stranger (originally 1) 2=intimate/familial (originally 5-7; 9-13)

		6=step-parent 7=sibling 8=non-related care giver 9=other relative 10=partner 11=ex-partner 12=spouse/life-time partner 13=ex-spouse/ex-LTP 14=employer/coworker 15=other (specify) 16=multiple (specify)	
2d	Victim consumed <i>alcohol</i> before or during the sexual assault	1=yes 0=no	Victim consumed <i>alcohol/ drugs</i> before or during the sexual assault 1=yes 0=no
2e	Victim consumed <i>drugs</i> before or during the sexual assault	1=yes 0=no	
2f	Type of sexual assault	1=vaginal penetration 2=oral penetration 3=anal penetration 4=multiple penetration 99=unknown penetration	1=single penetration 2=multiple penetration 0=unknown penetration
2g	Nurse Examiner	1=Ballinger 2=Barton 3=Bohach 4=Boni 5=Brooks 6=Burton 7=Creger 8=Dean-Mahan 9=Deboer 10=Diegel 11=Geiman 12=Gentile/pena 13=Glover 14=Halleck 15=Hejza 16=Henley 17=Hovan 18=Hunwick 19=Hurst 20=Johnson	Each nurse was reassigned a code of the number of exams they conducted

		21=Khalife 22=Korenek 23=Lamb 24=Lippert 25=Marchesi 26=Matheny-Lane 27=Meshinski 28=Moore 29=Scott 30=Spears 31=Starke 32=Tobin 33=Troszak 34=Webster 35=Zawacki	
2h	Law Enforcement Agency	1=Centerline 2=Chesterfield Twp 3=Clay Twp 4=Clinton Twp 5=Eastpointe 6=Fraser 7=Mount Clemens 8=Macomb County Sheriff 9=Michigan State Police 10=New Baltimore 11=New Haven 12=Richmond 13=Romeo 14=Roseville 15=St. Clair Shores 16=Selfridge 17=Shelby 18=Sterling Heights 19=Utica 20=Warren	0=law enforcement agencies located in lower income communities 1=law enforcement agencies located in higher income communities
	Law Enforcement Agency (as proxy for Prosecutor area)	1=Centerline 2=Chesterfield Twp 3=Clay Twp 4=Clinton Twp 5=Eastpointe 6=Fraser 7=Mount Clemens 8=Macomb County	0=area/prosecutor one Clinton Twp Mt. Clemens Macomb Sheriff Sterling Heights MSP Selfridge

		Sheriff 9=Michigan State Police 10=New Baltimore 11=New Haven 12=Richmond 13=Romeo 14=Roseville 15=St. Clair Shores 16=Selfridge 17=Shelby 18=Sterling Heights 19=Utica 20=Warren	1=area/prosecutor two ½ of Warren Fraser Roseville St. Clair Shores New Baltimore Richmond 2=area/prosecutor three ½ of Warren Centerline Eastpointe Chesterfield New Haven Shelby Utica Romeo
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	Evidence:	Original Coding	Coding Used for Analyses
3a	Physical injury	1=yes 0=no 99=unknown	1=yes 0=no
3b	Redness (erythema)	1=yes 0=no	1=yes 0=no
3c	Tear/laceration	1=yes 0=no	Only 3% of sample had tearing, so it was not used in the analyses
3d	Bruising/hematoma	1=yes 0=no	1=yes 0=no
3e	Abrasions	1=yes 0=no	1=yes 0=no
3f	Bleeding	1=yes 0=no	1=yes 0=no
3g	Oozing injury	1=yes 2=no	1=yes 0=no
4a	Anogenital injury	1=yes 0=no	1=yes 0=no
4b	Redness (erythema)	1=yes 0=no	1=yes 0=no
4c	Tear/laceration	1=yes 0=no	1=yes 0=no
4d	Bruising/hematoma	1=yes 0=no	1=yes 0=no

4e	Abrasions	1=yes 0=no	1=yes 0=no
4f	Bleeding	1=yes 0=no	1=yes 0=no
4g	Oozing injury	1=yes 2=no	1=yes 0=no
4h	Other injury (write type of injury in comment box)	1=yes 0=no	1=yes 0=no

	Evidence continued:	Original Coding	Coding Used for Analyses
5a	Trace evidence	1=yes 0=no	1=yes 0=no
5b	Type of trace evidence		

	Case decisions:	Original Coding	Coding Used for Analyses
6a	Police Referred case	1=yes, referred 0=no, not referred	
6b	Prosecutor warranting decision	1=yes, warranted 0=no, not warranted	
6c	Case outcome	1=case warranted, but later dropped 2=plea bargain 3=trial, conviction 4=trial, acquittal 99=unknown	

	Non-referred Stranger Cases	Circle Code/Enter Data	Comments
9a	Was the stranger in this case identified?	1=yes, offender was identified 0=no, offender was not identified 99-not applicable	1=yes, offender was identified 0=no, offender was not identified 99-not applicable -cases were removed from sample if stranger was not identified

APPENDIX E

Comparison of Published Attrition Rates of Cases and Current Study

Stage in the Legal System	Attrition Rates of Current Study	Attrition Rates of Previous Studies*
Cases referred by the police	49% (N=90)	41% (Chandler & Torney, 1981) 44% (Galvin & Polk, 1982) 22% (Frazier & Haney, 1996) 18% (Bouffard, 2000) 38% (Crandall & Helitzer, 2003).
All reported cases prosecuted	25% (N=47)	17% (Galvin & Polk, 1982) 18% (Chandler & Torney, 1981) 16% (Frazier & Haney, 1996)
All reported cases that resulted in conviction (plea-bargain/guilty verdict)	24% (N=44)	12% (LaFree, 1980) 17% (Chandler & Torney, 1981) 7% (Galvin & Polk, 1982) 12% (Frazier & Haney, 1996)
All reported cases ending in prison sentence	11% (N=21)	9% (LaFree, 1980) 6% (Galvin & Polk, 1982) 7% (Frazier & Haney, 1996)

*Samples from prior studies were obtained from police departments and/or hospitals not Sexual Assault Nurse Examiner Programs.

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