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**INJURY EVIDENCE, BIOLOGICAL EVIDENCE
AND PROSECUTION OF SEXUAL ASSAULT**

Final Summary Overview

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Injury evidence and biological evidence gained from forensic medical examinations of victims can provide evidence about the crime as well as the means of linking a suspect to the crime. Evidence from a forensic medical examination can include genital and non-genital injuries, biological evidence (including sperm or semen, blood, and amylase, an enzyme of saliva), and a DNA profile that can often be derived from the biological evidence. This DNA can be matched to a potential suspect, matched to another investigation in the FBI's Combined DNA Index System (CODIS), or matched to a convicted offender in CODIS. Injury evidence can be used to establish a victim's lack of consent and could lead to physical assault charges.

This project explored the use and impact of injury evidence and biological evidence through a study of the role of these forms of evidence in prosecuting sexual assault in an urban district attorney's office in a metropolitan area in the eastern United States. The research questions addressed in this summary overview are as follows:

- How frequent were different forms of injury evidence and biological evidence in the sample?
- Is the presence of injury evidence and biological evidence correlated with the presence of other forms of evidence?
- Which types of cases and case circumstances are more likely to yield injury evidence and biological evidence?
- Do the presence of injury evidence and biological evidence predict criminal justice outcomes, taking into account the effects of other predictors?
- In what ways do prosecutors use injury evidence and biological evidence and what is their appraisal of their impact on case outcomes?

The study site was a major city in the eastern United States. The project analyzed case data from 257 cases of alleged sexual assault with adult or adolescent victims (age 12 or older) that the police department referred to the District Attorney's Office between 2005 and 2011. Data were abstracted from prosecutor paper files, from crime laboratory reports, and from documentation completed by medical examiners who conducted forensic medical examinations following the assault. Most victims in the sample had forensic medical examinations. Most of the medical documentation was included in the evidence kits that were prepared as part of forensic medical examinations and were sent to the crime laboratory. Additional data about the assault were downloaded from a statewide database of reports completed by the medical examiners who conducted the forensic medical examinations, who are required to fax these reports to the research division of the state criminal justice agency, which maintains the database. Prosecution data were abstracted at the prosecutor's office and medical documentation and crime laboratory reports were abstracted at the crime laboratory. Semi-structured interviews were also conducted with eight Assistant District Attorneys (ADAs) in the DA's office who had experience prosecuting sexual assault cases. Interviews aimed to obtain a better understanding of how prosecutors use injury evidence and biological evidence in prosecuting sexual assault and how they assessed the impact of these forms of evidence on case outcomes.

Analysis subsamples were often used to focus analysis only on those cases that were relevant for a particular event or outcome. The most common analysis subsample was the *prosecution subsample* (N=106). Because no cases were prosecuted when a suspect was not identified (n=52), nor when victims either passively or actively declined to pursue prosecution (n=104), cases with either or both of these conditions were dropped from the prosecution subsample.

Results

Case Characteristics

The vast majority of victims (96.5%) were female and their average age was 27.8. While the largest percentage of victims was White (non-Hispanic) (41.8%), the number of Black (non-Hispanic) and Hispanic victims was substantial (32.5% and 20.1% respectively), and together these latter two groups made up a majority of victims. Small percentages of victims had experiences like an arrest record (13.6%) that might have affected their credibility.

Suspects were overwhelmingly male (99.6%). Half the suspects were Black (non-Hispanic) (50.0%), while 21.4% were White non-Hispanic, with an average age of 33.1. Substantial proportions of suspects had an arrest record (40.5%) and prior convictions (30.0%), and 10.1% had a prior history of convictions for sexual assault. Almost half of suspects (47.5%) were acquaintances of the victim, while 29.8% were strangers and 16.5% were current or former intimate partners.

The suspect was identified in 79.4% of cases. The majority of cases (60.3%) involved vaginal penetration. Bodily force was used in 65.2% of incidents, most commonly via holding the victim down and/or pushing them. In 20.2% of cases, the suspect used threats to gain control of the victim. In 57.6% of cases, victims actively resisted the attack with the primary resistance strategy being verbal demands to stop. Half of all of the assaults (50.6%) involved victims who had been using drugs or alcohol prior to the assault. Just over half of victims (54.9%) actively agreed to cooperate with the investigation and participate in prosecution. In a quarter of cases the investigators noted credibility concerns with the victim. Credibility concerns included inconsistent statements made during the investigation (16.7%) and investigators' concern that the victim withheld information (8.6%).

Prosecution Case Flow

The District Attorney's Office has a policy of encouraging the police in the Sexual Assault Unit (SAU) to refer to the DA's office any case the SAU investigates, and the DA's office reviewed a number of cases in which arrests had not been made. This means that some cases were included in this sample that would not necessarily be present in other DA caseloads. Prosecutors filed criminal charges or otherwise accepted the case for prosecution or diversion in 33.8% of the cases in the sample. Of the cases that were not charged or accepted, the suspect was not identified in 52 cases (20.2% of the total sample) and the victim declined to participate in prosecution in 66 cases (25.6% of the total sample). Of the 87 cases that were charged or accepted, 56.3% were dismissed *nolle prosequi*, 24.1% resulted in a guilty plea or diversion without a trial, 11.5% cases went to trial, and 8.0% had other dispositions (e.g., referral to district court). In 29 cases that were dismissed *nolle prosequi*, the victim declined to participate after criminal charges had been filed (11.3% of the entire sample and 59.2% of *nolle prosequi* dismissals). The 10 cases that went to trial resulted in 7 convictions.

Biological Evidence Case Flow and Frequency of Injury Evidence

From the 257 cases in the sample, medical and crime laboratory data were available for 185 cases (72%) and were not available in 72 cases (28%). Data from prosecutor files suggest that evidence kits were not collected in about half of the 72 cases and that kits were collected but not necessarily tested or available in the other half. In a few cases, crime laboratory reports were not found at the crime laboratory, but were available in prosecutor files. These were used to help calculate some of the statistics below. Where the crime laboratory report was found was not significantly related to any key variable. We were able to determine whether a sexual assault nurse examiner (SANE) or another medical examiner conducted the examination in 125 of the

cases with medical and crime laboratory data. SANEs conducted the examination in 77.6% of these cases.

Biological evidence was found in 60.0% of the kits at the crime laboratory. Majorities of the kits with biological evidence had DNA analysis done (88.3% of kits) and yielded a DNA profile (82.9%). Of the cases with a DNA profile, 47.8% had a suspect sample that enabled a test for a DNA match to suspect, though that might be biased upward because we had supplementary prosecutor data on suspect sample but not on DNA profile. A suspect comparison sample came from a suspect buccal swab in 21.7% of the DNA profiles, from a CODIS hit in 20.7%, and from both in 5.4%.

A DNA match to the suspect was obtained in 17.0% of cases at the crime laboratory. In the vast majority of cases in which a suspect was identified, the suspect's identity was known or was established through non-biological means. DNA was the primary means of identifying the suspect in only 8 cases (3.2% of cases with valid data on suspect identification). A timing analysis suggests that crime laboratory reports were typically not available prior to arrests being made or criminal charges being filed, but were usually available prior to other events such as declining and dismissing cases, indictment at grand jury, guilty pleas, and initiating a trial.

In the entire study, only 16.3% of cases both had the biological samples needed and met all the necessary conditions for testing for a DNA match to suspect. In this small group in which both biological samples were available and all the conditions were met, a DNA match was achieved in 96.6% of cases. The vast majority of cases without a DNA match to suspect did not have the necessary samples and/or did not meet the necessary conditions for a test of the match to be done. Specifically, 31.6% of these cases did not have evidence kits, 29.9% had kits but no biological evidence was derived from them, 8.0% had biological evidence but no DNA analysis

(which can indicate that the quality of the biological sample from the examination was not adequate for DNA testing), 3.4% had DNA analysis that did not yield a DNA profile, and 10.3% had a DNA profile but no suspect sample for comparison. In only 5.7% of cases without a DNA match would a match have even been possible. A suspect sample was not obtained in 30.3% of cases with a DNA profile.

Evidence.

The most common forms of evidence were sexual assault kits (75.1%), clothing (taken from the victim or suspect) (43.2%), toxicology kits (23.3%), cellular communications (15.2%), and bedsheets (14.8%). In the prosecution sample, in which we dropped cases in which victims declined to participate as well as cases in which suspects were not identified, prosecutors used or planned to use victim testimony in 95.3% of cases. On average, prosecutor files mentioned an average of 1.95 non-biological forms of evidence.

Sperm/semen was the most frequent biological product found (47.3%), followed by saliva (17.9%). Biological evidence was more likely when the assailant was a stranger, when victims did not use drugs or alcohol prior to the incident, when clothes and/or underwear were collected, and when the medical examiner used added swabs to collect evidence. These swabs supplement the standard set of swabs required for forensic evidence collection kits. The medical examiner may collect additional swabs when the patient's account of the assault suggests areas on the body that might yield biological evidence but are not covered by the standard swabs. SANEs and other medical professionals did not differ significantly on the likelihood of finding biological evidence.

The use of added swabs was the strongest predictor of biological evidence in a multivariate logistic regression model. Police collection of bedsheets, clothing, and fingerprints

were all significantly associated with whether a DNA match to the suspect was made. The presence of any biological evidence was not significantly related to the number of types of non-biological evidence, but cases with a DNA match to suspect had a significantly higher average number of types of evidence (2.98) than cases with tested evidence kits but no DNA match (1.76) and cases without kits at the crime laboratory (1.75). Cases in which SANEs conducted the examination were not significantly more likely than cases with other medical examiners to yield a DNA profile, a DNA match to suspect, or a CODIS hit.

Non-genital injuries were noted in over a third of all cases in which the crime lab received the sexual assault kit. Common locations of non-genital injuries included the back (13.5%), the arms (15.1%), the legs (14.6%), and the neck (9.7%). A number of cases also had documented pattern injuries and bite marks (27%). Genital injuries were noted in almost half of all cases (41.4%), including redness (25.3%), abrasions (14.9%), and swelling (9.5%).

In both bivariate and multivariate analyses, Black (non-Hispanic) victims were significantly less likely to have non-genital injuries identified, and intimate partner sexual assault victims were significantly more likely to have non-genital injuries than victims of stranger assailants. We did not find any factors that were related to detecting a genital injury. SANEs did not differ significantly from other medical professionals on the percentage of cases in which they reported a non-genital injury or a genital injury.

Relationship of Injury Evidence and Biological Evidence to Criminal Justice Outcomes

We conducted analyses of the relationship of injury evidence and biological evidence to criminal justice outcomes, taking into account other correlates of criminal justice outcomes. Most analyses in this section used the prosecution analysis sample (N=106) in which cases were dropped if the suspect was never identified or the victim was not willing to participate in

prosecution. Note that one cannot necessarily infer that biological evidence is a cause of criminal justice action from a statistical association between the two. Biological evidence may have an impact on criminal justice outcomes, but it is also possible that prosecutors may take action to obtain biological evidence in cases they decide to move forward on. These actions include analyzing kits for biological evidence, conducting laboratory procedures to obtain a DNA profile, and obtaining and testing samples from suspects for DNA matching. Thus, prosecutor actions may indirectly “cause” biological evidence. In addition, third variables such as characteristics of the assault may have an impact on both injury evidence and biological evidence on one hand, and criminal justice outcomes on the other hand, contributing to a statistical relationship between the two.

Injury evidence variables and most biological evidence variables were not statistically related to criminal justice outcomes. The one biological evidence variable that had numerous and robust relationships with criminal justice outcomes was DNA match to suspect, and most of this report focuses on this variable.

DNA and Case Progression. Analysis of the prosecution subsample revealed that cases with a DNA match were significantly more likely to move forward in the criminal justice system. About three-quarters of cases with a DNA match were carried forward without being declined or dismissed, and led to a guilty plea, trial or other outcome (a small number of cases were diverted or transferred to a lower court). On the other hand, 86.4% of cases at the crime laboratory that did *not* have a DNA match were either declined or dismissed, and so were over two-thirds of cases that were not at the crime laboratory. Just 26.4% of all prosecution subsample cases had a DNA match, but because cases without a DNA match were declined or dismissed at a high rate, 55.3% of cases that were carried forward had a DNA match and 80% of trials had a DNA match.

DNA and Conviction. Over half of cases (57.1%) with a DNA match to the suspect ended in conviction compared to 9.1% with crime laboratory results but no DNA match and 17.6% of cases without crime laboratory results. Conviction was also significantly more likely when there was clothing evidence and when there was blood evidence (though these forms of evidence were found in only 6 cases and 3 cases respectively) and when law enforcement collected more types of evidence. There was a greater likelihood of conviction when victims were below the age of consent, when there were a higher number of victim credibility concerns, and when suspects had prior arrests and/or prior convictions for any crimes.

In a multivariate logistic regression controlling for suspect prior arrest record, number of victim credibility issues, and number of types of non-biological evidence collected, the odds of a conviction with a DNA match to suspect were 7.67 greater than the odds of conviction in crime laboratory cases without a DNA match to suspect. The difference between DNA match cases and cases without crime laboratory results was no longer statistically significant once the other variables were controlled for.

It is likely that part of the association between DNA match and conviction stems from prosecutors' effort to obtain DNA evidence when they decide to move forward with a case. The usual procedure for seeking a DNA match is to obtain a suspect buccal swab, often through court order, to match with the sample obtained earlier, usually from the forensic medical examination. To control for the effect of prosecutors seeking a DNA match by obtaining a suspect buccal swab, we conducted additional analyses in which we held the suspect buccal swab variable constant. In cases *with* a suspect buccal swab, 65.0% of the 20 cases with a DNA match led to conviction versus only 16.7% of the 6 crime laboratory cases without a DNA match (exact test $p = .06$). In cases *without* a suspect buccal swab, 37.5% of the 8 cases with a DNA match (enabled by a

CODIS hit or because a sample was already on file) led to conviction compared to 7.7% of cases without a DNA match (exact $p=.068$). In 8 cases in which forensic evidence (usually CODIS hits) was the primary method of identifying a suspect, 2 convictions resulted.

DNA and Filing Criminal Charges. Additional analyses related DNA match to specific decisions in the prosecution process. Cases with a DNA match had charges filed (or were otherwise accepted for prosecution) 81.3% of the time, compared to 43.9% of cases without a DNA match and 72.3% of cases without a tested kit at the crime laboratory ($\chi^2 [2,136] = 15.192$, $p < .001$). It should be noted that the laboratory report was available to prosecutors ahead of time in only 29.4% of the cases in which criminal charges were filed and there was a DNA match; usually the laboratory report came later. On the other hand, when testing did *not* show a DNA match and cases were declined, the laboratory report was available before the date cases were declined 79.3% of the time. Lack of forensic evidence was cited as a reason for declining a case in 44.4% of declinations among crime laboratory cases with no DNA match and non-crime laboratory cases. This was the second most common reason behind lack of corroborative evidence. In coding case files, our data abstractors occasionally saw print-outs of emails requesting that testing be prioritized because of the need to make a decision. The relationship between DNA match and filing charges versus declining a case was maintained for cases with a suspect buccal swab (though at $p=.089$), but not for cases without a suspect buccal swab.

DNA and Carrying Cases Forward. When there was a DNA match, 91.3% of cases were carried forward without being dismissed, compared to 42.9% of tested cases that did not have a DNA match and 52.4% of cases that were not at the crime laboratory. However, the significant relationship between DNA match and carrying cases forward only applied to cases in

which the assailant used force and in which there were no victim credibility concerns. Lack of forensic evidence was cited as a reason for dismissal in 30.0% of cases that lacked a DNA match.

DNA and Guilty Pleas. Examining cases that were carried forward, defendants pleaded guilty in 55.0% of 20 cases with a DNA match versus 83.3% of 6 cases that were not at the crime laboratory, and 100% of 4 cases in crime laboratory cases without a DNA match. This difference was not statistically significant. In 3 of the 4 crime laboratory cases without a DNA match, no suspect sample was collected. These cases could obviously not have had a DNA match—perhaps the defendant’s guilty plea eliminated the need to collect a suspect sample. There was only one case in which a) an evidence kit was tested, b) a suspect sample was collected, and c) there was not a DNA match to the defendant. In this case, the defendant pleaded guilty anyway.

DNA and Trials. Prosecutors presented DNA evidence in 9 out of the 10 trials, 7 of which resulted in a conviction. In the one trial in which a DNA match was not presented, no evidence kit had been collected, but the defendant had made self-incriminating statements that had been audio-recorded and the defendant was convicted. The small sample and near-uniformity of presenting DNA evidence made it impossible to assess the effect of DNA evidence on trial outcome.

Findings from Prosecutor Interviews

Our interviews with prosecutors helped illuminate their strategies for using injury evidence and biological evidence and the prosecutors’ assessment of their effects. Prosecutors stated that victims’ undergoing forensic medical examinations was helpful in itself, because it helped support victims’ credibility. They felt that juries would perceive victims’ decisions not to get medical examinations as atypical for someone who was truly sexually assaulted. Prosecutors felt that the impact of biological evidence ranged from settling the issue of guilt (“dispositive”, in

one ADA's words), to enhancing the value of other evidence, to simply demonstrating to juries the seriousness of the prosecution team and victim in going forward with the case, even if the biological evidence was not probative.

Prosecutors endorsed the value of biological evidence for establishing that there was a sexual act, for identifying suspects in stranger cases or when the victim's ability to identify the assailant is compromised, and for confirming that the correct person is being prosecuted, even if additional evidence exists linking the suspect to the assault. Findings from forensic analyses can be used in interrogations to confirm sexual contact when suspects deny it, and confront them about inconsistencies in their stories. Specific information about what biological evidence was found in which location on the body or in the room may confirm victims' account and contradict defendants' accounts. Some prosecutors felt that such evidence was particularly helpful in cases in which the defense may question the victim's credibility. Biological evidence tends to be presented in court even if it is not probative; according to an ADA, "When we have the evidence, we use it. When we don't have it, we bring in experts to explain why we don't have it, every time." Several prosecutors also reported that they felt it was important to present biological evidence (including DNA evidence) because of juries' expectation of forensic evidence. This expectation has been dubbed the *CSI Effect*, after the popular television shows that focus on forensic evidence.

Prosecutors noted that most cases involve victims and suspects who know each other and the primary defense is that the sexual contact was consensual. The consent defense can even occasionally be effective in stranger cases if the suspect admits sexual contact right away and can plausibly argue that it was consensual, if anonymous, or so casual that the victim has forgotten the suspect's identity. In cases in which the suspect can use the consent defense,

biological evidence is typically considered less critical. Suspects sometimes deny sexual contact with the victims until confronted with the biological evidence; then admit there was sexual contact, but claim it was consensual. This strategy might be successful if the defendant finds a plausible reason for initially lying, such as the need to hide infidelity from a spouse.

Defendants may even use the consent defense when victims are below the age of consent in hopes of obtaining jury nullification, in which juries refuse to apply the law because they believe a conviction to be unjust. One ADA speculated that suspects may use the consent defense more now than in the past because they know that DNA evidence will rebut claims that the victim fabricated their account.

Another defense strategy was to provide alternative explanations for why DNA was recovered from the victim or crime scene (e.g., a physical fight in which the offender spat on the victim's chest rather than placing their mouth there), particularly in child and adolescent victim cases in which consent is not a defense. Although a less common and less reliable tactic, defense attorneys were occasionally successful in challenging the integrity of procedures (e.g., chain of custody) or questioning crime laboratory conclusions on purportedly scientific grounds.

ADAs overwhelmingly felt that injury evidence strengthened their cases and was likely to positively influence sentencing decisions. The presence of injuries, particularly serious injuries, signifies the aggravated nature of the incident itself. The only potential defense strategy was the claim that injuries represented the effect of rough, consensual sex, but ADAs did not feel that this was a particularly effective defense. Many felt that injury evidence corroborated the victim's version of events and could refute suspect claims of consensual sexual contact. However, most ADAs acknowledged that serious victim injuries were rare, and that even this form of evidence was susceptible to alternative explanations by the defense.

Conclusion and Implications

The purpose of this study was to explore the role of injury evidence and biological evidence in prosecuting sexual assault and assess the relationship of these forms of evidence to criminal justice outcomes. The key finding was that a DNA match to the suspect was significantly related to two specific steps in securing a conviction: filing criminal charges or otherwise accepting a case for prosecution, and carrying a case forward without dismissal. These relationships were maintained even when other predictors of these outcomes were taken into account in statistical analyses, including the amount of non-biological evidence obtained. As a result of its relationship to filing charges and carrying cases forward, DNA match to suspect was significantly related to obtaining a conviction and to case progression. Although crime laboratory reports were not typically available before criminal charges were filed, they were usually available before a case was declined or dismissed, and therefore could influence these decisions. Lack of forensic evidence was cited in prosecutor files as a reason for a declination or dismissal in a substantial proportion of cases without a DNA match or with no forensic evidence kit. When we held obtaining a suspect buccal swab constant to control for the effect of prosecutors' seeking DNA evidence after having decided to move forward with a case, the relationship of DNA match to outcomes still had large effect sizes, though these results were not quite statistically significant given the small samples in the subgroups analyzed. The results provide empirical evidence that DNA match to suspect has an impact on prosecution outcomes through its effect on prosecutor decision-making.

It proved elusive to assess the effect of DNA match on defendants' decision to plead guilty and on juries' decision to convict or acquit at trial. Relevant samples sizes for these outcomes were small. In addition, only one case advanced to these stages in which adequate

testing was done and there was not a DNA match to the suspect, making a relevant comparison on DNA match impossible. The preponderance of trials in which a DNA match to the suspect was presented as evidence was noteworthy.

DNA Match as Effect. Some results also suggest that obtaining a DNA match is in part an effect of prosecutors deciding to go forward with a case. DNA match was significantly related to filing criminal charges, but criminal charges were almost always filed before crime laboratory results were available, and then a DNA match was sought later. In 30.3% of cases with a DNA profile, a suspect sample was never obtained. Prosecutors may have determined that many of these cases were not likely to move forward, and decided therefore that investing time and money in obtaining a suspect buccal swab and testing for a match was not advisable. This contributed to the relationship between DNA match and criminal justice outcomes. Researchers examining the impact of biological evidence need to distinguish carefully between cause and effect.

DNA in Conjunction with Other Evidence. It would be misleading to conclude that DNA match is the most important form of evidence, or that it drives prosecutor decision-making by itself. This is not plausible, because a DNA match can often support a conclusion of a sexual act by the suspect involving the victim, but not that the sexual act was non-consensual.

Prosecutors also relied on victim testimony in almost all cases.

In addition, cases with a DNA match tended to have several types of non-biological evidence as well, significantly more than cases without a DNA match. There could be several explanations for this. Perhaps assaults that are more likely to leave biological evidence that enables a DNA match are also more likely to leave other forms of probative evidence such as torn clothes or stained bedsheets. Perhaps more thorough investigations are more likely to obtain

clothes or bedsheets that can yield DNA as well as other evidence. Perhaps the availability of multiple types of evidence helps move cases forward, which in turn leads prosecutors to seek a DNA match.

DNA Evidence as a Practice Standard

We found several circumstances in which all or nearly all cases had DNA matches. Prosecutors reported presenting DNA results in all but one trial, and DNA matches were presented in 100% of cases carried forward when there was no victim credibility concern and 100% of cases carried forward when suspects used bodily force. DNA matches may be considered a necessary tool to accompany evidence when prosecutors decide to carry a case forward, even if the decision to move forward was made primarily on the basis of the victim's testimony and other evidence. One can think of obtaining a DNA match as a practice standard. Consistent with this idea is the finding that prosecutors sought and obtained a suspect buccal swab in 100% of cases that had been carried forward, and all but one of these yielded a DNA match. This is also consistent with one ADA's statement in an interview: "When we have the evidence, we use it". Being able to establish that the defendant was at the scene and engaged in a sexual act involving the victim is a strong base on which to build a case, even though more evidence is needed to prove sexual assault. And, as prosecutors explained in interviews, presenting biological evidence helps establish how serious the victim, the medical examiner, the police and crime laboratory are about responding to the sexual assault, and may meet juries' expectations for forensic evidence.

The Implications of Failing to Obtain a DNA Match

The study results raise questions about the prospects for achieving a conviction if a DNA match is not available. A variety of circumstances can lead to a failure to obtain a DNA match.

Some victims do not want to have forensic medical examinations, which can be long and uncomfortable and emotionally difficult. One can understand their reluctance, particularly if biological evidence does not seem to be needed to identify the perpetrator or establish that there was a sexual act. Some victims may only feel emotionally ready to deal with the assault after some time has elapsed, but getting an examination more than a few days after the assault is unlikely to yield biological evidence. The findings on biological evidence case flow show that attrition affects the number of cases with DNA evidence just as attrition affects the prosecution of sexual assault. Even timely examinations do not always yield biological evidence, not all samples are adequate for DNA testing, a DNA profile is not always obtained from a sample from the victim, and circumstances may hinder obtaining a suspect sample, all situations that are out of the control of the victim.

In this day of widespread awareness of DNA evidence and other forensic results, it may be difficult to proceed in a case without a DNA match. One issue to consider is whether the growth in the use of DNA has the unintended consequence of making it more difficult to move forward with legitimate cases that do not have DNA evidence.

Injury Evidence and Other Biological Evidence

It was somewhat surprising that evidence from the medical examination of injuries had no statistical relationship to criminal justice outcomes in our sample. Though injuries occurred with some frequency, serious injuries may have been rare. Also, it may also be difficult to counter a defense claim that an injury could have been caused by another person in another incident; corroborating evidence may be needed to link the injury to the defendant, such as finding the defendant's DNA at a wound site or finding a pattern injury that could be linked to the specifics

of the assault. Further analysis will explore the possibility that more specific injury variables in the data set might be more predictive of criminal justice outcomes.

The finding that saliva and sperm were not, in themselves predictive of criminal justice outcomes, suggest that they are too non-specific in themselves to be probative, and their chief value lies in their potential to provide DNA evidence. Though the results for blood and clothing evidence were intriguing, these forms of evidence were too rare to draw any conclusions about them.

Limitations

This study has several limitations that should influence interpretation of the results and spur additional research on injury evidence and biological evidence in sexual assault cases. Sample sizes for several key categories of cases were small, limiting statistical power to find effects. Nevertheless, the effect sizes for results were often large enough to be statistically significant or nearly so despite small sample sizes. The research was conducted in one jurisdiction and the results may not generalize to other jurisdictions. The analysis of case data is an imperfect method for modeling decision-making, since, in an administrative dataset, cases with one type of decision may differ in the timing and circumstances of decision-making than cases with the contrasting decision (e.g., in this dataset, the decision to file criminal charges tended to be made early, without crime laboratory results, compared to the decision to decline cases, which was usually made later, after crime laboratory results were available).

Future Research. Future studies could focus more on those cases for which injury evidence and biological evidence are most likely to be probative. For example, case control studies could select matched cases with comparable biological samples and testing, and compare the difference in outcomes between cases with and without positive injury evidence or biological

evidence. Case control studies could also examine jury trials in sexual assault cases. If the widespread use of DNA evidence makes it difficult to find appropriate non-DNA comparison cases, studies using interrupted times series analysis could examine prosecution outcomes in sexual assault cases historically, before and after introduction of DNA methods. Future studies could also extend the case study method employed in McEwen's (2011) study of forensic evidence. A sample of cases with injury evidence and biological evidence could be selected and prosecutors could be interviewed or surveyed to study the case circumstances that made this evidence more or less probative, the specific methods they used with this evidence, how defense attorneys countered the introduction of this evidence, and how these factors related to outcomes.

The Importance of an Effective System of Biological Evidence Collection and Analysis

This study's findings underline the importance of DNA in sexual assault cases. They suggest that DNA is an important factor in prosecutors' decision to accept cases and carry them forward. They suggest that prosecutors, at least in the office we studied, value DNA evidence in prosecuting sexual assault and consistently make efforts to obtain it in cases they carry forward, to the point that it seems to be a practice standard. These results strengthen the case for providing victims access to quality forensic medical examinations and effective DNA analysis, and for seeking suspect samples for comparison. Yet communities differ in the availability of sexual assault nurse examiner (SANEs) or other trained medical examiners, skilled crime laboratories, and police and prosecutors knowledgeable about working with DNA evidence. Differential access to an effective system for seeking DNA evidence is a social justice issue. At the same time, there is attrition involved in obtaining DNA, and, through no fault of their own, DNA evidence may not be available for some victims. This raises equity concerns as well, particularly given how substantially DNA was related to moving cases forward. Advocates may

want to consider the results of this study in developing their arguments for enhancing systems of response to sexual assault.

Reference

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