

Forgotten Evidence: A Mixed Methods Study of Why Sexual Assault Kits (SAKs) Are Not Submitted for DNA Forensic Testing

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Throughout the United States, hundreds of thousands of sexual assault kits (SAKs) (also termed “rape kits”) have not been submitted by the police for forensic DNA testing. DNA evidence can help sexual assault investigations and prosecutions by identifying offenders, revealing serial offenders through DNA matches across cases, and exonerating those who have been wrongly accused. In this article, we describe a 5-year action research project conducted with 1 city that had large numbers of untested SAKs—Detroit, Michigan—and our examination into why thousands of rape kits in this city were never submitted for forensic DNA testing. This mixed methods study combined ethnographic observations and qualitative interviews to identify stakeholders’ perspectives as to why rape kits were not routinely submitted for testing. Then, we quantitatively examined whether these factors may have affected police practices regarding SAK testing, as evidenced by predictable changes in SAK submission rates over time. Chronic resource scarcity only partially explained why the organizations that serve rape victims—the police, crime lab, prosecution, and victim advocacy—could not test all rape kits, investigate all reported sexual assaults, and support all rape survivors. SAK submission rates significantly increased once criminal justice professionals in this city had full access to the FBI DNA forensic database Combined DNA Index System (CODIS), but even then, most SAKs were still not submitted for DNA testing. Building crime laboratories’ capacities for DNA testing and training police on the utility of forensic evidence and best practices in sexual assault investigations can help remedy, and possibly prevent, the problem of untested rape kits.

Keywords: rape, sexual assault kit, rape kit, police, criminal investigations

Sexual violence is a pervasive social problem (White House Council on Women & Girls, 2014), with national epidemiological data indicating that 17%–25% of women are sexually assaulted in their adult lifetimes (Breiding et al., 2014). When victims seek help after the assault, they are often advised to have a medical

forensic exam, including the collection of a sexual assault kit (SAK) to preserve forensic evidence of the crime (Department of Justice, 2013). A SAK (also termed a “rape kit”) contains biological evidence (e.g., semen, blood, saliva) that can be analyzed for DNA, which can be instrumental in solving crimes, prosecuting rapists, and preventing future assaults. The rape exam and SAK collection is an invasive and psychologically retraumatizing experience for sexual assault victims (Campbell, 2008), but one they endure in hope that the evidence will be used by police and prosecutors to hold perpetrators accountable (Kaiser, O’Neal, & Spohn, 2017; Patterson & Campbell, 2010). However, emerging research suggests that law enforcement personnel do *not* routinely submit rape kits for forensic DNA testing (Campbell et al., *in press*). Instead, police have been storing untested SAKs for years, sometimes even decades. Conservative estimates indicate there are 200,000–400,000 untested SAKs in U.S. police departments, and large stockpiles of kits have been documented in over five dozen jurisdictions, sometimes totaling more than 10,000 untested SAKs in a single city (Campbell et al., *in press*). Regional-scale studies have found that 41%–62% of SAKs collected at hospital emergency departments and health care clinics are not submitted for DNA forensic testing (Patterson & Campbell, 2012; Shaw & Campbell, 2013; Valentine et al., *in press*).

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DNA evidence can have tremendous utility for sexual assault investigations and prosecution by identifying offenders, revealing serial offenders through DNA matches across cases, and exonerating those who have been wrongly accused (Campbell et al., in press; Johnson, Peterson, Sommers, & Baskin, 2012; Strom & Hickman, 2010). Indeed, a Campbell Collaboration (C2) systematic review found that DNA evidence has a positive impact on criminal justice system outcomes (e.g., suspect identification, convictions; Wilson, Weisburd, & McClure, 2011). Yet, if the police do not submit SAKs for forensic testing, there is no opportunity for that evidence to inform criminal proceedings, which raises questions as to why rape kits are not routinely submitted for DNA testing. Researching this issue would require an in-depth examination into a problem that has garnered substantial negative media attention and civil lawsuits against multiple U.S. police departments (see Mitchell, 2015; Noyes, 2016). In such politically sensitive contexts, an action research project framework can be helpful for building collaborative partnerships with community stakeholders to work together to identify pressing questions and collect data that can inform policy and practice (Klofas, Hipple, & McGarrell, 2010). In this article, we describe a 5-year action research project conducted in Detroit, Michigan, and our examination into why thousands of rape kits in this city were never submitted for forensic DNA testing.

Why Are Sexual Assault Kits Not Submitted for DNA Forensic Testing?

Because the police are responsible for submitting SAKs to crime laboratories for forensic DNA testing, understanding what factors influence their decision making has been a key first step in this developing literature. In 2004, Lovrich and colleagues surveyed a stratified national random sample of approximately 1,700 law enforcement agencies about why police did not submit forensic evidence for DNA analysis in unsolved homicides, rapes, and property crimes for the years 1982–2002. Strom and Hickman (2010) later revised and expanded the Lovrich et al. (2004) survey to assess evidence submission practices in 2,250 police departments from 2003–2007. In both studies, the most commonly cited reason for not submitting evidence for DNA testing was that the police did not have an identified suspect in the case. This finding may seem puzzling because DNA testing can help reveal offender identity. However, when forensic DNA testing first emerged in the mid-1990s, it had limited practical utility because there was no organized national database of reference samples to which DNA profiles extracted from crime scenes could be compared (Butler, 2010; Wilson et al., 2011). As Butler (2010) explained, “a DNA profile by itself is fairly useless because it has no context. DNA analysis always requires that a comparison be made between two samples” (p. 9). To obtain a comparison sample, crime laboratories required police to submit a reference sample from an identified suspect against which they could evaluate the crime scene sample (Butler, 2010); therefore, if a detective did not have a known suspect, there was little to be gained from DNA testing. In 1998, the FBI established a federal criminal DNA database, Combined DNA Index System (CODIS), which contains reference samples from convicted offenders, arrestees, and other crime scenes. With the advent of CODIS, police could submit either an unknown or known DNA profile and search that record against criminal refer-

ence samples; a match (termed a “hit”) could provide an inordinately helpful investigational lead (i.e., identification of the offender). Yet, police did not seem to change their testing practices after the emergence of CODIS.

There are other indications that police have not viewed DNA as an investigatory tool, but rather as an “end-stage” step during the prosecution phase of the criminal justice system (Lovrich et al., 2004; Strom & Hickman, 2010). In both national surveys, law enforcement personnel stated that they did not submit evidence for testing if the suspect had already been adjudicated or was expected to be adjudicated (14% in 2004; 24% in 2010), if they were uncertain about the usefulness of such evidence (6% in 2004; 17% in 2010), if there was no specific request from the prosecutors to test the evidence (9% in 2004; 15% in 2010), and if no charges were expected to be filed against the offender (10% in 2004; 12% in 2010; percentages within each study do not sum to 100% because respondents could select multiple options). Similarly, in a regional-scale study of sexual assault case processing in an Arizona jurisdiction, Tasca, Rodriguez, Spohn, and Koss (2013) found that police did not believe forensic evidence would help their investigations, but it could strengthen the case later in the prosecutorial phase by confirming suspect identity. These findings suggest that police have viewed DNA evidence as a confirmatory check to be requested by the prosecutor for cases that will be going to trial, but not as an investigatory resource that can help build a case to determine if it should be referred for prosecution.

Whether a jurisdiction has sufficient resources for DNA forensic testing also affects evidence submission practices. Lovrich et al. (2004) and Strom and Hickman (2010) found that police do not submit evidence for forensic testing if they believe that their crime laboratories do not have capacity to test evidence. Likewise, the police surveyed by Tasca et al. (2013) noted that they thought that forensic analysis would take too long to be useful to the investigation. In Peterson, Johnson, Herz, Graziano, and Oehler (2012) examination of untested SAKs in Los Angeles, lack of funding for testing and lengthy delays in processing were contributing reasons why police did not submit SAKs for DNA testing. The National Research Council (2009) noted that U.S. forensic laboratories are underresourced to meet growing demand for crime scene evidence testing, including, but not limited to rape kit testing. These resource constraints likely bolster police perceptions that DNA testing is not a resource available for all investigations.

These national-scale studies by Lovrich and colleagues (2004) and Strom and Hickman (2010) reflect the most current and comprehensive assessment of law enforcement personnel’s DNA evidence submission practices. However, these studies captured general reasons why evidence was not submitted in unsolved homicides, rapes, or property crimes, which are markedly different offenses. As such, we know little about why rape kits specifically are not submitted for DNA testing. In sexual assault cases, it is particularly problematic if this evidence is “missing” because prosecutors are significantly less likely to charge a case if there is no physical/forensic evidence (Murphy, Banyard, & Fennessy, 2013). As a growing number of U.S. cities have stockpiles of thousands of untested rape kits (Bureau of Justice Assistance, 2016), there is a pressing need to understand why police do not submit SAKs for DNA analysis. Therefore, an in-depth exploration within a jurisdiction that has a large number of unsubmitted SAKs can provide a useful complement to this national-scale work

in order to further our understanding of what factors affect SAK submission practices. Examining the underlying reasons why SAKs are not submitted for testing could help create empirically supported policies to help communities resolve large numbers of untested rape kits and may also prevent this problem from developing in other jurisdictions.

The Current Study

In August 2009, approximately 11,000 SAKs were discovered in a remote Detroit police property storage facility. An initial review indicated that these kits dated back to the 1980s, and the vast majority had never been submitted for DNA testing; most of these reported sexual assaults had not been thoroughly investigated, and in many instances, there had been virtually no investigation at all (Michigan Domestic and Sexual Violence Prevention & Treatment Board, 2011). Local, county, and state officials demanded an in-depth examination of the problem (Campbell, Shaw, & Fehler-Cabral, 2015). In fortuitous timing, the National Institute of Justice had just released a funding announcement to support action research projects on untested SAKs, as an increasing number of U.S. cities were making similar discoveries (National Institute of Justice, 2010). Action research projects are designed to address an immediate problem in a specific community by bringing together front-line practitioners, community leaders, and researchers (Greenwood & Levin, 2006; Klofas et al., 2010). Detroit was selected for one of two NIJ-funded action research projects on unsubmitted rape kits. This project brought together Detroit stakeholders from law enforcement, prosecution, forensic science crime laboratories, medical/nursing, and victim advocacy to work together with researchers (the authors of the article) to examine why SAKs had not been submitted for DNA testing and to develop testing and victim notification protocols (see Campbell, Fehler-Cabral, et al., 2015). The enormity of the problem in Detroit—11,000 SAKs spanning 30 years—meant that it was not feasible to approach the study of root causes by asking individual officers about case-wise decision making. Certainly, individual-level knowledge, beliefs, and attitudes likely affected SAK submission decisions, but a problem of this size, scale, and duration suggests that there were institutionalized, routinized organizational practices at play, as well as interorganizational and community-level factors to be considered.

Therefore, our study on why Detroit had so many unsubmitted SAKs was informed by ecological systems theory (Bronfenbrenner, 1979, 1986; Kelly, 1968). This theoretical model posits that human behavior and social phenomenon are shaped by mutually influencing relationships among individuals and the settings in which they live and work (Bronfenbrenner, 1979). Furthermore, setting-level factors, such as policies, resources, and norms of an organization or community also dictate behavior (Kelly, 1968; Schensul & Trickett, 2009). Kelly's (1968) Principle of Interdependence states that components within a social system function in relation to each other and changes in one component of a system will produce changes in another. Applying this model to the study of unsubmitted rape expands the scope of inquiry to *all* organizations that are involved in SAK processing, not just law enforcement, and focuses on understanding the history, resources, policies and practices regarding rape kit testing in the police department, crime lab, prosecutor's office, medical facilities, and victim advoca-

cacy organizations. What happened within and between these organizations over time such that in the end, 11,000 SAKs were not submitted for forensic testing?

Methodologically, this focal question was well-suited for a mixed methods research design, given the sparse literature on the issue of untested SAKs and the need for both a contextually nuanced understanding of rape kit testing and also the press for data that could inform public policy. We selected Creswell's (2010; Creswell & Clark, 2011) sequential exploratory mixed methods design, which is a multistage design that begins with qualitative data collection and analysis to identify what participants see as core issues and processes (an emic perspective). From those exploratory data, more refined research questions are generated, which are then evaluated in a second stage of quantitative data collection and analysis (an etic perspective). In the quantitative phase, it may be possible and useful to code some qualitative data for use in statistical modeling (i.e., quantizing data, such as creating variables that reflect the timing of key events; Sandelowski, Voils, & Knafl, 2009). Taken together, the qualitative and quantitative studies identify emerging ideas and then evaluate questions stemming from the exploratory work. Greene (2007) noted that the findings from the qualitative and quantitative components of a mixed method design may or may not converge. In other words, what is identified in the qualitative work as critical and salient to participants may or may not bear out as influential in quantitative modeling. Greene (2007) emphasized that convergence of findings across methods is certainly useful, as it provides strong confirmability of the results, but divergent findings may also be informative, as they highlight contradictions and paradoxes that can inform future studies.

Applying this design to our examination of Detroit's untested SAKs, we started with exploratory qualitative work to understand practitioners' perceptions regarding why rape kits were not consistently submitted for DNA forensic testing for the years 1980 (date of oldest kit found) through 2009 (project scope end date, per grant). We collected multiple types of qualitative data, including ethnographic observations of all SAK collaborative team meetings; in-depth interviews with front-line practitioners and senior leadership in all organizations; and archival record reviews of organizational policies, practices, and resources. From this qualitative work, we identified several factors that stakeholders identified as key turning points and challenges that made it impossible for them to submit all SAKs for forensic testing. Then, using multilevel modeling (MLM), we quantitatively evaluated whether these factors were associated with demonstrable increases or decreases in SAK submission rates over time.

Study 1: Qualitative Exploration of Factors That Could Affect SAK Submissions

Method

Ethnographic observations: Sample and procedures. The Detroit SAK Action Research Project ("the SAK collaborative") met in-person, bimonthly for 3 years. Multiple representatives from the police department, county prosecutor's office, the state crime laboratory, the local Sexual Assault Nurse Examiner (SANE) program, and local, state, and national victim advocacy organizations attended these meetings. The researchers were

participant-observers in these collaborative meetings (~186 hr of observation). Members of the SAK collaborative were briefed individually and as a group regarding institutional review board (IRB) procedures for ethnographic observations so that they understood that their remarks would be written down; informed written consent was obtained from all collaborative participants (100% participation). After each meeting, the researchers wrote fieldnotes and conducted preliminary open coding of those notes within 72 hr of each observation to monitor data quality, identify new areas of inquiry, and assess saturation of themes (Emerson, Fretz, & Shaw, 1995). These procedures (and all other data collection procedures used in this project) were approved by the IRB of Michigan State University.

Qualitative interviews: Sample and procedures. Purposive and snowball sampling methods were used to recruit participants for individual qualitative interviews. All members of the SAK collaborative (across all disciplines and organizations listed above) were asked to participate in one-on-one interviews (i.e., purposive sampling; 100% participation rate). In those interviews, we asked participants to nominate other key individuals within their organizations that we should also interview, given their knowledge and expertise (e.g., key individuals who had changed positions or retired but were once closely involved in these issues; snowball sampling; 100% participation rate). Over the 3 years of primary data collection in this project, we conducted 42 interviews with Detroit stakeholders. The interviews were semistructured qualitative assessments that examined many topics, including the following: (a) the participants' current job position and their role in SAK testing, investigation, prosecution, and/or victim advocacy; (b) their organization's past and present procedures regarding SAK testing and sexual assault investigations; (c) their beliefs regarding why only some SAKs were submitted for forensic testing; and (d) their understanding of the resources available in their organization for SAK testing, sexual assault investigations and prosecutions, and/or victim advocacy. Written informed consent was obtained and the interviews were digitally recorded with participants' permission and transcribed verbatim.

Archival records: Sample and procedures. To supplement the information from our ethnographic observations and qualitative interviews, we requested archival records from each organization within the SAK collaborative regarding their staffing, resources, services provided, and policies and procedures from 1980 to 2009 (e.g., yearly budgets, staffing rosters, standard operating procedure documents, internal memos outlining changes in policy/practice). A total of 93 individual documents were provided to the research team. Each record was reviewed by the principal investigator and coinvestigator to determine what information should be extracted/captured for later analysis (akin to conducting preliminary open coding of narrative data). Because it was unwieldy to manage so many documents, we created a new composite file and copied text/screen shots of the selected information into that file (tagged by date, source, and preliminary open code).

Qualitative data analytic approach. We used Miles, Huberman, and Saldaña's (2014) analytic framework, which is a rigorous multistep approach for the analysis of qualitative data. Throughout data collection, the research team open coded all data sources to capture emerging themes (Corbin & Strauss, 2008). Once data collection was complete, we then conducted a triangulation assessment of each theme across participants, organizations, and data

sources (ethnography, interview, archival records). Triangulation checks are recommended in qualitative and mixed methods research to gauge the quality and credibility of the data before researchers begin more detailed coding (Creswell & Clark, 2011; Lincoln & Guba, 1985). To conduct this triangulation assessment, we checked whether each preliminary code could be verified across people (i.e., another person gave the same information), across organizations (a stakeholder from a different organization also provided that information), and across data types (that information was documented in multiple data sources). Then, using a visually intuitive green-yellow-red color-coding system, we coded the extent to which each preliminary open code could be triangulated. "Green" data had multiple individuals within an organization and individuals outside that organization confirm information, and multiple data types confirmed that information as well. For the findings presented in this manuscript, all data and quantified variables were fully triangulated (i.e., "green;" no "yellow" or "red" data were retained in these analyses).

Working from a master file that contained preliminary open codes and color-coded triangulation codes, we then developed refined subcodes for each theme, akin to Charmaz's (2006) stage of focused coding. This phase of the analysis was conducted by three coders so that each preliminary code and refined subcodes were reviewed and discussed by multiple analysts (MacQueen, McLellan-Lemal, Bartholow, & Milstein, 2008). The research team selected sample quotes to illustrate each final theme, checking to ensure that the quote was typical of the theme (rather than an extreme or uncommon illustration of the theme; see Emmel, 2013). To verify the trustworthiness of the analyses (Creswell, 2012; Lincoln & Guba, 1985), we maintained an audit trail tracking our coding and analysis processes. We also conducted member checks by presenting these findings to the SAK collaborative for their review and feedback. The partner organizations did not contest the results, though they did ask that we provide more contextual details to our presentation of the findings, which we have done.

Results

Historical context: DNA forensic testing practices over time.

In the SAK collaborative meetings and in the qualitative interviews, stakeholders across all organizations often began their reflections on the issue of unsubmitted rape kits by emphasizing that the problem had to be placed in its proper historical context. As one member of the collaborative noted:

We're talking about kits from a long time ago, let's not take our 2011 expectations of DNA, CODIS, and CSI and all that, and apply today's standards to back then. We didn't have DNA testing for a long time, didn't have CODIS, we need to judge what happened based on what was possible, at what time . . . we've got put what happened in context.

Stakeholders also emphasized that the problem needed to be considered within the broader context of *Detroit's* history as a city that has struggled for decades with chronic resource scarcity:

This is Detroit, not New York City, not Los Angeles. This is Detroit and there's no city in the U.S. that's like Detroit. . . . You have to keep in mind what was possible *in Detroit*. What they had in other cities, you know, money, personnel, technology, well, we didn't. Everything

came online here years after it did in other places. Things other cities were doing, we couldn't do. Not that we didn't want to, we didn't have the resources. (emphasis in original)

Indeed, over the past 30 years, there have been revolutionary changes in how forensic evidence can be tested and used by the criminal justice system (Butler, 2010), and many of these innovations did take quite a while to become practice in Detroit. From 1980 to 1993, DNA testing was not yet available (in the U.S. generally, not specific to Detroit), so the biological samples in rape kits were tested using discriminating protein markers, such as ABO blood typing; however, such methods have low discriminatory power and proteins can degrade quickly, so the utility of this information in an investigative context was limited (Butler, 2010). In 1994, the Detroit crime lab switched to limited-scale DNA testing (as was common practice in U.S. forensic labs), so from 1994–1997, DNA testing was sometimes conducted on rape kit samples, but the results had limited practical utility because there was no organized national database of reference samples to which DNA profiles extracted from crime scenes could be compared. In 1998, CODIS came online, which provided a mechanism for searching crime scene DNA samples against a national database of criminal reference samples, but to access/use CODIS, crime laboratories had to complete FBI auditing requirements and/or seek accreditation from independent forensic science organizations. It took the Detroit crime lab a substantial period of time—nearly 10 years—to achieve full CODIS access. In Detroit, from 1998 to 2001, the police crime lab did not have authorized access to CODIS, and from 2002–2005, they had provisional access while seeking accreditation. In 2006, the crime lab had full access to CODIS for loading profiles and searching against existing reference DNA samples. Thus, the availability of DNA testing and access to CODIS may be key contextual factors that affected SAK submissions rates over time. In the pre-DNA/pre-CODIS era, fewer kits would be expected to be submitted, given the limited utility of forensic testing at that time. However, after the development of CODIS, SAK submissions would be expected to increase, given the potential utility of DNA evidence to police and prosecutors.

Police department context: Resources for sexual assault investigations. The decision whether to submit a SAK for forensic DNA testing is typically made by the investigating officer in charge of the case, so we examined how the police department's resources for sexual assault investigations changed over time. Stakeholders across all organizations noted that the police department did not have sufficient staffing to investigate all reported sexual assault cases, which would also affect whether SAKs were submitted for DNA forensic testing. In pre-DNA/pre-CODIS era, the police department had, on average, 20–30 sex crime unit investigators/staff, and that staffing level continued until the early 2000s. In 2002, the staffing levels in sex crimes were cut approximately 50% (to 12 investigators/staff). In 2008, the sex crimes unit had another 50% cut in staffing (to 6–8 investigators). Front-line investigators and command personnel were concerned that these staffing cuts would have long-term negative impacts on sexual assault investigations. As one senior police official commented:

I saw this coming (meaning problems with SAKs). when we started losing manpower, I could see that corners were going to be cut because there was no way you could just keep up with the demand of cases they were getting and you want results.

In our interviews with police personnel, they also noted that their policies regarding SAK submissions changed over time, which would affect how many unsubmitted rape kits were in storage in any given year. From the 1980s to 1999, only those kits associated with “known suspect” SAKs were supposed to be submitted for forensic analysis (ABO blood typing until 1994; DNA testing thereafter). If police had a possible suspect identified (e.g., known-offender assaults, such as acquaintance rapes or intimate partner rapes), then SAK testing might have been conducted; without the existence of CODIS or access to CODIS, a profile of an unknown offender had limited investigational utility. In 2000, the police department changed their practice, most likely because of the emergence of CODIS (though the laboratory did not yet have access to CODIS), and from that point forward both “known suspect” and “no suspect” kits were eligible for testing. Therefore, depending on the victim-offender relationship and the year in which the SAK was collected, department practices were such that SAKs from particular kinds of rape cases would be unlikely to be submitted for testing.

Crime lab context: Resources for SAK testing. The crime lab was a division of the police department, and as such, it also struggled to maintain sufficient resources to keep pace with the crime rate in Detroit. Stakeholders across all organizations noted that the crime lab simply did not have sufficient staffing to test all forensic evidence. As stipulated by the FBI and professional accrediting organizations, laboratories must have a minimum of two scientists for quality assurance purposes (Butler, 2010). In Detroit, the lab typically had two to three DNA scientists: one position was primarily administrative, and only two scientists were typically available for actual testing. For a city of 900,000+ residents, with a high crime rate, these staffing levels are strikingly low. During the years that the crime lab was seeking accreditation for access to CODIS (2002–2005), these staffing levels were particularly challenging, as one forensic scientist noted, “one [DNA scientist] was pretty much entirely on accreditation . . . functionally, those years, it's like we [had] lost a position.” Similarly, another stated, “during then (the push for accreditation) it was more impossible than usual [to keep up] . . . and yeah, we told them (the police) that.” Detroit did not have funds to outsource forensic testing (to try to keep pace with demand), though in late 2004, the police crime lab received a federal Department of Justice DNA Backlog Reduction Grant, which allowed them to start outsourcing some testing in 2005. Stakeholders indicated that some, but not all, of these funds were allocated for testing rape kits.

Prosecutorial context: Resources for sexual assault prosecutions. The prosecutor's office is, as one stakeholder termed them, “the second stage” in the criminal justice system and not all crimes reported to the police are referred to the prosecutor's office for consideration of charges. Police have considerable discretion in what they decide to investigate and which cases they forward to prosecutors (Campbell, Bybee, Kelley, Dworkin, & Patterson, 2012; Spohn, White, & Tellis, 2014). As such, prosecutors are focused on the crimes that *are* brought before them, and what was brought before the prosecutors in this community was a staggering number of criminal cases with not enough attorneys to handle the caseload. Data on staffing levels in the prosecutor's office prior to 2000 were not available, but from 2000 to 2009, they had approximately 92 trial attorneys per year, and in that period of time, they issued 17,907 felony cases (including, but not

limited to, sexual assault cases). In this decade, there were small fluctuations in staffing levels, but the primary change in staffing occurred in 2009, when they dropped to 82 trial attorneys because of budget cuts from county government. Both before and after this staffing cut, the prosecutor's office always struggled with sufficient staffing, as one prosecutor noted:

We've never had enough prosecutors, especially given the crime rates in Detroit and other cities around here . . . but, we have obligation to public safety, so we have to deal with it and we do . . . it's hard and its exhausting and we keep going because it matters.

The prosecutor's office staff also noted that they did not have a critical resource that could have been instrumental in monitoring how many sexual assaults were reported to the police, namely a specialized sexual assault prosecution unit. Though the exact structure and operations of such units vary, they are typically organized as a team with law enforcement personnel, prosecutors, and victim advocates so that all reported rape cases are reviewed, not just those that the police decide merit referral (Beichner & Spohn, 2005). Detroit did not have this kind of funded unit until 2011.

Medical system context: Resources for collecting SAKs. Health care providers conduct the medical forensic exam and collect the forensic evidence for the SAK, which they then release to the police as crime scene evidence. In Detroit, victims of sexual assault typically received their medical care and forensic exams at one of three large hospital emergency departments (EDs). All three EDs handled high volumes of crime-related injuries, and as one ED staff member noted: "with all the gun shots, beatings, drug overdoses, sexual assault victims were low priority . . . we had to take real emergencies first." In terms of the forensic adequacy of the kits (i.e., whether they were collected correctly and had good forensic utility), most stakeholders we interviewed stated that they simply did not know. Indeed, most noted that the exams and kits were "known for" their unknown quality, so to speak; as one member of the collaborative explained:

Were the exams any good? Who knows? Were the kits collected correctly? Who knows? . . . it's safe to say they were known for being kind of a crap-shoot . . . most (exams/kits) were probably rushed, you know, swab-swab, move on.

Standard practice for medical forensic exams changed dramatically in 2006, when Detroit established a SANE program. These specialized programs are staffed by specially trained nurses, who provide 24/7 crisis intervention and medical care to sexual assault victims in either hospital emergency department or community clinic settings (Department of Justice, 2013). Prior research has found that the exams and evidence collection conducted by SANEs is more thorough and accurate than what victims receive in traditional emergency department care (see Campbell, Patterson, & Lichty, 2005, for a review). Many U.S. SANE programs were founded in the 1990s (Campbell et al., 2005; Department of Justice, 2013), so Detroit's SANE program was established later than what was typical in many other communities. However, once this community did have a SANE program, stakeholders called it a "game-changer." As one member of the police department explained:

[Things were] completely different [after the SANE program]. Before, it was hard to see or talk to the doctor at all. Now, we've got nurses

to discuss the case with, explain what she found in the exam, what the evidence was, swabs for DNA . . . a complete package.

Throughout our ethnographic observations of the SAK collaborative meetings, we noted how all organizations praised the SANE program and directly linked how it changed the criminal justice system response to rape, including SAK submissions. As one detective explained, "now we understood how this [the kit] could really help [the investigation] . . . so we got them tested."

Victim advocacy context: Resources for supporting survivors and advocating for reform. Members of the SAK collaborative discussed how victim advocacy services are essential to a well-functioning community response to rape. The staff and volunteers in these programs support survivors through the process of the medical forensic exam, police investigation, and prosecution of a case, which could include directly intervening on behalf of victims to ensure that the police were investigating their cases and that their rape kits were tested. There are two main types of victim advocacy programs: systems-based programs (e.g., police department victim advocacy programs) and community-based/nonprofit programs (e.g., rape crisis centers). In Detroit, the police department had a long-standing systems-based sexual assault victim advocacy program. Staffing levels were stable over the 30 years we examined in our historical analysis, typically 10–14 MSW-level staff members, who provided on-site assistance in hospital emergency departments and follow-up counseling services (if requested by survivors). However, our interview data indicated that the staff in this program may not have been effective in influencing sexual assault investigations and SAK submissions, as they had the same chain of command as the sex crimes unit (i.e., they both report to the same senior command staff). As one stakeholder explained:

It was assumed that the [police advocacy program] was taking care of it . . . they were funded to do hospital advocacy . . . they had a lot of funding for that, a lot of staff . . . and they were there [at the hospital, with victims] but were they really there? Advocating for victims, pushing back against the police, who by the way, were their employers. I don't know . . . given how many [unsubmitted] kits we have now, it doesn't seem likely.

Community-based advocacy programs, by contrast, exist outside the criminal justice system, and typically have explicit goals of creating social change (Martin, 2005). Nonprofit rape crisis centers were formed throughout the United States in the 1970s and 1980s (Martin, 2005), but Detroit did not have such an organization during the years these SAKs were accumulating. In an effort to provide some community-based advocacy services in Detroit, in 2000, a domestic violence agency created one sexual assault-designated advocate position. The likelihood that one staff member might have been able to have a demonstrable impact on the criminal justice system response to sexual assault, including SAK submissions, seems quite unlikely.

Discussion

The qualitative data indicated that all organizations with the SAK collaborative struggled with chronic understaffing and resource scarcity for decades, which created what some referred to as "The Perfect Storm":

It's like *The Perfect Storm* . . . the conditions were ripe for this to happen . . . honestly, looking back, I think the real question isn't, how did it happen, but how could it not have happened? Not as an excuse . . . as reality—how could it not have happened?

Within this general context of resource scarcity, we were able to identify specific systemic changes that may have affected SAK submissions over time. Stakeholders noted that submission rates must be examined in light of what DNA technology was available at the time, as they expected rates to be lower before Detroit had access to the federal criminal DNA database, CODIS. Also, the police department changed its policies regarding which kits could be submitted (i.e., known or unknown offenders), as CODIS became available. With that context in mind, there were particularly difficult resource cuts over time (e.g., staffing cuts in the police sex crimes units) that might have curbed submission rates, but also some welcome resource additions, such as a federal grant for outsourcing DNA testing and the establishment of a SANE program that could have increased the likelihood that police would submit SAKs for DNA testing. The timing of each of these systemic changes could be reliably verified, so we can quantitatively examine whether the factors that stakeholders felt were influential to their practice had demonstrable associations with SAK submission rates over time.

Study 2: Quantitative Evaluation of Factors Affecting SAK Submission

Method

Sample. A census of all SAKs in police property revealed that there were 11,219 rape kits in storage (current to November 1, 2009). Four hundred of these SAKs had been previously sampled and analyzed in a pilot project ([Michigan Domestic and Sexual](#)

[Violence Prevention & Treatment Board, 2011](#)), so they were removed from the sample for this study; final $N = 10,817$ SAKs.

Procedures and measures. We requested records from the police department crime lab to determine how many of these 10,817 SAKs had been submitted for forensic DNA testing (dependent variable). The vast majority of these rape kits had never been submitted for DNA analysis, either “in-house” to the police crime lab or outsourced to a private vendor laboratory: 8,391 SAKs (77.6%) unsubmitted; 2,426 SAKs (22.4%) submitted. To examine what factors predict SAK submission rates (independent variables), we quantitized five key systemic changes that were identified through the qualitative data in Study 1 ([Table 1](#)). First, there were distinct “eras” of forensic DNA testing practices in Detroit: (a) pre-DNA (1980–1993); (b) DNA testing, CODIS not yet developed (1994–1997); (c) DNA testing, crime lab did not have access to CODIS (1998–2001); (d) DNA testing, provisional access to CODIS while crime lab sought accreditation (2002–2005); and (e) DNA testing, crime lab had full access to CODIS (2006–2009). Second, the police sex crimes unit faced two major staffing cuts, one in 2002 and a second in 2008. Third, the police department changed its forensic testing policy in 2002 to expand the types of SAKs that should be submitted for DNA analysis. Fourth, the crime lab received federal funds in 2005 for outsourcing DNA testing. Finally, Detroit established a comprehensive SANE program in 2006.

Quantitative data analytic approach. For these analyses, the unit of analysis was the SAK, which is nested within years. Only the dependent variable (kit submission) is measured at the kit level; all independent variables are at the level of years. To accommodate dependencies among kits collected in the same year, the analysis used multilevel or mixed effects regression, with individual SAKs at Level 1, nested within years at Level 2. Models were estimated with random intercepts for kit submission and

Table 1

Factors Affecting Sexual Assault Kit (SAK) Submission: Variables Identified by Qualitative Data, Evaluated in Quantitative Modeling

Independent variables	Number of kits	% of total	% of kits submitted
Historical context: Forensic DNA testing era			
Pre-DNA (1980–1993)	2,261	20.9	13.6
DNA/CODIS not yet developed (1994–1997)	2,751	25.4	12.9
DNA/no access to CODIS (1998–2001)	2,026	18.7	32.9
DNA/provisional access to CODIS during accreditation (2002–2005)	2,070	19.1	23.6
DNA/full access to CODIS (2006–2009)	1,709	15.8	35.5
Police department context: Staffing cuts in sex crimes unit (2002 and 2008)			
Staff cut year	925	8.6	29.2
Not staff cut year	9,892	91.4	28.1
Police department context: Policy change for SAK submission to Crime Lab (2002)			
Before police policy change	6,089	56.3	16.6
After police policy change	4,728	43.7	29.9
Crime Lab context: Federal funding for outsourcing DNA testing (2005)			
Before DOJ backlog reduction grant funding	8,464	78.2	20.0
After DOJ backlog reduction grant Funding	2,353	21.8	31.0
Medical system context: SANE program established (2006)			
Not year SANE program established	10,414	96.3	21.5
Year SANE program established	403	3.7	46.9
Dependent variable: submission of SAKs to crime lab			
Submitted	2,426	22.4	100
Not submitted	8,391	77.6	0

Note. CODIS = Combined DNA Index System; DOJ = Department of Justice; SANE = Sexual Assault Nurse Examiner.

fixed slope effects for Level 2 covariates. Because the dependent variable is a dichotomous variable (kit submitted/unsubmitted), a logit link function was used, producing multilevel logistic regression models. Analyses were conducted using HLM 7 software (Raudenbush, Bryk, Cheong, & Congdon, 2011).

Results

Figure 1 graphs how many SAKs were submitted/unsubmitted each year, from 1980 (the date of the oldest SAK in police storage) to 2009 (project end date). In only one year, 2007, the number of submitted and unsubmitted SAKs was roughly equivalent (52% were not submitted; 48% were submitted), and there were no years in which more kits were submitted than unsubmitted. The proportion of unsubmitted kits was not constant over the years, because there are discernible increases and decreases throughout the 1990s and 2000s, which underscores the need to understand what factors affected kit submission over time.

To assess whether the systemic changes identified in the qualitative data affected SAK submission rates, a baseline null model was estimated first to verify the adequacy of the variance of the random intercept and to obtain a baseline log likelihood value against which the fit of more complex nested models could be compared, as other covariates were added. Then a fixed linear effect for time (in years, centered at the mean year of 1999) was estimated in a random intercept/fixed slope model. To check for curvilinearity, models incorporating polynomial functions of time (squared and cubed) were also estimated, but neither term made a significant improvement to model fit, indicating that the effect of time was essentially linear in form. The null and fixed linear time slope models are summarized in Table 2. The random effects variance in the null model was large and significant, indicating sufficient variability among yearly submission rates to warrant further analysis. The addition of the linear slope term made a

significant improvement to model fit; the fixed effect for time was positive and significant, indicating that on average, there was a trend toward increasing proportions of kits being tested, with each subsequent year associated with a 1.09 increase in submission rate. These baseline models formed the basis for substantive models examining the contribution of Level 2 covariates. Because all covariates are time-related and therefore potentially correlated with the linear effect of time, each covariate was initially examined both with (conditional) and without (unconditional) the fixed effect of time, to test whether the covariate was associated with change in kit submission at all (unconditional) and whether the covariate explained changes after accounting for the general increase in submission over time (conditional). Subsequent multivariable models were derived from the initial bivariate models.

Results of preliminary bivariate models are presented in Table 3. The first panel contains the unconditional models, with the Likelihood Ratio (LR) χ^2 comparing models containing individual independent variables against the null, random intercept model. The second panel contains the conditional models, with the LR χ^2 testing whether the addition of linear time improved model fit relative to the independent variable alone. The first pair of models examines the effect of DNA era. In the unconditional model, DNA era made a significant contribution to model fit. Each of the eras differed significantly from the fourth era, the category designated as the reference because it provided the clearest illustration of the overall effect: The first 2 eras (pre-DNA and DNA/CODIS not yet developed) did not differ significantly from each other but were both significantly lower than the reference category (DNA/provisional access to CODIS during accreditation). Rates of kit submission in the first two eras were only half the size of rates in the reference category. Eras 3 (DNA/no access to CODIS) and 5 (DNA/full access to CODIS) did not differ significantly from each other but were both significantly higher than the reference cate-

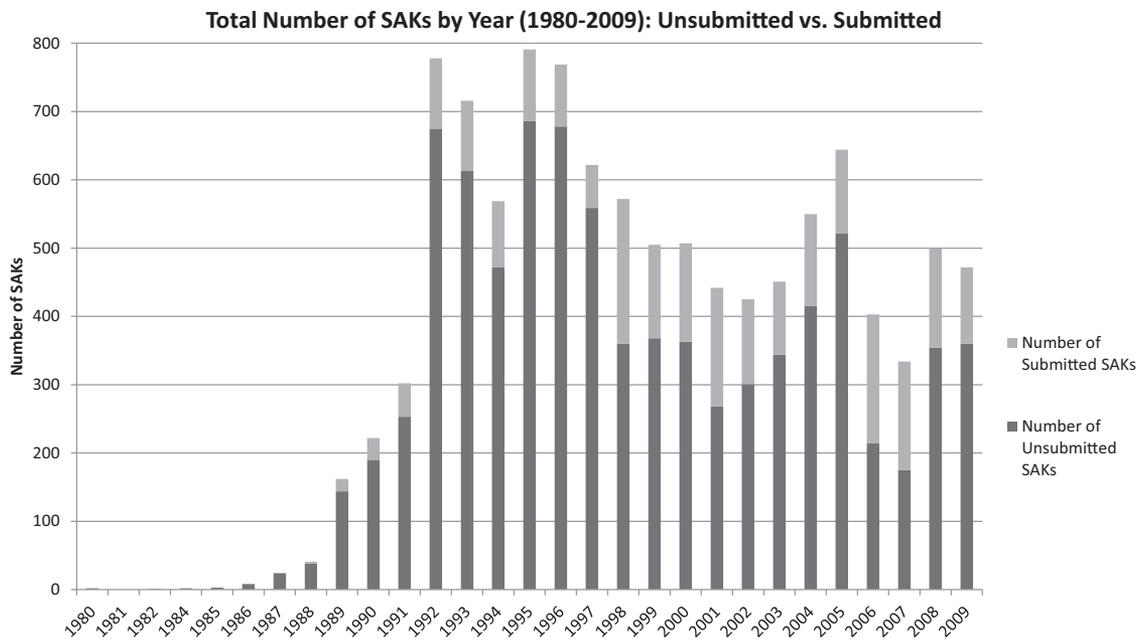


Figure 1. Sexual assault kits (SAKs) in police property ($N = 10,817$)—Submitted versus unsubmitted SAKs.

Table 2
Baseline Models Predicting Sexual Assault Kit (SAK) Submissions

Model	Model components	Fixed effects					Random effect variance				Model fit			
		Log odds	SE	Odds ratio	Confidence interval	p	SD	df	χ ²	p	Log likelihood	No. of parameters	LR χ ²	p
Null	Intercept (random)	-1.390	.139	.249	.187-.331	<.001	.655	27	757.156	<.001	-15,351.1	2		
Fixed linear	Intercept (random)	-1.299	.097	.273	.0224-.333	<.000	.435	26	3,999.27	<.001				
	time slope Time (years, linear)	.084	.015	1.087	1.054-1.122	<.001					-15,343.20	3	15.86	<.0001

Note. LR = Likelihood Ratio. N = 10,817 kits, nested within 28 years; analysis was conducted using mixed-effects logistic regression, with random effects of kits nested within years.

gory (Odds ratio [OR] = 1.55 and 1.80, respectively). The conditional model added the linear effect of time; rather than improving fit, the addition of time slightly worsened model fit, relative to the fit of the unconditional model. This finding, along with the reversed sign of the effect of linear time in the conditional model, reflects strong collinearity between DNA era and linear time.

Turning to factors within the police department that may have affected SAK submissions, we evaluated a bivariate model that tested

the effects of the staffing cuts in the police sex crimes unit, which occurred in 2002 and 2008. In both the unconditional and conditional models, staffing cuts had no significant effect on kit submission. Results were virtually identical for separate analyses examining the effect of each separate year in which there were cuts (2002 and 2008). We also examined whether the change in police department policy expanding the types of SAKs that should be submitted for testing (i.e., kits from both stranger- and nonstranger-perpetrated assaults should

Table 3
Bivariate Multivariate Logistic Regression Models Examining Predictors of Sexual Assault Kit (SAK) Submission, Unconditional and Conditional on Time

Model	Unconditional model						Conditional model					
	Odds ratio	Confidence interval	p	LR χ ²	df	p	Odds ratio	Confidence interval	p	LR χ ²	df	p
Historical context: Forensic DNA testing era												
Intercept (random)	.32	.24-.42	<.001				.36	.22-.58	<.001			
DNA era in which SAK was collected												
1. Pre-DNA (1980-1993)	.46	.31-.68	<.001				.32	.10-1.07	.062			
2. DNA/CODIS not yet developed (1994-1997)	.47	.31-.71	.001				.38	.17-.85	.021			
3. DNA/no access to CODIS (1998-2001)	1.55	1.03-2.33	.036				1.39	.82-2.35	.214			
4. DNA/provisional access to CODIS during accreditation (2002-2005)												
5. DNA/full access to CODIS (2006-2009)	1.80	1.19-2.71	.007	12.54	4	.014	2.01	1.19-2.35	.012	-2.40	1	1.00
Time (years, linear)							.97	.89-3.41	.516			
Police department context: Staffing cuts in sex crimes unit (2002 and 2008)												
Intercept (random)	.24	.18-.32	<.001				.28	.22-.34	<.001			
Years of staff cuts (2002 and 2008)	1.73	.65-4.64	.263	.01	1	1.00	.89	.43-1.84	.753			
Time (years, linear)							1.09	1.05-1.13	<.001	16.22	1	<.001
Police department context: Policy change for SAK submission to Crime Lab (2002)												
Intercept (random)	.17	.13-.22	<.001				.26	.17-.39	<.001			
Year of policy change (2002)	2.59	1.71-3.04	<.001	6.64	1	.010	1.11	.51-2.38	.792			
Time (years, linear)							1.08	1.02-1.15	<.015	8.68	1	.003
Crime Lab context: Federal funding for outsourcing DNA testing (2005)												
Intercept (random)	.21	.16-.28	<.001				.30	.23-.38	<.001			
Year funds were received (2005)	2.24	1.23-4.09	.011	5.42	1	.020	.73	.37-1.44	.350			
Time (years, linear)							1.10	1.05-1.15	<.001	10.32	1	.001
Medical system context: SANE program established (2006)												
Intercept (random)	.24	.18-.31	<.001				.27	.22-.32	<.001			
Year SANE was established (2006)	3.71	1.05-13.10	.043	5.40	1	.020	1.94	.78-4.88	.149			
Time (years, linear)							1.08	1.05-1.11	<.001	14.22	1	<.001

Note. LR = Likelihood Ratio; CODIS = Combined DNA Index System; SANE = Sexual Assault Nurse Examiner.

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be tested) was associated with change in submission rates. In the unconditional model, the effect of this policy change had a significant and positive ($OR = 2.59$) effect on kit submission and it significantly improved model fit over the null model. The addition of linear time made a significant improvement to model fit. However, in this conditional model, the change in police department policy was no longer significant, suggesting that these effects were subsumed in the general trend toward increasing levels of submission.

In the crime lab, the receipt of federal funds in 2005 for outsourcing some DNA testing to private vendor labs was noted as an important new resource for SAK testing. In the unconditional model, the receipt of this funding had a significant and positive ($OR = 2.24$) effect on kit submission, and it significantly improved model fit over the null model. Years following receipt of federal funding had rates of kit submission that were more than double the rates of years prior to the funding. The addition of linear time in the conditional model significantly improved model fit. However, after adjusting for linear time, the effect of federal funding reversed sign and was much smaller and no longer significant.

In the medical system, the establishment of the SANE program in 2006 was seen as a positive change for the criminal justice system response to sexual assault. In the unconditional model, the impact of the establishment of the SANE program on SAK submissions was significant and positive ($OR = 3.71$), and it significantly improved model fit over the null model. The year in which the SANE program was established had a rate of kit submission that was nearly 4 times the average across all other years. The addition of linear time in the conditional model significantly improved model fit. The effect of SANE remained positive ($OR = 1.94$), although it was no longer significant, according to the Wald test.

These initial bivariate models were used to develop subsequent multivariate models. Because DNA era appeared to fully explain the linear increase in kit submission over time (i.e., adding the linear time effect worsened model fit, because of its collinearity with DNA era), DNA era was used as the basis of a final model related to kit submission (Table 4). These models had the random

intercept in Block 1 and the DNA era variable in Block 2. Block 3 of each subsequent model added, one at a time, a variable that had been found in bivariate models to have significant relationships with kit submission, unconditional on linear time. Three variables met this criterion and were evaluated: police policy change regarding SAK submissions, the crime lab's receipt of federal funding, and the establishment of a SANE program in Detroit. In the separate models that added police policy or federal funding for outsourcing some DNA testing, neither variable improved model fit. In the model that examined the year the SANE program was established, the coefficient for this variable was large and positive, but it did not reach the conventional level of significance ($OR = 1.81, p = .053$). However, the addition of the SANE program significantly improved model fit. This model that contained DNA era and the year in which the SANE program was established was considered the final, best-fitting model to explain shifts in rates of SAKs submissions over time (Table 4).

Discussion

The availability of DNA testing and CODIS are critical contextual factors that were significantly associated with rates of SAK submissions over time. In the eras before forensic DNA testing and before the advent of CODIS, SAK submissions were significantly lower. It would be expected that after the emergence of these innovations, SAK submissions would increase substantially, given the potential utility of DNA evidence to sexual assault investigations. Yet, we need to consider local history as Detroit did not come "on line" as quickly as many other cities in the U.S. (see Campbell, Fehler-Cabral, et al., 2015). It was challenging for the crime lab to obtain full access to CODIS, and during the years in which the lab was seeking accreditation (2002–2005), SAK submissions dipped significantly. Once the lab had full access to CODIS, as expected, submissions rates were significantly higher. These patterns in SAK submission rates suggest that the police and crime lab did capitalize on innovations in forensic DNA testing as they became available in Detroit, but as a city that struggled with chronic resource scarcity, this was a long, slow process. It was

Table 4
Final Multilevel Logistic Regression Model Predicting Sexual Assault Kit (SAK) Submissions by DNA Era and Implementation of Sexual Assault Nurse Examiner (SANE) Program

Block		Log odds	Odds ratio	Confidence interval	<i>p</i>	Log likelihood	No. of parameters	LR χ^2	<i>p</i>
1	Intercept	-1.157	.314	.242-.409	<.001	-15,351.13	1		
2	Historical context: Forensic DNA testing era					-15,344.86	5	12.54	.028
	Pre-DNA (1980–1993)	-.764	.466	.325-.667	<.001				
	DNA/CODIS not yet developed (1994–1997)	-.751	.472	.324-.686	<.001				
	DNA/no access to CODIS (1998–2001)	.440	1.553	1.074–2.246	.021				
	DNA/provisional access to CODIS during accreditation (2002–2005)	<i>Reference category</i>							
	DNA/full access to CODIS (2006–2009)	.437	1.548	1.036–2.412	.034				
3	Medical system context: SANE program established (2006)	.596	1.814	.992–3.316	.053	-15,342.74	6	4.24	.039
		<i>SD</i>	<i>df</i>	χ^2					
	Random intercept variance	.231	22	119.564	<.001				

Note. LR = Likelihood Ratio. *N* = 10,817 kits, nested within 28 years; analysis was conducted using mixed-effects logistic regression, with random effects of kits nested within years. CODIS = Combined DNA Index System.

nearly 10 years after the creation of CODIS before criminal justice professionals in this community had full access to this critical resource.

DNA era appeared to account for the linear increase in rape kit testing over time, so we needed to take this history into account when considering whether other systemic changes affected SAK submission practices over time. The revised police department policy regarding forensic testing and the crime lab's receipt of federal funding for outsourcing DNA testing were associated with increased rates of SAK submissions, but after accounting for the historical era in which a kit had been collected, these factors were no longer significant. This suggests that the impacts of police policy and federal funding were subsumed by the effects of DNA era and showed no distinguishable effects once DNA era was considered. The change in police policy and the receipt of federal funds occurred within the final DNA era, which had the highest relative submission rate, so it would be difficult to pinpoint the effects of additional historical events that occurred during this time period. However, another event that occurred during the final DNA era—the emergence of the SANE program—was found to exert an identifiable effect on submission rates, above and beyond DNA era. Once Detroit criminal justice professionals had a resource for high quality medical forensic exams and colleagues from the medical community with whom they could discuss cases, rates of rape kit testing significantly increased.

Summary and Concluding Discussion

Rape kit testing has tremendous utility to the criminal justice system (Wilson et al., 2011), but when SAKs are not consistently tested, “justice [is] denied,” as Strom and Hickman (2010) argued, because that evidence cannot help prosecute offenders, give justice to victims, protect the safety of the community as a whole, and/or clear those who have been wrongly accused. Detroit is one city among many that has not tested rape kits over the years, and from 1980 to 2009, over 11,000 SAKs were placed in storage, most of which had never been tested for DNA. Thousands of sexual assault victims had come forward after a surviving a violent crime to file a police report and endure an invasive medical exam so that crime scene evidence could be collected from their bodies. So why then was such potentially valuable evidence placed in storage?

Our in-depth analysis into one city's experience with large numbers of untested rape kits highlights that it is important to place this problem in historical context: DNA testing has not always been available or truly *useful* to police and prosecutors. There was clear convergence of the qualitative and quantitative data showing that SAK submissions were closely linked to DNA/CODIS era. Before the advent of CODIS, most rape kits were not submitted for DNA testing, and after the crime lab in Detroit had full access to CODIS, submission rates significantly increased. These findings suggest that availability and accessibility of forensic technology certainly matters, but it is *not* the sole reasons why rape kits went untested. Once the crime lab in Detroit had full access CODIS, all kits still were not submitted for testing, so access was clearly not the hold-up. Also, the police did not go back and submit older SAKs from previous years/decades. Rather, law enforcement personnel commented that they did not feel it was necessary or appropriate to “go back and get those.” Our results are consistent with prior studies that have found that even as forensic

technology has increased in availability and utility, law enforcement personnel still do not consistently submit evidence for testing and question whether it would be helpful to their work (Lovrich et al., 2004; Patterson & Campbell, 2012; Shaw & Campbell, 2013; Strom & Hickman, 2010; Tasca et al., 2013; Valentine et al., in press).

Prior research has also found that police do not submit forensic evidence for testing if their crime labs do not have sufficient capacity to keep pace with demand or if they cannot test quickly enough so that the forensic results could be helpful to their investigations (Lovrich et al., 2004; Peterson et al., 2012; Strom & Hickman, 2010; Tasca et al., 2013). In some jurisdictions, resource constraints may be limited to just the crime lab, but in Detroit, resource scarcity was more pervasive. In our qualitative data, stakeholders emphasized that they did not have the resources to test all kits, investigate all reports, and provide support and services to all victims. The untested kits were a tangible symbol of a systemic breakdown in the criminal justice system's response to sexual assault. Law enforcement personnel noted that deep staffing cuts compromised their ability to investigate reported sexual assaults, which includes submitting SAKs for DNA analysis. However, the quantitative findings did not converge and support these qualitative results. There was no significant association between staffing levels and SAK submission rates, which suggests that the problem of unsubmitted SAKs is not simply a “person power” issue—there are other reasons why police do not submit SAKs that must be identified.

Greene (2007) argued that divergent findings in mixed methods research can help suggest additional areas of inquiry, and in this case, we suspected that individual officer/detective discretion may have a critical role in rape kit testing. A robust, multidisciplinary literature suggests that police ascribe to victim-blaming beliefs and rape myths (Edwards et al., 2011; Mennicke et al., 2014; Page, 2010; Venema, in press), and that they often do not investigate cases, mark cases as unfounded, and close cases prematurely without referrals to prosecutors for consideration of charges (Campbell et al., 2014; Lonsway & Archambault, 2012; Pattavina, Morabito, & Williams, 2016; Spohn, White, & Tellis, 2014). As noted previously, assessing case-level decision making in 11,000 cases was not feasible, so based on the results of this study, we conducted follow-up studies with more manageable numbers (400 cases in Shaw, Campbell, Cain, & Feeney, in press; and 1,600 cases in Campbell, Fehler-Cabral, et al., 2015). In that work, we found ample evidence that police held negative, victim-blaming beliefs about sexual assault victims, which was a fundamental reason why they decided not to test rape kits. These two problems—chronic resource scarcity and victim blaming beliefs—may be related. Research from psychology, sociology, social work, and management indicates that chronic scarcity tends to decrease individuals' empathy for others (Fried, 1982; Lipsky, 2009; Mullanathan & Shafir, 2013). For those working in the helping professions, it is not uncommon that staff will dehumanize the very people they are supposed to help, disregarding their suffering and distancing themselves (Lipsky, 2009). Therefore, the effects of the resource scarcity we captured in our qualitative data may be more complex than what we modeled quantitatively in this study, and this remains an important issue for future research.

Our findings also showed that an influx of resources can help the criminal justice system response to sexual assault. Practitioners

noted that funding for outsourcing DNA testing was instrumentally helpful, though our quantitative findings were mixed as to its impact. The receipt of federal funds to support DNA testing was a significant predictor of SAK submission in the bivariate model, but the effect became nonsignificant in the multivariate model. We were not able to determine how exactly those funds were allocated, so we do not know what percentage of the monies were used for SAKs specifically versus testing DNA in other types of crimes. In the member check presentation of these findings to the SAK collaborative, stakeholders were not surprised by these mixed findings and referred to the funding as useful, but probably a “drop in bucket.” A key resource influx that did have a clear demonstrable impact on SAK testing was the establishment of a sexual assault nurse examiner (SANE) program in Detroit. Once the community had a resource for quality medical forensic exams and forensic consultation, SAK submission rates significantly increased. Practitioners across multiple disciplines noted that the forensic nurses educated members of other organizations about the utility of forensic evidence in sexual assault cases. Prior research has found that SANE programs have positive direct and indirect effects as community change agents (Campbell et al., 2014; Campbell, Patterson, & Fehler-Cabral, 2010), and our results here are consistent with that literature.

We acknowledge several contextual factors and limitations of this study that temper the strength of the conclusions that can be drawn from this work. First, an in-depth study of one city always raises questions about the generalizability of the findings, perhaps more so here given the uniqueness of Detroit. Detroit is a racially homogeneous city (82% Black in the 2000 Census, 83% in the 2010 Census), with a high violent crime rate (second highest rate in the nation in the 2000 FBI Uniform Crime Report [UCR], highest rate in the nation in the 2010 UCR), and severe economic hardships (see Campbell, Shaw, & Fehler-Cabral, 2015). Clearly, these factors are related to the chronic resource scarcity documented in this study, so whether our findings would generalize to other cities is unknown. However, our results are consistent with national and regional-scale studies on the utilization of forensic evidence by law enforcement, suggesting that the police in this city are similar to others in that they do not routinely submit evidence for DNA analysis. The magnitude of the problems facing Detroit may be different, but key themes regarding resource availability and accessibility may be applicable across jurisdictions. Research with multicity samples is clearly warranted for a more complete understanding of the varied reasons why rape kits are not submitted for DNA testing.

Second, the criminal justice data information systems in Detroit were also underresourced and not well maintained, so there were key variables we would have liked to examine in our quantitative models that we could not evaluate because of missing/unreliable data. Electronic records that captured basic descriptive information about the assault, victim, and offender did not exist for the vast majority of these cases/SAKs, and paper records were unwieldy and incomplete. For example, race/ethnicity is clearly salient in the criminal justice system, and there are some indications that the racial match/mismatch between the victim and offender could affect whether police submit SAKs for forensic testing (Shaw & Campbell, 2013). We would have liked to explore whether there were racial/ethnic differences in SAK submissions and whether forensic testing was utilized differentially in certain types of cases.

However, given the racial homogeneity of Detroit, this may have been difficult to evaluate even if we had available data, so we recommend that this issue is pursued in future work. Likewise, whether the offender is known or unknown to the victim has affected DNA testing policies over the years (Butler, 2010), and has also affected the extent to which police thoroughly investigate and pursue reported rapes (Spohn & Tellis, 2010; Spohn et al., 2014; Tasca et al., 2013). We were unable to examine how submission rates varied as a function of victim-offender relationship and whether stranger-perpetrated and nonstranger perpetrated cases were submitted for testing with equivalent frequency.

With these limitations in mind, our ecological exploration of why Detroit had so many untested sexual assault kits highlights how multiple organizations are instrumental to rape kit processing. When victim advocacy organizations cannot advocate on behalf of victims; when crime labs cannot keep pace with demand for DNA testing; when prosecutor's offices cannot keep on top of their current caseloads so they cannot feasibly keep track of what isn't being brought before them; and when law enforcement agencies are unable and/or unwilling to help their citizens, the fairness and equity of the criminal justice system suffers. DNA evidence can be a powerful tool for police investigations, but it is not fully accessible and affordable for all communities, so only some victims, some cases, and some kits are benefitting from these advancements. This is a classic example of a science-practice gap (Kazdin, 2008; National Research Council, 2015), whereby technological innovations could be improving lives (Wilson et al., 2011), but have not become institutionalized in front-line practice. Building crime laboratories' capacities for DNA testing and training police on the utility of forensic evidence throughout all phases of the criminal justice system can help remedy, and possibly prevent, the problem of untested rape kits.

References

- Beichner, D., & Spohn, C. (2005). Prosecutorial charging decisions in sexual assault cases: Examining the impact of a specialized prosecution unit. *Criminal Justice Policy Review*, 16, 461–498.
- Breiding, M. J., Smith, S. G., Basile, K. C., Walters, M. L., Chen, J., & Merrick, M. T. (2014). Prevalence and characteristics of sexual violence, stalking, and intimate partner violence victimization—National intimate partner and sexual violence survey, United States, 2011. *MMWR Surveillance Summaries*, 63, 1–18. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4692457/pdf/nihms745990.pdf>
- Bronfenbrenner, U. (1979). *The ecology of human development* (pp. 16–42). Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, 22, 723–742. <http://dx.doi.org/10.1037/0012-1649.22.6.723>
- Bureau of Justice Assistance. (2016). *The Sexual Assault Kit Initiative (SAKI) Program*. Washington, DC: Author. Retrieved from https://www.bja.gov/ProgramDetails.aspx?Program_ID=117
- Butler, J. M. (2010). *Fundamentals of forensic DNA typing*. Boston, MA: Academic Press/Elsevier.
- Campbell, R. (2008). The psychological impact of rape victims. *American Psychologist*, 63, 702–717.
- Campbell, R., Bybee, D., Kelley, K. D., Dworkin, E. R., & Patterson, D. (2012). The impact of Sexual Assault Nurse Examiner (SANE) program services on law enforcement investigational practices: A mediational analysis. *Criminal Justice & Behavior*, 39, 169–184. <http://dx.doi.org/10.1177/0093854811428038>

- Campbell, R., Bybee, D., Townsend, S. M., Shaw, J., Karim, N., & Markowitz, J. (2014). The impact of sexual assault nurse examiner (SANE) programs on criminal justice case outcomes: A multi-site replication study. *Violence Against Women, 20*, 607–625.
- Campbell, R., Fehler-Cabral, G., Pierce, S. J., Sharma, D., Bybee, D., Shaw, J., . . . Feeney, H. (2015). *The Detroit sexual assault kit (SAK) action research project (ARP)* (NIJ 2011-DN-BX-0001; NCJRS Document No. 248680). Washington, DC: National Institute of Justice. Retrieved from <https://www.ncjrs.gov/pdffiles1/nij/grants/248680.pdf>
- Campbell, R., Patterson, D., & Fehler-Cabral, G. (2010). Using ecological theory to evaluate the effectiveness of an indigenous community intervention: A study of sexual assault nurse examiner (SANE) programs. *American Journal of Community Psychology, 46*, 263–276. <http://dx.doi.org/10.1007/s10464-010-9339-4>
- Campbell, R., Patterson, D., & Lichty, L. F. (2005). The effectiveness of sexual assault nurse examiner (SANE) program: A review of psychological, medical, legal, and community outcomes. *Trauma, Violence, & Abuse: A Review Journal, 6*, 313–329. <http://dx.doi.org/10.1177/1524838005280328>
- Campbell, R., Shaw, J., & Fehler-Cabral, G. (2015). Shelving justice: The discovery of thousands of untested rape kits in Detroit. *City & Community, 14*, 151–166.
- Campbell, R., Feeney, H., Fehler-Cabral, G., Shaw, J., & Horsford, S. (in press). The national problem of untested sexual assault kits (SAKs): Scope, causes, and future directions for research, policy, and practice. *Trauma, Violence, & Abuse: A Review Journal*. <http://dx.doi.org/10.1177/1524838015622436>
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: Sage.
- Corbin, J., & Strauss, A. (2008). *Basics of qualitative research* (3rd ed.). Los Angeles, CA: Sage.
- Creswell, J. W. (2010). Mapping the developing landscape of mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *The Sage handbook of mixed methods in social and behavioral research* (2nd ed., pp. 45–68). Thousand Oaks, CA: Sage.
- Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W., & Clark, V. P. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.
- Department of Justice. (2013). *A national protocol for sexual assault medical forensic examinations: Adults & adolescents* (2nd ed.). Washington, DC: Author. Retrieved from <https://www.ncjrs.gov/pdffiles1/ovw/241903.pdf>
- Edwards, K. M., Turchik, J. A., Dardis, C. M., Reynolds, N., & Gidycz, C. A. (2011). Rape myths: History, individual and institutional-level presence, and implications for change. *Sex Roles, 65*, 761–773.
- Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). *Writing ethnographic fieldnotes*. Chicago, IL: University of Chicago Press.
- Emmel, N. (2013). *Sampling and choosing cases in qualitative research: A realist approach*. London, England: Sage.
- Fried, M. (1982). Endemic stress: The psychology of resignation and the politics of scarcity. *American Journal of Orthopsychiatry, 52*, 4–19. <http://dx.doi.org/10.1111/j.1939-0025.1982.tb02660.x>
- Greene, J. C. (2007). *Mixed methods in social inquiry*. San Francisco, CA: Jossey-Bass.
- Greenwood, D. J., & Levin, M. (2006). *Introduction to action research* (2nd ed.). Thousand Oaks, CA: Sage.
- Johnson, D., Peterson, J., Sommers, I., & Baskin, D. (2012). Use of forensic science in investigating crimes of sexual violence: Contrasting its theoretical potential with empirical realities. *Violence Against Women, 18*, 193–222.
- Kaiser, K. A., O'Neal, E. N., & Spohn, C. (2017). "Victim refuses to cooperate": A focal concerns analysis of victim cooperation in sexual assault cases. *Victims & Offenders, 12*, 297–322.
- Kazdin, A. E. (2008). Evidence-based treatment and practice: New opportunities to bridge clinical research and practice, enhance the knowledge base, and improve patient care. *American Psychologist, 63*, 146–159.
- Kelly, J. G. (1968). Towards an ecological conception of preventive interventions. In J. W. Carter, Jr., (Ed.), *Research contributions from psychology to community mental health* (pp. 75–99). New York, NY: Behavioral Publications.
- Klofas, J., Hipple, N. K., & McGarrell, E. (Eds.). (2010). *The new criminal justice: American communities and the changing world of crime control*. New York, NY: Routledge.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage.
- Lipsky, L. V. (2009). *Trauma stewardship: An everyday guide to caring for self while caring for others*. San Francisco, CA: Berrett-Koehler Publishers.
- Lonsway, K. A., & Archambault, J. (2012). The "justice gap" for sexual assault cases: Future directions for research and reform. *Violence Against Women, 18*, 145–168.
- Lovrich, N. P., Pratt, T. C., Gaffney, M. J., Johnson, C. L., Asplen, C. H., Hurst, L. H., & Schellberg, T. M. (2004). *National forensic DNA study report*. Washington, DC: National Institute of Justice. Retrieved from <https://www.ncjrs.gov/pdffiles1/nij/grants/203970.pdf>
- MacQueen, K. M., McLellan-Lemal, E., Bartholow, K., & Milstein, B. (2008). Team-based codebook development: Structure, process, and agreement. In G. Guest and K. M. MacQueen (Eds.), *Handbook for team-based qualitative research* (pp. 119–136). Lanham, MD: Altamira/Rowman & Littlefield.
- Martin, P. Y. (2005). *Rape work: Victims, gender, and emotions in organization and community context*. New York, NY: Routledge.
- Mennicke, A., Anderson, D., Oehme, K., & Kennedy, S. (2014). Law enforcement officers' perception of rape and rape victims: A multimethod study. *Violence and Victims, 29*, 814–827.
- Michigan Domestic and Sexual Violence Prevention & Treatment Board. (2011). *The 400 project report*. Lansing, MI: Author.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook*. Thousand Oaks, CA: Sage.
- Mitchell, M. (2015, March 20). Harvey faces federal trial over untested rape kits. *Chicago Sun Times*. Retrieved from <http://chicago.suntimes.com/columnists/mitchell-harvey-faces-federal-trial-over-untested-rape-kits/>
- Mullainathan, S., & Shafir, E. (2013). *Scarcity: Why having too little means so much*. New York, NY: Henry Holt Books.
- Murphy, S. B., Banyard, V. L., & Fennessy, E. D. (2013). Exploring stakeholders' perceptions of adult female sexual assault case attrition. *Psychology of Violence, 3*, 172–184.
- National Institute of Justice. (2010). *Solicitation: Strategic approaches to sexual assault kit (SAK) evidence: An action research project (SL #000947)*. Washington, DC: Author.
- National Research Council. (2009). *Strengthening forensic science in the United States: A path forward*. Washington, DC: The National Academies Press. Retrieved from <https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf>
- National Research Council. (2015). *Enhancing the effectiveness of team science*. Washington, DC: The National Academies Press.
- Noyes, D. (2016, January 11). Rape survivor sues San Francisco, SFPD over untested rape kit. *ABC 7 News*. Retrieved from <http://abc7news.com/news/i-team-rape-survivor-sues-san-francisco-sfpd-over-untested-rape-kit/1155643/>
- Page, A. D. (2010). True colors: Police officers and rape myth acceptance. *Feminist Criminology, 5*, 315–334.
- Pattavina, A., Morabito, M., & Williams, L. M. (2016). Examining connections between the police and prosecution in sexual assault case processing: Does the use of exceptional clearance facilitate a downstream orientation? *Victims & Offenders, 11*, 315–334.

- Patterson, D., & Campbell, R. (2010). Why rape survivors participate in the criminal justice system. *Journal of Community Psychology, 38*, 191–205.
- Patterson, D., & Campbell, R. (2012). The problem of untested sexual assault kits: Why are some kits never submitted to a crime laboratory? *Journal of Interpersonal Violence, 27*, 2259–2275.
- Peterson, J., Johnson, D., Herz, D., Graziano, L., & Oehler, T. (2012). *Sexual assault kit backlog study*. Washington, DC: The National Institute of Justice.
- Raudenbush, S., Bryk, A., Cheong, Y. F., & Congdon, R. (2011). *HLM 7: Hierarchical linear and nonlinear modeling*. Chicago, IL: Scientific Software International.
- Sandelowski, M., Voils, C. I., & Knafl, G. (2009). On quantizing. *Journal of Mixed Methods Research, 3*, 208–222. <http://dx.doi.org/10.1177/1558689809334210>
- Schensul, J. J., & Trickett, E. (2009). Introduction to multi-level community based culturally situated interventions. *American Journal of Community Psychology, 43*, 232–240.
- Shaw, J., & Campbell, R. (2013). Predicting sexual assault kit submission among adolescent rape cases treated in forensic nurse examiner programs. *Journal of Interpersonal Violence, 28*, 3400–3417.
- Shaw, J. L., Campbell, R., Cain, D., & Feeney, H. (in press). Beyond surveys and scales: How rape myths manifest in sexual assault police records. *Psychology of Violence*. <http://dx.doi.org/10.1037/vio0000072>
- Spohn, C., & Tellis, K. (2010). Justice denied? The exceptional clearance of rape cases in Los Angeles. *Albany Law Review, 74*, 1379–1421. Retrieved from http://www.albanylawreview.org/Articles/Vol74_3/74.3.1379%20SPOHN.pdf
- Spohn, C., White, C., & Tellis, K. (2014). Unfounding sexual assault: Examining the decision to unfound and identifying false reports. *Law & Society Review, 48*, 161–192.
- Strom, K. J., & Hickman, M. J. (2010). Unanalyzed evidence in law-enforcement agencies: A national examination of forensic processing in police departments. *Criminology & Public Policy, 9*, 381–404.
- Tasca, M., Rodriguez, N., Spohn, C., & Koss, M. P. (2013). Police decision making in sexual assault cases: Predictors of suspect identification and arrest. *Journal of Interpersonal Violence, 28*, 1157–1177.
- Valentine, J. L., Sekula, K., Cook, L. J., Campbell, R., Colbert, A., & Weedn, V. W. (in press). Justice denied: Low submission rates of sexual assault kits and the predicting variables. *Journal of Interpersonal Violence*.
- Venema, R. M. (in press). Making judgments: How blame mediated the influence of rape myth acceptance in police response to sexual assault. *Journal of Interpersonal Violence*.
- White House Council on Women and Girls. (2014). *Rape and sexual assault: A renewed call to action*. Washington, DC: U.S. Government Printing Office. Retrieved from https://www.knowyourix.org/wp-content/uploads/2017/01/sexual_assault_report_1-21-14.pdf
- Wilson, D. B., Weisburd, D., & McClure, D. (2011). Use of DNA testing in police investigative work for increasing offender identification, arrest, conviction, and case clearance. *Campbell Systematic Reviews, 7*. Advance online publication.

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