



## IN-BRIEF SERIES (Part 1 of 3)

### Digital Transformation of Cold Case Reviews: Prevalence, Challenges, and Benefits of Just Resolutions

#### Introduction to Report Series

Advances in forensic science capabilities represent opportunities and challenges for allied professionals involved in cold case violent crime investigations. Modern technologies can uncover important insights that may not have been previously possible; however, law enforcement and other associated agencies can struggle to efficiently leverage the large amounts of information associated with a cold case. Factors such as a lack of case file organization, decentralization of documents, and the time-intensive process of manually searching paper records for relevant details make it difficult to identify cases that may benefit from the application of new techniques and technologies (i.e., new compared to what was available at the time of the initial investigation or advances made to what was available at the time of the initial investigation).

The cold case review process is a collaborative effort during which professionals representing a variety of disciplinary backgrounds review all relevant case details to develop a strategy that will advance the investigation. The members of this multidisciplinary team (MDT), which may consist of law enforcement investigators, forensic science service providers (FSSPs), prosecutors, victim/family advocates, medicolegal death investigators, and sexual assault nurse examiners (SANEs), share common challenges within the case review process.

Tracking down and extracting relevant information to create an informed forensic or investigative strategy is both time and resource intensive. MDTs may look to technology to digitize paper cold case records, thus enabling multiple agencies on a secured network to search, share, and access files. The digitization of case files may support the future implementation of text analytics tools, which are enabled by artificial intelligence (AI) and can quickly identify key details, relationships, and patterns within or between case file records. Applying AI to the cold case review process can help MDTs become more agile and efficient in collaborating and developing valuable forensic and investigative strategies, but this digital transformation requires technical, time, and resource investments. This in-brief is the first of a three-part

***“Criminal investigations have been compared to a jigsaw puzzle. Volumes of information can be generated in an original investigation, and any number of professionals (investigators, laboratory staff, and prosecutors) may have been involved. In addition to applying new technology to evidence, advancements in the digitization of records and correlation capabilities can also aid in identifying new investigative leads.”***

*—National Best Practices for Implementing and Sustaining a Cold Case Investigation Unit<sup>1</sup>, p. 58*

#### Objectives

- ▶ Provide a background on the prevalence of cold cases accompanied by the benefits associated and challenges faced with their resolution.
- ▶ Emphasize the role of advanced forensic testing in enabling just resolutions for cold cases.
- ▶ Demonstrate the benefit of incorporating digitization and AI in the overall cold case review process.



series that highlights the potential value, approaches, and considerations for digital transformation of cold case files and the case review process. Although created for cold case MDTs with an emphasis on the role of law enforcement and FSSP involvement, this series is valuable for all forensic science service providers involved in an MDT and criminal justice decision-makers. All three in-briefs focus on sexual assault and violent crime cold cases and the possible benefits of identifying evidence for additional or advanced DNA testing, but converting paper records into searchable electronic records may also lead to the identification and (re)testing of other types of physical evidence to advance other types of cases.<sup>2</sup> The information presented within these in-briefs can be applied to and benefit all cases regardless of the passage of time. **Specifically, this in-brief focuses on the importance of the cold case review process and the potential impact of cold case digital transformation on this process.**

## Key Takeaways

- Cold cases involving violent crimes are a common challenge within the criminal justice community, with low clearance rates perpetuating the accumulation of unresolved cases in the United States.
- Although resolving cold cases plays a crucial role in improving public safety, investigators' and other allied criminal justice professionals' abilities to address these cases may be limited by enterprise-level resources and available case-specific information.
- Advances in forensic testing, the development of new case information, societal and external pressures, and agency-based systematic re-examination may lead an MDT to revisit a case.
- Although implementing a review process can help determine cases that may benefit from new investigative and forensic techniques and technologies, this is a resource-intensive process. During a case review, MDTs often manually search large amounts of case data to gather details that inform a strategy to advance the investigation.
- To streamline the case review process, agencies and laboratories may consider digitizing their case files and implementing AI-based text analytics tools.
- Digitizing paper case files can help agencies and laboratories securely store case information, search and access details within the case file easily, and share information effectively with key collaborators.
- Although an AI technology has yet to be widely implemented in the criminal justice community, AI-based text analytics tools have the potential to aid in automated searches, identify linkages within a case or across cases, and facilitate objective investigations by shielding investigators from potentially biasing or task-irrelevant information.



## Context

**Unresolved cold cases are a challenge within the criminal justice community that have negative implications on public safety.**

Cold cases are a pervasive challenge within the U.S. criminal justice community, with only one in five cases being resolved and one in 100 cases resulting in arrest leading to conviction.<sup>3</sup> As of 2020, there were an estimated 250,000 unresolved homicide cases within the United States, with lower clearance rates resulting in over 100,000 of these cases accumulating in the past two decades alone.<sup>4</sup> Furthermore, as of 2019, only 32.9% of rape cases had been cleared by arrest or exceptional means by the investigating agency.<sup>5a</sup> With these statistics solely encompassing homicide and sexual assault cases, it is reasonable to assume that the true number of unresolved cold cases for all crime types far exceeds what is reported.

Factors contributing to the increasing number of cold cases are multifaceted and are difficult to quantify. Many of these factors are coupled to the investigating agency's enterprise-level planning and capabilities. Often, agencies possess limited resources, or lack them entirely, to devote toward cold case investigations.<sup>3</sup> Although some agencies have personnel or units solely dedicated to managing these types of investigations, most do not have the ability to split personnel between active and cold case investigations. Agencies may lack the necessary finances to investigate unresolved cold cases, including funding overtime compensation for investigators involved in the review process, paying for travel outside of the investigating agency's local jurisdiction to pursue leads, and covering costs to outsource retained evidence for forensic testing. Aside from these agency-level considerations, the passage of time creates unique challenges for unresolved cases—case files and other pertinent paper documents may have been lost or misplaced, evidence may have been destroyed or degraded, and involved individuals (e.g., victims, witnesses, persons of interest, investigators, professional collaborators) may be unavailable for re-interview or may present a limited memory of the account.

Despite the cited challenges to investigating cold case crimes, there are numerous societal benefits to their resolution. A study released by Indiana University–Purdue University Indianapolis estimated that 15% of homicides are committed by serial offenders.<sup>8</sup> In addition, a study conducted in Cuyahoga County, Ohio, examined 243 sexual assault cases and found that 51% of these cases were associated with serial sexual offenders.<sup>9</sup> A similar study conducted in Detroit, Michigan, found that 56.3% of the 433 sexual assault cases examined were connected with serial sexual offenders.<sup>10</sup> Recidivism rates, or re-offenses, for all crime types continue to remain a constant trend within the United States, with nearly 82% of convicted individuals facing rearrest within 10 years after release.<sup>11, 12</sup> As such, failure to apprehend

### For this in-brief series, the FTCoE has defined the following terms:

- **Cold Case:** Cases where investigative leads have been exhausted with specific focus on cases related to violent crimes, including homicide, sexually motivated homicide, and sexual assault.
- **Resolution:** An outcome resulting from a full investigation in which a case is cleared by arrest (i.e., an individual has been arrested/charged with the crime or the case is turned over to prosecution) or closed as a result of a circumstance outside of the investigating agency's control that prevents an arrest, charge, or prosecutorial action against the individual (e.g., individual is deceased).<sup>7</sup>

<sup>a</sup> The FBI's Uniform Crime Reporting Program defines rape as "penetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim."<sup>6</sup> This reported statistic also includes "attempts or assaults to commit rape" whereas "statutory rape and incest are excluded."<sup>6</sup>



individuals who have committed violent crimes creates significant risk to the community because these individuals are likely to commit additional similar offenses.

In addition to preventing future crimes and protecting potential victims, especially vulnerable populations (e.g., children, women),<sup>13</sup> cold case resolutions resulting in convictions of previously at-large individuals ultimately improves public safety.<sup>4</sup> Furthermore, just resolutions provide long-awaited answers to victims and co-victims (e.g., family members) who have been directly impacted by violent crime. Agencies that resolve cold cases can reallocate their resources, shifting policing efforts from a reactive to proactive focus. Case resolution can alleviate the caseload of investigators splitting time between cold and active cases, reduce agency administrative tasks, and prevent potentially overwhelming laboratory evidence queues leading to increased backlogs.<sup>1</sup>

**Advanced forensic techniques and technologies have created additional opportunities to achieve resolution in previously unresolved cases.**

Retesting physical evidence to identify DNA associations can play an important role in case resolution, highlighting the importance of meticulously reviewing all affiliated evidence during the case review process.<sup>3</sup> Evidentiary items that were never tested during the initial investigation (e.g., untested sexual assault kits) and previously tested evidence that did not yield potential leads may be suitable and benefit from the application of advanced forensic testing (e.g., improved short tandem repeat chemistries, Y-chromosomal markers, familial DNA analysis, or forensic genetic genealogy). The process of identifying these evidentiary items can be strongly augmented by digitizing case files and then applying AI text-based analytics tools. These tools can help identify case-critical information to support the (re)testing of evidentiary items, thereby providing a technology-based approach to resolving previously unresolved cold cases.

**What is an MDT?**

An MDT is a working group of allied professionals who discuss factors related to unresolved cold cases. Collaboration between individuals with different experience and backgrounds provides an opportunity to gain alternative perspectives into various aspects of the case. At a minimum, an MDT should consist of a law enforcement investigator, FSSP, prosecutor, and victim/family advocate. For certain scenarios, including professionals from other disciplines may be beneficial (e.g., a medicolegal death investigator when reviewing a homicide investigation or a SANE when reviewing a sexual assault).

**Roles of MDT Members**

- **Law Enforcement Investigator:** Provides insight on actions taken during the initial investigation and case status.
- **FSSP:** Provides an understanding of prior forensic testing and laboratory reports and can identify additional evidence, previously tested or not, that may benefit from (re)testing through the application of new forensic techniques and technologies.
- **Prosecutor:** Provides guidance on benefits and possible obstacles of pursuing reinvestigation and charging decisions associated with the case (e.g., statute of limitations).
- **Victim/Family Advocate:** Provides relevant information about the victim and their family members (e.g., history, behaviors/habits, relations, beliefs/wishes) and can serve as a liaison between the victim/family and other MDT members.
- **Medicolegal Death Investigator:** Provides information on postmortem examinations (if applicable).
- **SANE:** Provides information on sexual assault forensic medical examinations (if applicable).



## The Cold Case Review Process

Cold case reviews require collaboration among professionals from a variety of disciplinary backgrounds and are a crucial first step in developing strategic approaches to advance an unresolved cold case investigation.

Engaging in a thorough case review before launching a renewed investigation can help an MDT determine their ability to advance the case using new forensic and investigative techniques and technologies. This case review process is a multidisciplinary effort that ensures all case details are known, including actions taken by investigators during the initial investigation, previous forensic testing efforts, and case status. This effort, though primarily led by law enforcement investigators, requires coordination with all case-involved agencies and individuals, which may include FSSPs, prosecutors, victim/family advocates, medicolegal death investigators, and SANEs.

The first step is selecting a case to review, which can be triggered in a variety of ways. Most initiating factors result from new or old witnesses coming forward with additional information, the development of new testing techniques, re(testing) of previously tested or untested evidence, and agency-based systematic re-examination.<sup>3</sup> Societal and external pressures such as heightened public interest, media attention, or concerns brought forth by co-victims may also prompt a case evaluation.<sup>3</sup>

Once a case has been selected for review, investigators should make concerted efforts to locate all relevant information, which includes the investigative agency’s reports and reports from other agencies (e.g., FSSP, medical examiner’s office, health care system) that were involved in the initial investigation. A thorough review of this information provides investigators with a foundational understanding of the case’s status, allowing the MDT to make an informed decision regarding the potential success of proceeding with a renewed investigation. **Exhibit 1** demonstrates the typical systematic review process and tasks accompanied with each step of the process. This exhibit is not intended to represent the full scope of an in-depth case review and as such is not all-encompassing.

The Cold Case Review Process					
Launch cold case review in response to an impetus	Compile case-related information	Review compiled case file and extract relevant information	Identify opportunities for further investigation	Consider factors that may impact pursuing a renewed investigation	Initiate renewed investigation, if needed
<ul style="list-style-type: none"> <li>• New lead information</li> <li>• New forensic techniques and technologies</li> <li>• New physical evidence</li> <li>• Systematic reexamination</li> <li>• Societal and external pressures</li> </ul>	<ul style="list-style-type: none"> <li>• Initial report(s)</li> <li>• Supplemental report(s)</li> <li>• Witness statement(s)</li> <li>• Person of interest interview(s)</li> <li>• Tip(s)/lead(s)</li> <li>• Medicolegal death investigation report(s)</li> <li>• Evidence/laboratory report(s)</li> <li>• Crime scene documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Compiled list of all involved individuals and their relevance to the investigation</li> <li>• Timeline</li> <li>• Collected evidence and associated analyses</li> <li>• Unresolved/outstanding leads or persons of interest</li> <li>• Key locations</li> </ul>	<ul style="list-style-type: none"> <li>• Retesting of evidence with applicable advanced forensic technologies</li> <li>• Submission of new evidence for forensic analyses</li> <li>• Follow-up of unresolved/outstanding leads or persons of interest</li> <li>• Additional interviews with witnesses or persons of interest</li> </ul>	<ul style="list-style-type: none"> <li>• Statute of limitations</li> <li>• Likelihood of case resolution</li> <li>• Availability of victims, co-victims, or witnesses</li> <li>• Likelihood of developing investigative leads from advanced forensic techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluation of current case status informs the likelihood of advancing the case through the application of investigative or forensic techniques, with identified potential for successful case resolution</li> </ul>

**Exhibit 1.** This process is initiated by an impetus for launching a renewed investigation. Through a multidisciplinary approach, agencies should compile all information related to the case, review the case file to identify opportunities for case advancement, and determine the potential for case resolution before launching an official reinvestigation.



Although law enforcement investigators primarily lead cold case reviews, FSSPs and other collaborators play a key role in developing a strategic plan for case advancement.

Law Enforcement Investigator's Roles	FSSP's Roles
<ul style="list-style-type: none"> <li>✓ Review case file thoroughly to identify all evidentiary items collected during the initial investigation</li> <li>✓ Share relevant reports with MDT members</li> <li>✓ Determine chain of custody and current disposition of each evidentiary item</li> <li>✓ Develop and communicate investigative questions, which may be informed by forensic testing completed by FSSPs</li> </ul>	<ul style="list-style-type: none"> <li>✓ Locate relevant laboratory reports</li> <li>✓ Explain the impact of prior testing (if applicable)</li> <li>✓ Identify evidentiary items most likely to yield usable results and provide insight to investigative questions</li> <li>✓ Provide guidance on outsourcing evidence to other laboratories</li> <li>✓ Explain limitations of DNA technologies</li> <li>✓ Develop forensic testing strategy</li> </ul>

**Exhibit 2.** The key roles and responsibilities of law enforcement investigators and FSSPs during the cold case review and testing strategy plan development.

In 2008, the RAND Corporation conducted a survey of law enforcement agencies' policies and protocols related to cold case investigations. Of the 1,051 agencies that responded, 70% advised that their agency had an "articulated policy on reactivating and investigating cold cases." Of the respondents who affirmed their agency had an articulated policy, 23% indicated that their agency had a "formal protocol for determining which cases to work." Of these respondents, 90% cited the "availability of new DNA technologies to test old physical evidence" as a policy leading to case reinvestigation.<sup>3</sup> Since the publication of this survey, advances such as the increased sensitivity of DNA technology, software, and the successful application of advanced forensic techniques such as forensic genetic genealogy have led to just resolutions, illustrating similar trends within the modern landscape of cold case investigations.

This survey's findings provide insight into the importance of advanced forensic testing for initiating cold case reinvestigations, emphasizing the role of FSSPs in the case review process. Using prior testing documentation, case-relevant information from scene narratives and evidence recovery logs, investigators and FSSPs can collaboratively develop a testing strategy that identifies retained evidence that were not previously tested or were previously tested but yielded negative, uninformative, or neutral results (**Exhibit 2**). Testing potentially probative evidence using advanced forensic techniques should be prioritized.

#### Impact of an MDT: Development of a Forensic Testing Strategy

During the cold case review process, FSSPs play an important role in assisting investigators to review available evidence within a case and consider which evidentiary items may benefit from additional analysis. In addition to investigators and FSSPs, there are other MDT members who may play a role in the development of a forensic testing strategy:

- **Prosecutor:** Provides guidance on the benefits of advanced forensic testing in regard to prosecutorial considerations (e.g., admissibility of evidence).
- **Victim/Family Advocate:** Provides intermediary communication between MDT members, victims, and co-victims regarding advanced forensic testing.
- **Medicolegal Death Investigator:** Provides information that could impact the retesting of suitable evidence (e.g., decomposition and exposure to natural elements such as light and humidity).
- **SANE:** Provides information regarding evidence collected during the sexual assault forensic medical examination (e.g., sexual assault kit samples, photographs).

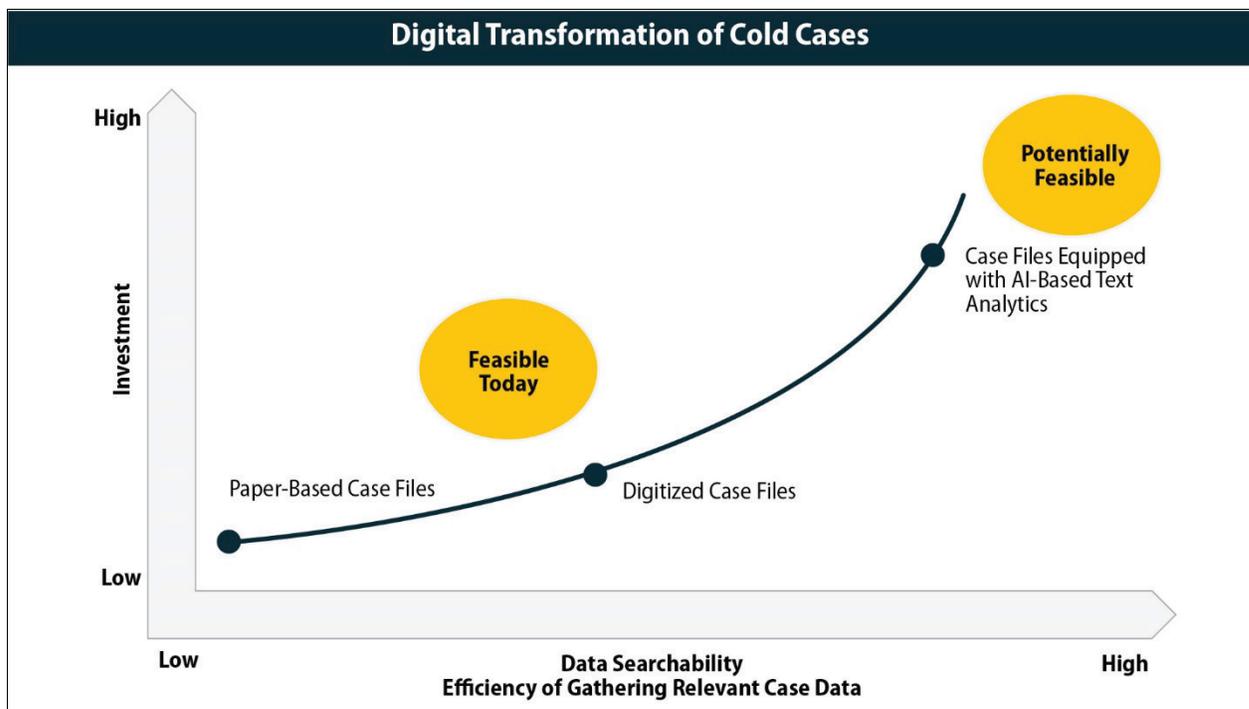


## The Applicational Benefits of Digitization and AI Within Cold Case Investigations

The comprehensive review of a cold case is a time- and labor-intensive process. The initial step of compiling case file data (i.e., documents containing information relative to the case) and gathering relevant case details is often a manual process, which is further complicated when case data are decentralized and presented in paper formats. Today, agencies and laboratories can digitize these paper-based records, allowing for future implementation of **text analytics tools** that are enabled by AI technology and reducing the need for manual data searching, thereby saving time and increasing accessibility. These technologies may improve data storage and security, enhance objectivity of investigations, and promote multi-organization collaboration. Although these technologies can potentially aid in the investigation of unresolved cases, implementation may require significant resource investments (**Exhibit 3**).

**“Digitization of records provides law enforcement the opportunity to organize records and realize connections. Computer analyses can identify connections between cases, people, and places. Investigators and crime analysts can apply their expertise toward analyzing the relevance of the connections.”**

*—National Best Practices for Implementing and Sustaining a Cold Case Investigation Unit<sup>1, p. 19</sup>*



**Exhibit 3.** Transitioning from manual, paper case reviews to reviews informed by AI-enabled text analytics requires digitization of case files. The process of implementing digital approaches may improve collaborators’ abilities to search data, share it across involved agencies, and be aware of key details relevant to the investigation. Implementation may require time and resource investments in the form of labor, equipment, and technical services.



## Digitizing case files may improve data accessibility, sharing, storage, security, and collaborative capabilities during a case review.

As identified in the National Institute of Justice’s report, [\*National Best Practices for Implementing and Sustaining a Cold Case Investigation Unit\*](#), digitizing records affords law enforcement investigators the ability to better organize records and recognize connections between entities (e.g., people and places) within cases.<sup>1</sup> Digitizing a case’s paper documentation promotes easier, more efficient human-based review. Fully digitizing case documentation involves (1) capturing case data via an optical scanner and (2) converting written text into “machine-readable” text via optical character recognition (OCR) technology to allow the text to be searched and extracted easily from the document. By digitizing case files, collaborators involved in the case review process can:

- **Facilitate document access:** Digitizing case files can be viewed as a proactive measure to ensure case documentation is readily available in the event that an investigation is launched or needed for review in the future. The proper organization of digitized documents within one centralized location ensures all relevant case data are easily accessible and reduces the need to invest time and labor into sorting through paper documents.
- **Streamline some searching capabilities:** The MDT can easily search for specific documents or simple keywords within documents, reducing the time needed to find relevant information.
- **Secure data:** Digitized files are associated with a lower risk of being lost, destroyed, or misplaced than paper documents. This also negates the need for paper documents to be copied multiple times, which can impact their readability and quality.
- **Enable collaboration:** Digitized case documentation can allow for easier inter- and intra-organization sharing when needed. This can also be helpful when co-victims request case file disclosure for their personal records or for use by independent case consultant reviewers.
- **Improve consistent case tracking:** Digitizing case files can allow for upload to internal case management systems such as a Record Management System, Laboratory Information Management System, or Evidence Management System to ensure work and information pertaining to the case is tracked in an organized fashion (e.g., data such as personnel assigned to the case, cases that have been worked, cases that have been resolved, cases that have been worked but remain unresolved, evidence testing results).

### Digitization Enabling Technologies

- **Optical Scanner:** A device that can read text or illustrations on a page and transform the information into a form that the computer can understand.<sup>14</sup>
- **OCR Technology:** Technology used to convert printed, written, or typed characters into a digital format and into recognizable letters, numbers, and characters. This allows text to be read by a computer, allowing characters to be editable and searched (i.e., machine-readable). Having an OCR system is required to edit text read by an optical scanner.<sup>15</sup>

Alternative digitization technologies may be required for handwritten documents and documents stored on formats such as microfilm and microfiche (see the second in-brief of this three-part series, “[\*Digital Transformation of Cold Case Reviews: Digitizing Case Files\*](#)”).

Presently, agencies can use the following approaches to digitize their case files:

- Manually transcribe handwritten and text-based data to an electronic version.
- Convert images that have already been scanned into machine-readable text using OCR-enabled software.



- Capture and conversion via integrated scanner systems.
- Capture and conversion via outsourcing to a Criminal Justice Information Services–compliant scanning company.

**Digitization of case files provides a foundation for applying AI technologies that can help further organize, search, and identify linkages between entities.**

Digitizing case information can create a foundation for text analytics tools, which let investigators search efficiently through previously unsearchable case documents. Text analytics tools are powered by AI, which uses computer-based data analyses that “perceive and respond independently and perform tasks that would typically require human intelligence and decision-making processes, but without direct human intervention”<sup>22</sup> and rely closely on a subset of AI technology called natural language processing (NLP). Tools with NLP technology are configured or trained to understand human language inputs and automatically extract insights; consider, for example, common daily work operations such as email filters, predictive or suggestive text, and autocorrect.

Implementing AI-enabled text analytics tools can help investigators and other MDT members:

- **Automatically search** for a set of criteria defined by the user, including entities relevant to a case (e.g., names, dates, locations).
- **Gather information on the potential relationships** between these entities, which can provide insight to linkages between people, places, and evidence within or across cases. Linkages, unless intentionally sought after, can be difficult for humans to make, often because of oversight or a lack of intentional searching.
- **Help label and organize case files** based on their content to help sort and group specific documents or cases.

Although an “off-the-shelf” tool does not currently exist for cold case applications, organizations may implement this technology by:

- **Leveraging adjacent tools** developed for managing large amounts of law enforcement data (e.g., investigative case management tools like [Sintelix](#)) for cold cases.
- **Configuring text analytics platforms**, which are created for general needs (e.g., [Google Cloud Natural Language AI](#)), to the needs of the organization. This may include training the tool with cold case datasets.
- **Developing a customized tool** with help from contracted programmers and resources like open-source NLP toolkits (e.g., the [spaCy toolkit](#)).

**AI-Enabling Technologies**

- **Text Analytics:** Processes large amounts of unstructured text-based case information.<sup>16</sup>
- **NLP:** Understands and generates human language as it is written or spoken.<sup>17, 18</sup>
- **Named-Entity Recognition:** Identifies and categorizes entities (e.g., names, locations, domain-specific terms) into a particular category.<sup>19</sup>
- **Relation Extraction:** Identifies potential linkages or relationships between words in a sentence (e.g., Person A is a witness or known associate).<sup>18</sup>
- **Text Classification:** Sorts documents or text into specific taxonomies and categories outlined by humans. Can identify specific clusters of words or expressions.<sup>20</sup>
- **Topic Modeling:** Scans a text file for similar word groups and expressions and clusters them based on shared characteristics.<sup>21</sup>



## How Can Digital Transformation Advance My Case?

**Consider the Following Scenario:** A new DNA technique has evolved, and law enforcement investigators want to know if they have any cold cases that may benefit from this advancement.

### **Impact of Digitization on Informing Forensic Testing Strategies:**

- **Ease of access to information:** Instead of searching through paper documents to identify all reports and information related to evidentiary items (which can be time-consuming), investigators can quickly access all information in one centralized, virtual location.
- **Ability to organize and sort:** Well-labeled documents can easily be sorted by report type (e.g., laboratory reports, chain of custody reports, and evidence disposition reports), allowing the case file to be organized in a manner best suited for collaborators.
- **Allows for easier inter- and intra-agency sharing:** Sharing laboratory reports and other evidence-related documents with forensic science service providers and other MDT members can aid in determining which evidentiary items would benefit from advanced testing.
- **Enables keyword searching:** Relevant details can be found within a case file through digitization-enabled keyword searching. For example, a keyword search of “collected” may identify specific reports discussing the collection of evidence from a scene, whereas “disposition” may identify reports that help provide insight on the current disposition of each item.

### **Impact of AI on Informing Forensic Testing Strategies:**

- **Enables sorting and prioritization:** Sorting prioritization helps investigators or FSSPs sort through cases to rank those that present identifiers associated with higher-weighted case solvability measures to aid in case prioritization. Given a new DNA technology, AI may automatically identify cases that meet submission criteria (e.g., case type such as homicide or sexual assault, cases with available evidence based on disposition information found in evidence-related reports, and cases with evidence presenting a low degradation index as identified in laboratory reports). AI may also be able to identify a case’s missing documentation or information, which can impact suitability for forensic testing (e.g., missing elements within an evidence recovery log).
- **Facilitates objective forensic testing:** Objective testing helps investigators and FSSPs eliminate biases and subjectivity, allowing for forensic testing to be less influenced by task-irrelevant information (i.e., a FSSP will be shielded from potentially influential investigative theories and documented external pressures during the development of a testing strategy).
- **Links cases:** Investigators or FSSPs reviewing a case could use these tools to automatically pull a list of potentially important names, locations, dates, and relationships between these entities (e.g., three cases identified in which a “white van with a red bumper sticker” was used with one of these cases presenting evidence suitable for testing).

The application of technological advancements such as case file digitization and AI capabilities to cold case investigations does not seek to replace the work completed by professionals involved in the case review process. Creating an equilibrium between technology and human intervention, in which agencies should not solely rely on advanced technology to guide them through the case review process, is needed.

## Conclusion

Low clearance rates of cold cases involving violent crimes have perpetuated an accumulation of case-related data (e.g., crime scene notes, evidence recovery logs, laboratory reports) found in paper formats, which often lack organization.



These challenges can make it difficult for law enforcement investigators and other MDT members to know all of the information belonging to a case and develop a forensic testing strategy for the associated evidence items. MDT members may look to technology to quickly uncover relevant case information, which also enables them to securely store and share these data, allowing them to spend more time investigating and less time searching for data. These technology-based techniques should augment the critical work completed by investigators, FSSPs, and other MDT members to aid in the efficiency and effectiveness of the case review process; allow for easier multi-agency communication; and increase the attainment of just resolutions within the modern-day cold case investigation landscape.

For more information on the value and implementation of these technologies, consult the second in-brief of this series, “*Digital Transformation of Cold Case Reviews: Digitizing Case Files*,” and the third in-brief, “*Digital Transformation of Cold Case Reviews: The Application of Text Analytics*.”

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Published November 2022

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The NIJ FTCoE, led by RTI International, is supported through a Cooperative Agreement from the NIJ (2016-MU-BX-K110), Office of Justice Programs, U.S. Department of Justice. Neither the U.S. Department of Justice nor any of its components are responsible for, or necessarily endorse, this in-brief. NIJ is the research, development, and evaluation agency of the U.S. Department of Justice. NIJ is dedicated to improving knowledge and understanding of crime and justice issues through science. NIJ provides objective and independent knowledge and tools to inform the decision-making of the criminal and juvenile justice communities to reduce crime and advance justice, particularly at the state and local levels. The NIJ Office of Investigative and Forensic Sciences (OIFS) is the federal government's lead agency for forensic science research and development. OIFS's mission is to improve the quality and practice of forensic science through innovative solutions that support research and development, testing and evaluation, technology, information exchange, and the development of training resources for the criminal justice community.

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#### Suggested Citation

Rodriguez, Ashley, Mikalaa Martin, Rebecca Shute, Brailey Faris, Shannon Krauss, Matthew Mecray, and Patricia Melton. "Digital Transformation of Cold Cases: Prevalence, Challenges, and Benefits of Just Resolutions." Forensic Technology Center of Excellence. U.S. Department of Justice, National Institute of Justice, Office of Investigative and Forensic Sciences, November 2022.

