

Non-CODIS Rapid DNA Considerations and Best Practices for Law Enforcement Use

Background and Introduction

Following enactment of the Rapid DNA Act of 2017 (Public Law 115-50) in August 2017, the Federal Bureau of Investigation (FBI) began implementation of the Act's provisions. The Rapid DNA Act authorizes the FBI Director to: (1) issue standards and procedures for the use of Rapid DNA instruments in the booking station and resulting DNA analyses; and (2) include in the National DNA Index System¹, DNA identification records and analyses by criminal justice agencies using Rapid DNA instruments approved by the FBI Director in compliance with the FBI Director's standards and procedures.

The House Report accompanying the Rapid DNA Act of 2017 (H.R. 510) described the bill as follows:

“DNA technology has advanced a great deal in the years since the 1994 Act. Whereas it once took days or weeks, DNA testing can now be completed in a matter of hours. There is currently technology, known as Rapid DNA technology, that allows for DNA testing and identification on **a small, copier-sized machine. A DNA sample--oftentimes a cheek swab--is taken, placed into a cartridge that slides into the Rapid DNA machine, and reports back the DNA profile in** approximately ninety minutes. The FBI, working with the forensics community, is hopeful that this technology can be used in a booking station to help identify suspects in the same way a fingerprint is currently used. **At present, Rapid DNA technology can only be used for identification purposes, not crime scene analysis.**

Unfortunately, the 1994 Act creating CODIS does not allow for the use of this technology since only state labs are allowed access to CODIS. Currently, booking stations have to send their DNA samples off to state labs and wait weeks for the results. This has created a backlog that impacts all criminal investigations using forensics, not just forensics used for identification purposes. H.R. 510 would modify the current law regarding DNA testing and access to CODIS. **The short turnaround time resulting from increased use of Rapid DNA technology would help to quickly eliminate potential suspects, capture those who have committed a previous crime and left DNA evidence, as well as free up current DNA profilers to do advanced forensic DNA analysis, such as crime scene analysis and rape-kits.”** House Report 115-117 (May 2017) [emphasis added]

A number of professional associations/organizations issued statements on Rapid DNA reiterating agreement with the position that Rapid DNA technology be used, at present, for single source reference analyses.² These position statements identify the following challenges to the use of Rapid DNA

¹ Note: the terms NDIS (National DNA Index System) and CODIS (the Combined DNA Index System) may be used interchangeably in this document, however, NDIS references the index at the national level and CODIS typically refers to the software and databases at all levels – local, state and national.

² See, for example, ASCLD Position Statement (2017) at <https://www.asclcd.org/wp-content/uploads/2017/11/ASCLD-Position-Statement-RAPID-DNA.pdf>; NDAA Position Statement on Use of Rapid DNA Technology (2018) at <https://dps.alaska.gov/getmedia/fb933229-8e52-4cf8-8fe0-cb72d5e039e3/NDAA-Statement-on-Use-of-Rapid-DNA-Technology-2018.pdf.aspx>; Scientific Working Group on DNA Analysis Methods Position Statement on Rapid DNA Analysis (2017) at https://docs.wixstatic.com/ugd/4344b0_f84df0465a2243218757fac1a1cffeaf.pdf.

technology presented by crime scene or forensic samples that are not present with single source reference samples:

- Crime scene samples may be mixtures, contain low quantity or degraded DNA;
- The FBI Director's Quality Assurance Standards for Forensic DNA Testing Laboratories requires quantitation of forensic samples;
- There are currently no approved Expert Systems for crime scene samples; and
- Law enforcement collecting crime scene samples do not have the education, training or experience necessary to assess the crime scene evidence and determine the type of testing to achieve the optimal results from the DNA sample.

The FBI has been focusing its primary implementation efforts on the use of Rapid DNA instruments in booking stations for the analysis of single source reference samples obtained from arrestees and other offenders required by law to provide DNA samples. In particular, the FBI is working to develop the statutorily required standards and procedures and pilot testing of the computer interfaces and communications involving law enforcement agencies (as contrasted with forensic DNA laboratories who are the current participants in the National DNA Index System). However, at the same time, the FBI is aware that Rapid DNA instruments are being marketed to and used by law enforcement agencies for the analysis of crime scene samples. To address this, the FBI empaneled a Rapid DNA Task Force composed of two task groups to assess, evaluate, and make recommendations on the use of Rapid DNA instruments for the analysis of crime scene samples -- the Rapid DNA Crime Scene Technology Advancement Task Group and the Non-CODIS Rapid DNA Best Practices/Outreach and Courtroom Considerations Task Group.

The Non-CODIS Rapid DNA Best Practices/Outreach and Courtroom Considerations Task Group was empaneled in October 2018 and includes representatives from forensic DNA laboratories, law enforcement, and prosecutors. One of the objectives for the Task Group includes providing best practices for the law enforcement community when using Rapid DNA instruments for the analysis of crime scene samples. This will allow law enforcement to strategically implement this technology for purposes of establishing a proper foundation for the introduction of the resulting DNA analyses in court. The Task Group recognizes that law enforcement's use of Rapid DNA instruments to analyze crime scene samples reflects on the use of Rapid DNA technology in general and accordingly seeks to ensure a consistent and appropriate use of Rapid DNA technology on crime scene samples, even if the resulting DNA analyses are not eligible for CODIS and NDIS. It is important to the law enforcement community and the criminal justice system that Rapid DNA technology be used in a responsible manner that preserves the reputation of statutorily authorized law enforcement DNA databases at the local, state and national levels.

Accordingly, the Task Group is providing guidance for law enforcement implementing Rapid DNA technology in the analysis of crime scene samples in the following areas: administrative practices, Rapid DNA instruments and consumables, staffing, training and proficiency testing, crime scene samples, consensual reference samples, abandoned or surreptitious samples, sample assessment and acceptance, sample comparisons, reporting Rapid DNA results, metrics, and safety.

Administrative Practices:

1. Consult with the prosecutor and, if applicable, your agency counsel, before establishing a Rapid DNA Program.
2. Establish a policy for whether your agency will process evidence from other agencies. If you are going to process samples for other agencies, the policy should require that the submitting agency notify their prosecutor.
3. If possible, consult with your CODIS laboratory to understand CODIS requirements before considering establishing a non-CODIS Rapid DNA Crime Scene Program.
4. Consider meeting with your CODIS laboratory or an accredited commercial forensic DNA laboratory that produces CODIS eligible profiles to determine if the laboratory will provide Rapid DNA interpretation and/or database support for crime scene and reference samples.
5. Consider establishing a Rapid DNA liaison with the CODIS laboratory.
6. Consider annual operating costs for a Rapid DNA program. Consider maintenance agreements, ongoing training, and total per sample costs.
7. Establish written procedures for sample collection, submission, interpretation, comparison, reporting, chain of custody, and storage of samples. Consider consulting with an accredited forensic DNA laboratory producing CODIS eligible profiles or a qualified DNA analyst with knowledge of CODIS eligibility requirements.
8. Determine if and when Rapid DNA will be used with and without CODIS consideration. Establish written policies.
9. Determine if and when database applications will be used with Rapid DNA. Determine if Rapid DNA results will be databased with manufacturer-provided software and/or with an independent application. Establish written databasing policies and procedures, if applicable.
10. Determine if Rapid DNA will be used for direct comparison: crime scene to individual and crime scene to crime scene.
11. Determine if Rapid DNA will be used as an evidence screen/triage tool.
12. Determine if your state/agency has sample consumption notification requirements or policies. Establish a written crime scene sample consumption policy for Rapid DNA analysis.
13. Establish a policy addressing whether a subject will be able to obtain their DNA profile from their consent sample.
14. Establish written policies and procedures for data access/storage/use, access, duplication/reproduction, disclosure, security, and, if applicable, expungement.

15. Establish written policies and procedures for complying with Discovery and Public Records requirements.

Rapid DNA Instrument and Consumables:

1. Validate Rapid DNA instrument(s) for appropriate sample types. Consider working with a CODIS laboratory for validation assistance. Have validation study reviewed by an accredited DNA laboratory or qualified DNA analyst.
2. Whenever possible, a Rapid DNA instrument should be operated in a fixed indoor location.
3. Budget for the instrument service maintenance agreement.
4. Establish written policies and procedures for instrument use, physical and database access (staff and vendor/service technician), data usage, duplication/reproduction, disclosure, and security.
5. Establish documented procedures for routine maintenance, repair, calibration, software upgrades, and data backup.
6. Establish performance check procedure for routine use, following a period of operator-defined dormancy, and power outages.
7. Establish quality assurance procedures for assessing each new lot of consumables.
8. Utilize an uninterrupted power supply (UPS) in conjunction with an emergency power circuit for each instrument.

Staff:

1. A minimum of two staff members should be trained in the use of Rapid DNA. Roles and responsibilities should be defined and documented.
2. Establish a Rapid DNA program manager or lead operator with administrative authorities for Rapid DNA machine access, password assignment, and calibration/maintenance responsibilities.
3. Establish a Staff Elimination DNA Database, as allowed pursuant to Human Resource (HR) policies (to include collective bargaining agreements, if applicable). Determine what staff positions will be required to provide elimination samples for the database (Rapid DNA operators, crime scene personnel, and other staff with access to scene).
4. If samples are to be sent to an accredited forensic DNA laboratory for confirmatory testing, establish a mechanism that allows for the submission of elimination samples from law enforcement personnel to the laboratory, as allowed pursuant to HR policies.

Training and Proficiency Testing:

1. Establish a documented Rapid DNA Training Program with minimum training requirements appropriate for the duties required by staff involved in the Rapid DNA Program.
2. Establish written and practical competency exams to authorize staff for use of the Rapid DNA instrument.
3. Establish competency testing, proficiency testing, and continuing education programs with documented requirements and time periods for continued use by authorized staff.

Crime Scene Samples:

1. Establish a policy to identify which samples will be collected and subjected to Rapid DNA analysis. Consider quantity, quality, potential mixtures, and sample consumption when developing the policy. Criteria should be based on validation data, the training level of the user, potential investigative and court impact, and quality assurance concerns.
2. “A-Swab/ B-Swab” strategy should be employed: A-Swab: swab/sample for accredited forensic DNA laboratory analysis. B-Swab: “additional swab” for Rapid DNA analysis. Consider side-by-side collection where biological material is collected “together” during the swabbing motion (bouquet method) versus the A-Swab is collected first and the B-Swab collected second (sequential).

Consensual Reference Samples:

1. Follow existing consent standards for your state and agency, if applicable. Consider written consent form, witness, audio or video recording of consent and collection.
2. Determine method of reference swab collection, either self-collection or law enforcement officer collection and establish a written protocol for reference sample collection.
3. If Rapid DNA analysis will be used for databasing in addition to direct comparison, collect at least 2 samples (one for Rapid/one for lab **OR** 2 for databasing purposes).

Abandoned or Surreptitious Samples:

1. Determine if and when abandoned or surreptitious DNA samples will be processed.
2. Determine if abandoned or surreptitious Rapid DNA data will be databased and/or used for direct comparisons only.

Sample Assessment and Acceptance

1. Establish written assessment and acceptance procedures. Consider the following:
 - a. Fully automated Rapid DNA (black box) analysis of a sample to generate a profile by a validated and approved Rapid DNA instrument.

- b. Modified Rapid DNA analysis that incorporates some level of review of the data/electropherogram by a trained individual. The level of review and interpretation should be dictated by the level of training/expertise of the user. For example, levels could include:
 - i. Technician: trained to review basic single source profiles and identify those profiles (data) that need to be rejected or submitted to the laboratory examiner for review.
 - ii. Forensic Examiner: a fully qualified DNA analyst, trained on all aspects of DNA analysis.
 - c. Procedure should address interpretation or rejection of samples that yield no data, are inconclusive, mixtures, or partial profiles. If fully automated system, this should be addressed in the parameters used to set up your system and may not require a separate procedure.
 - d. Procedure should be based on developmental and/or internal validation, as appropriate.
2. Establish written protocols on how Rapid DNA profiles may be utilized.
 - a. Single source profiles generated by an approved and properly maintained Rapid DNA instrument, utilizing approved Expert System software.
 - b. Profiles interpreted by a qualified DNA analyst.
 - c. Procedure should address whether profiles will be used for single case comparisons and/or stored/searched within a local DNA database.

Sample Comparisons

1. Establish written Rapid DNA comparison procedures. Consider the following:
 - a. Fully automated Rapid DNA (black box) analysis and comparison of samples using a validated and approved Rapid DNA instrument.
 - b. Modified Rapid DNA analysis and comparison that incorporates interpretation and comparison of data/electropherograms by a trained individual. The level of interpretation and comparison should be dictated by the level of training/expertise of the user. For example, levels could include:
 - i. Technician: trained to review and compare basic single-source profiles and identify those comparison profiles (data) that require submission to a laboratory examiner for review.
 - ii. Forensic Examiner: a fully qualified forensic DNA analyst, trained on all relevant aspects of DNA analysis.
2. Establish requirements and procedures for reporting the conclusions from a comparison that may include ‘match’, ‘possible match’, ‘no match’, and ‘inconclusive’ conclusions when comparing profiles.
 - a. Consider how the significance of a match/no match will be reported.
 - i. Basic match statement with no statistics issued as an investigative lead with referral to future accredited forensic DNA laboratory analysis.
 - ii. Match statement based on a pre-established threshold, such as a minimum number of loci.
 - iii. Actual statistics for the comparison, calculated by a qualified DNA analyst.

- iv. No match (exclusion) statement.
3. Establish a procedure for the interpretation and reporting of mixtures, if using modified approach with trained and qualified DNA analyst.
4. Establish a procedure for the review of electropherograms, if using the modified approach or as a quality assurance/quality control (QA/QC) step in the fully automated approach to ensure the system is functioning appropriately.
5. Establish if Rapid DNA data will be compared to previously generated results and/or stored within a local non-CODIS database.
 - a. Local non-CODIS databases should have fully developed and documented procedures for profile acceptance, expungement, use, and security.
6. Establish a policy to address concordance/non-concordance between A-swab and B-swab results.

Reporting Rapid DNA Results

1. Establish a Rapid DNA report writing procedure that includes the comparison issues addressed above.
2. Establish a procedure for sample failures and machine run failures.

Metrics:

1. Considering tracking volume and type of cases and samples submitted.
2. Considering tracking outcomes including number and types of samples processed, profiles generated (sample success rate: partial and complete profiles).
3. Consider tracking arrests, prosecutions, convictions, and exonerations involving Rapid DNA results.
4. Consider determining effect of Rapid DNA program on crime statistics.

Safety:

1. Establish procedures for the handling and disposal of chemical hazardous waste.
2. Establish procedures for the handling and disposal of biohazardous waste.
3. Establish safety procedures that comply with local, state, and federal regulations.