

## Rapid DNA Crime Scene Technology Advancement Task Group Recommendations

### Background:

In March 2018, the FBI Laboratory established a Rapid DNA Task Force to investigate the potential use of Rapid DNA technology for the analysis of forensic evidence samples. This Task Force was separated into two Task Groups: The *Non-CODIS Rapid DNA Best Practices/Outreach and Courtroom Considerations Task Group* and the *Rapid DNA Crime Scene Technology Advancement Task Group* (Technology Advancement Task Group). The Technology Advancement Task Group is comprised of individuals from law enforcement, District Attorneys Association, Major Cities Chiefs Association, DNA experts from NDIS participating laboratories, NIST and non-NDIS participating operations. The primary objective of the Technology Advancement Task Group is to drive and continuously monitor the maturity of Rapid DNA technology in order to ensure its reliable, responsible and appropriate implementation for crime scene DNA analyses and CODIS.

In July 2020, the Technology Advancement Task Group published a joint position statement with the Scientific Working Group on DNA Analysis Methods (SWGDM) and the European Network of Forensic Science Institutes DNA Working Group (ENFSI) regarding the use of Rapid DNA Technology on forensic evidence for State and National DNA databases. The Joint Letter to the Editor in Forensic Science International – Genetics titled *Rapid DNA for crime scene use: Enhancements and data needed to consider use on forensic evidence for State and National DNA Databasing - An agreed position statement by ENFSI, SWGDM and the Rapid DNA Crime Scene Technology Advancement Task Group (FSI-Genetics 48 (2020) 102349)* identified five major areas that must be addressed before Rapid DNA instruments can be tested and considered for the analysis of forensic evidence for State and National databasing purposes. The Technology Advancement Task Group engaged with manufacturers on a regular basis to monitor their progress in addressing the enhancements outlined in the joint letter.

In summer of 2023, the Technology Advancement Task Group finalized a multi-laboratory collaborative study plan designed to test the enhanced Rapid DNA technology outlined in *(FSI-Genetics 48 (2020) 102349)*. The study included six laboratories for each Rapid DNA manufacturer and was designed to test the entire crime scene sample Rapid DNA process, including the extraction of test samples with known DNA quantities as determined through the use of cell counting. The main objectives of this study were to determine the limitations of the enhanced technology through sensitivity and mixture studies and to determine the variability between the instruments of the same manufacturer with the enhanced typing technology. Pre-commercial products were purchased from each manufacturer for the purpose of this study. This work was funded by the National Institute of Justice. The FBI coordinated the study and partnered with NIST for study sample creation and data analysis.

The Technology Advancement Task Group has analyzed data from the multi-laboratory study and offers the following recommendations for SWGDM and the NDIS Procedures Board:

# Rapid DNA Crime Scene Technology Advancement Task Group Recommendations

## Recommendations:

### SWGAM:

The Technology Advancement Task Group recommends SWGDAM:

1. Develop Quality Assurance Standards for the forensic use of Rapid DNA for CODIS purposes.
  - a. Data currently supports that full CODIS 20 core loci profile development is possible with several nanograms of total single source cellular DNA.
  - b. Data demonstrates DNA mixture interpretation would require extensive validation by the laboratory and must be approached with extreme caution.
2. Require the use of the NDIS approved forensic Rapid DNA cartridges that contain the requirements outlined in *FSI-Genetics 48 (2020) 102349* for forensic samples.
3. Require modified Rapid DNA analysis on all forensic samples.
  - a. Modified Rapid DNA analysis must be validated by the laboratory prior to use on forensic samples.
  - b. More data is needed to meet the *SWGAM Validation Guidelines for the Use of Expert System with Forensic Samples* for forensic Rapid DNA. The Technology Advancement Task Group anticipates that the current Rapid DNA expert systems will require updates to meet the SWGDAM Guidelines and approval by NDIS.

### NDIS Board:

The Technology Advancement Task Group recommends the NDIS Board:

1. Require modified Rapid DNA analysis on all forensic samples prior to upload or search in CODIS until enough data is available to approve the Rapid DNA expert systems for single source forensic profiles containing the CODIS 20 core loci.
  - a. More data is needed to meet the *SWGAM Validation Guidelines for the Use of Expert System with Forensic Samples* for forensic Rapid DNA. The Technology Advancement Task Group anticipates that the current Rapid DNA expert systems will require updates to meet the SWGDAM Guidelines and approval by NDIS.
2. Prior to approval of forensic Rapid DNA cartridges for forensic sample use, ensure the following is complete:
  - a. Manufacturer developmental validation is available for consumers and follows the developmental validation requirements outlined in *FSI-Genetics 48 (2020) 102349*.
  - b. Data has been provided to support that the manufacturer's quantitation system is reflective of the amount of DNA extracted by the instrument and contained within the amplification.
    - i. Such data would include an estimated quantitation value in picograms or nanograms.
  - c. Review of any manufacturer provided sample collection training materials.
3. Incorporate a statement in the NDIS Operational Procedures that describes the limitations of Rapid DNA use on forensic samples with the forensic Rapid DNA cartridge approval.