

Rapid DNA Deployed in a Jail Reduces CODIS Upload Time from 46 Days to 8 Hours

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ABSTRACT

On August 18, 2017, the Rapid Act of 2017 was signed into law. Law enforcement agencies may now utilize Rapid DNA systems in booking stations to generate DNA profiles from buccal reference swabs. Over 30 states authorize DNA collection from individuals arrested for violent crimes or other felonies. If an arrestee sample tested with a Rapid DNA system matches a DNA profiles associated with an unsolved crime, an investigator has a lead for what would otherwise be a cold case. This critical investigative tool is most impactful when sample processing and searching occurs before the arrestee is released. Currently, few laboratories offer results within this short time window. Longer processing turnaround times for DNA profiles may require law enforcement officers to find, re-capture, and re-arrest a person of interest.

ASG Detention Center

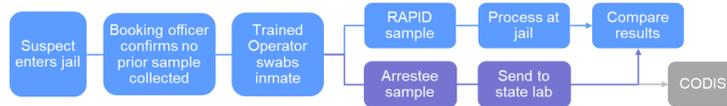


The RapidHIT® ID (IntegenX, Pleasanton, CA) is a Rapid DNA system designed for decentralized locations, allowing non-technical operators to generate DNA profiles from buccal swabs in 90 minutes. The Rapid DNA Act of 2017 enables jails using RapidHIT ID to generate, search and match DNA profiles from arrestees before they are released.

METHODS

The Richland County Sheriff's Department (RCSD) Laboratory, in cooperation with the Alvin S. Glenn (ASG) Detention Center in Columbia, SC, conducted a trial (RAPID, Richland Assesses Potential of near Intant DNA testing) to compare the processing of arrestee buccal samples on the RapidHIT ID by non-technical operators versus sending buccal samples to a state lab. We compared both methods for the quality of DNA profiles produced, and the turnaround time for getting results in the hands of the arresting law enforcement agents.

RAPID Trial Workflow



ASG has been collecting arrestee samples for several years in accordance to procedures issued by the DNA database department of the state laboratory. For the RAPID trial, an additional sample was collected in parallel with the sample collected for processing at the state laboratory. Samples for the RAPID trial were processed immediately using the RapidHIT ID system, and reviewed remotely by RCSD. This allowed for a direct comparison of the time from collection to result, as well as the correlation of the profiles generated.

OPERATOR TRAINING

Two ASG sergeants participated in the RAPID trial. Both were previously trained to collect arrestee buccal swabs for processing at the state laboratory. They received additional training from RCSD on theory, sample collection and handling, logbook documentation, the trial protocol and instrument operator training from the manufacturer. RCSD kept records of their training.

Logbook at ASG



As part of the RAPID protocol, instrument operators logged on to the RapidHIT ID using their fingerprint and a key code. The RapidHIT ID automatically tracks who ran each sample. If there were to have been a failed run, the operator could notify RCSD for support.

Operator Training: Sample Collection, Logging Into the RapidHIT ID instrument, and Running a Sample



INSTRUMENT VALIDATION

An internal validation of the RapidHIT ID system was completed at RCSD prior to installation at ASG. Details of the validation have been previously presented (poster session, ASCLD 2017). An instrument performance check was completed once the instrument was placed at the jail and prior to the trial.

DATA REVIEW

To control the access to DNA results and to secure other pertinent data, the RapidHIT ID system does not display DNA profiles on the instrument. Rather, DNA results may be viewed through RapidLINK® software (IntegenX, Pleasanton, CA), which utilizes an established,

secure network connection between the jail and the forensic lab. The software allows for data generated at ASG to be transferred to, and reviewed at, RCSD.

In addition to connectivity to remote instruments, RapidLINK also enables data review and interpretation via embedded GeneMarker® HID (Soft Genetics, State College, PA). Version 2.9.0 was used for review data of the trial.

Local Area Network Connection Between the RapidHIT ID at ASG and RapidLINK at RCSD

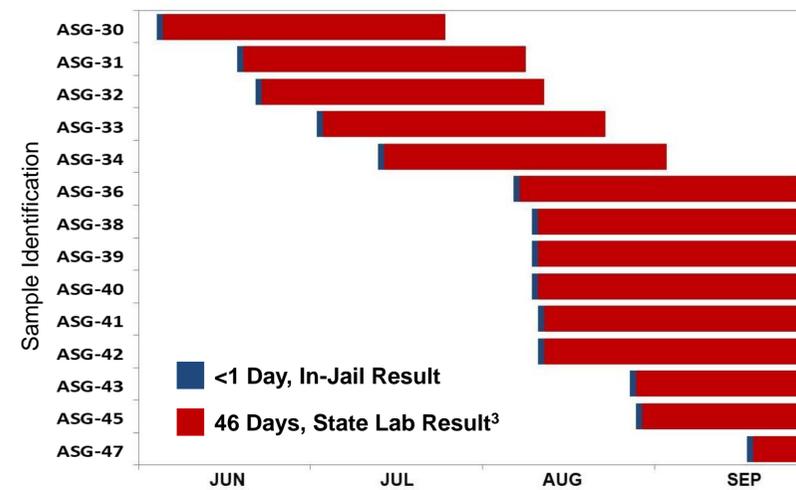


RESULTS AND DISCUSSION

Every sample processed with the RapidHIT ID resulted in DNA profiles within 8 hours of sample collection. All of the profiles generated at the detention center were flag-free, demonstrating optimal performance without the need for human intervention. Under the new legislation, profiles generated at the jail would be eligible for upload into CODIS.

In addition to the RAPID trial samples, four performance check samples were processed to confirm instrument performance through the duration of the trial (ASG-35, ASG-37, ASG-44 and ASG-46).

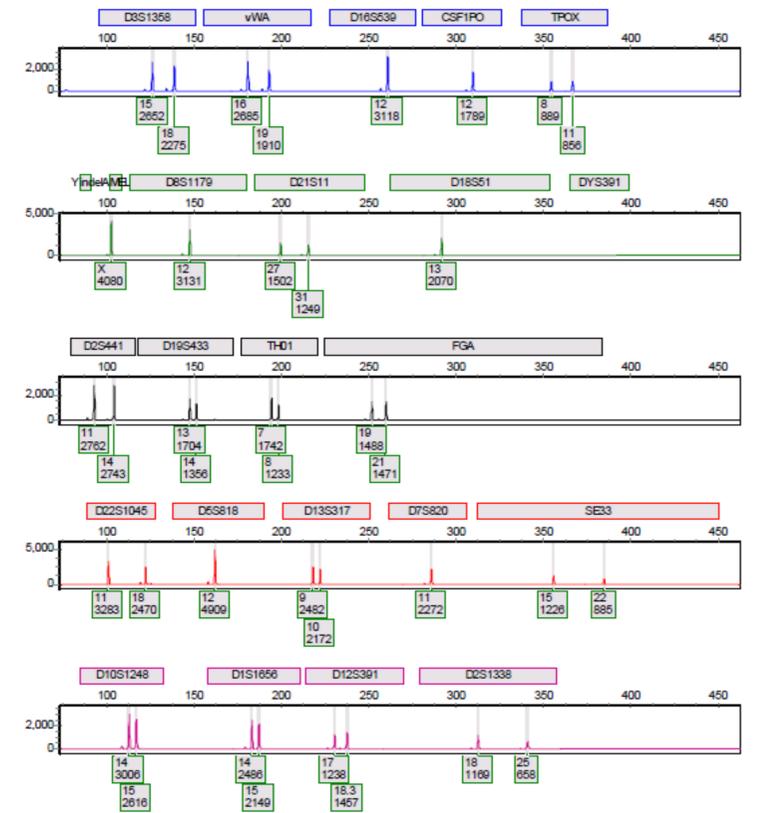
Time to Results



RapidHIT ID samples were processed upon collection, generating results in as little as 2 hours. Remote connectivity between the instrument at the jail and the RapidLINK computer at RCSD allowed for immediate data transfer. From collection to simulated database upload, the trial turnaround time was never longer than 24 hours and less than 8 hours for the majority of samples.

In comparison, the state laboratory reported an average turnaround time from sample receipt to upload of 46 days. Information regarding the time between collection at the jail and receipt of the sample by the state laboratory was shared for 3 samples and ranged from 1-7 days.

Sample of a Flag-Free RapidHIT ID Profile



CONCLUSION

This trial demonstrated that using Rapid DNA at the point of collection could return a CODIS hit in less than the 24-hour provisional detention period. This turnaround time is superior to current state laboratory processing time of 46 days.

This trial resulted in the generation of 14 flag-free, CODIS-eligible, DNA profiles generated from arrestees at the point of collection by sergeants at the detention center. These profiles would meet the draft requirements from the FBI for upload into CODIS.

Challenges overcome during this trial included logistics of working inside a detention facility (limited access, no cellphones, etc.), networking for data transfer between two agencies, and maintaining proper protocol given frequency of sample runs. These were easily overcome through the coordination and cooperation among the entities involved, making DNA results generated in the booking environment both rapid and feasible.

1. Richland County Sheriff's Department (RCSD) Forensics Lab, 5623 Two Notch Road, Columbia, South Carolina 29223.

2. Alvin S. Glenn Detention Center, 201 John Mark Dial Dr, Columbia, SC 29209.

3. Average days from sample receipt to CODIS upload from June to mid-September 2017 was 46 days.