

Blood, sweat, and new leads

Connecticut's rapid DNA program generates investigative leads and helps solve crimes faster



Summary

- To address an evidence backlog, the Connecticut state crime laboratory implemented rapid DNA technology
- Connecticut's rapid DNA program trains law enforcement officers to use the Applied Biosystems™ RapidHIT™ ID System, an easy-to-use tool that empowers crime-solving efforts in collaboration with lab scientists and state and federal DNA databases, with results in as little as 90 minutes
- Connecticut's rapid DNA program has been an overwhelming success, providing investigative leads and opening new possibilities for fighting crime

Introduction

An officer drove into a narrow street one night in September 2021, to investigate a report of thieves trying to steal catalytic converters from parked cars at a condo complex. When he arrived, he saw a suspect jump into a car and attempt to flee. The officer stepped out of his cruiser, which had the suspect blocked in; suddenly the suspect drove right into the officer, crushing and nearly killing him and causing severe injuries that would require a lengthy and difficult rehabilitation. The suspect sped away, ditched the stolen car, and escaped on foot into some woods.

But if he thought he'd gotten away with it, the criminal had another thing coming. Farmington, Connecticut, the town where the incident occurred, is in one of several states in the U.S. that is pioneering the use of rapid DNA. Connecticut's

rapid DNA program uses an advanced forensic technology that allows investigators to generate a DNA profile from crime scene evidence in as little as 90 minutes—a profile that can then be searched against criminal DNA databases.

Inside the stolen vehicle, officers found a bandana and a face mask and brought them to the new rapid DNA kiosk at the Connecticut Department of Emergency Services and Public Protection (DESPP) Division of Scientific Services. It was implemented in partnership with local and state law enforcement just months before the assault on the officer. At the kiosk, under the guidance of the division's forensic scientists, officers tested the evidence using the RapidHIT ID System.

They quickly obtained a usable DNA profile, searched it against a copy of the state database, and got a hit. The DNA matched that of a convicted offender who had been arrested on a charge of larceny in connection with a different stolen vehicle just a few days after the vehicular assault on the officer. Because the man was already in custody when DNA identified him as the assault suspect, he was easily and safely served with a warrant and charged for the assault. Farmington Police Chief Paul Melanson credited the department's rapid DNA process for turning around the DNA evidence in hours rather than what would typically require 90 days [1].

This is just one example of how effective Connecticut's rapid DNA program has been at generating investigative leads. Rapid DNA is not only helping the state solve crime; by involving officers directly in the process, it's also changing the way crime is solved. Cheryl Carreiro and Sevi Papakanakis, assistant lab directors for the Connecticut DESPP Division of Scientific Services, talked with Thermo Fisher Scientific about the difference rapid DNA has made for Connecticut law enforcement, how the program works, and why they consider it an essential 21st century crime-fighting tool.

Getting started with rapid DNA

Facing a backlog of unprocessed DNA evidence, Connecticut's Division of Scientific Services forensic crime lab launched its rapid DNA program in the summer of 2021. As the only crime lab in the state, the Division of Scientific Services lab aims to provide law enforcement agencies (LEAs) with timely information. The lab's director, Guy Vallaro, has made it a priority to help improve the turnaround time of DNA profiles to LEAs. Since 2013, he had been investigating technologies to help give law enforcement investigative leads more quickly. When rapid DNA became an option, he decided to investigate its use with crime scene samples, and, according to Cheryl Carreiro, it's been an exciting success.

The Connecticut rapid DNA program is a great example of partnership and collaboration across the criminal justice system. The program was established after meetings with the Connecticut State Attorney's Office to make sure the implementation was in line with Connecticut statutes and aligned with best practices for evidence collection and processing. It required navigating the logistics of coordinating and validating the implementation. It also meant figuring out how to provide 24/7 access to the kiosk and populating the Connecticut convicted offender DNA profiles into the state's SmallPond database, as well as ensuring the database is updated every month.

Another key component contributing to the program's success is training law enforcement personnel to work directly with DNA evidence using the rapid DNA technology.

"It's their tool to use for their investigations. I'm just here to help them and provide oversight," Carreiro explains.

The rapid DNA training program can accommodate about five or six officers at a time. The training includes information about collecting crime scene samples suspected to be single-source profiles; a practical test that includes processing a cigarette butt; and an exam that requires a score of above 80% to pass. Once they pass the exam, they receive certification as operators of the Connecticut rapid DNA program.



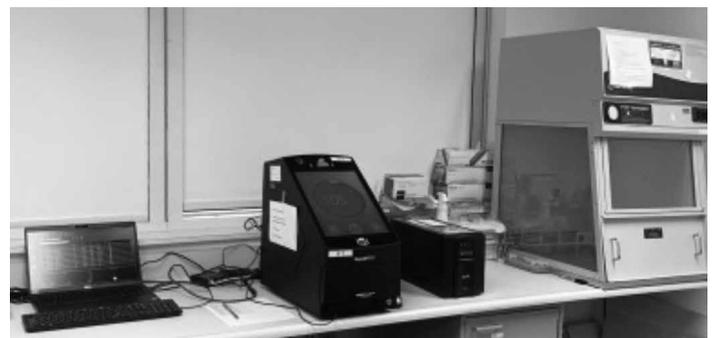
Sevi Papakanakis and Cheryl Carreiro, assistant lab directors, Connecticut DESPP Division of Scientific Services

Integrating the rapid DNA instrument into the forensic evidence kiosk

Law enforcement officers trained and certified as rapid DNA operators can then access the lab's rapid DNA instrument within the department's forensic evidence kiosk. The kiosk contains three different types of technology that officers can be trained on and use: the Automated Fingerprint Identification System (AFIS); the National Integrated Ballistic Information Network (NIBIN); and now the state's rapid DNA system, the RapidHIT ID System.

When officers investigating a crime scene—for instance, the scene of a homicide—find evidence such as blood at the point of entry where someone broke into a house, they collect samples for the lab; but they're now trained to also take and process an additional sample for their rapid DNA analysis on the RapidHIT ID System. If they get a DNA profile on the RapidHIT system, it is uploaded and searched, using Applied Biosystems™ RapidLINK™ software, against their SmallPond database. If the profile search results in a hit, lab personnel will notify the investigator of the match and provide the investigative lead.

"It's their tool to use for their investigations. I'm just here to help them and provide oversight."



Connecticut rapid DNA kiosk

Papakanakis emphasizes this collaborative aspect of rapid DNA: “We in scientific services are hands-on with the profiles, doing the reviews, analyzing the results, and making sure the profiles are sufficient to be searched.”

Strengthening collaboration between law enforcement and the crime lab

The program has generated considerable interest in LEAs across the state. The Division of Scientific Services receives calls every day about the rapid DNA program from state and local police departments. The lab has even trained personnel in Connecticut’s FBI unit.

“It’s been great,” says Carreiro. “Everybody is asking questions. It’s very interactive, and I feel like we’re helping [LEAs] to think about the types of samples that they’re taking from crime scenes.”

“And the enthusiasm that I see in the officers that I train is outstanding. It’s so exciting that even I get excited about it. For the LEAs, this is a great program, a great tool. I think rapid DNA is going to spread across the United States.”

One of the major advantages of Connecticut’s rapid DNA program for law enforcement, according to Papanakis, is that officers are more hands-on with DNA evidence. “They get to make decisions about what to test and how to test it,” she explains, “so they are more invested in collecting and handling evidence properly.”

“We’re there to help them if they need it,” adds Carreiro. “But they are the operators, and I think they feel more involved in the forensic science aspect of crime-solving.” Since the officers are hands-on with rapid DNA, the training includes a basic overview of DNA and how the science and technology of conventional testing and rapid DNA compare. Officers who may have had little to no prior science education are showing interest. “I love the

energy I get from our agencies. They call and say, ‘Hey, what do you think about this sample? I could bring it down,’” she says. “I feel like we’re on a team, doing teamwork with the agencies.”

“And the officers are always grateful,” she continues. “Even if they don’t get an investigative lead, they’re always grateful for our help and for having this program working for them.”

Likewise, Papakanakis sees how the more symbiotic relationship between officers and lab scientists enabled by rapid DNA has impacted the lab. Lab personnel interact more directly with officers and are therefore closer to the outside-the-lab aspects of the criminal investigation process.

“Now [the forensic scientists] see the excitement the officers have when they get results,” she explains.

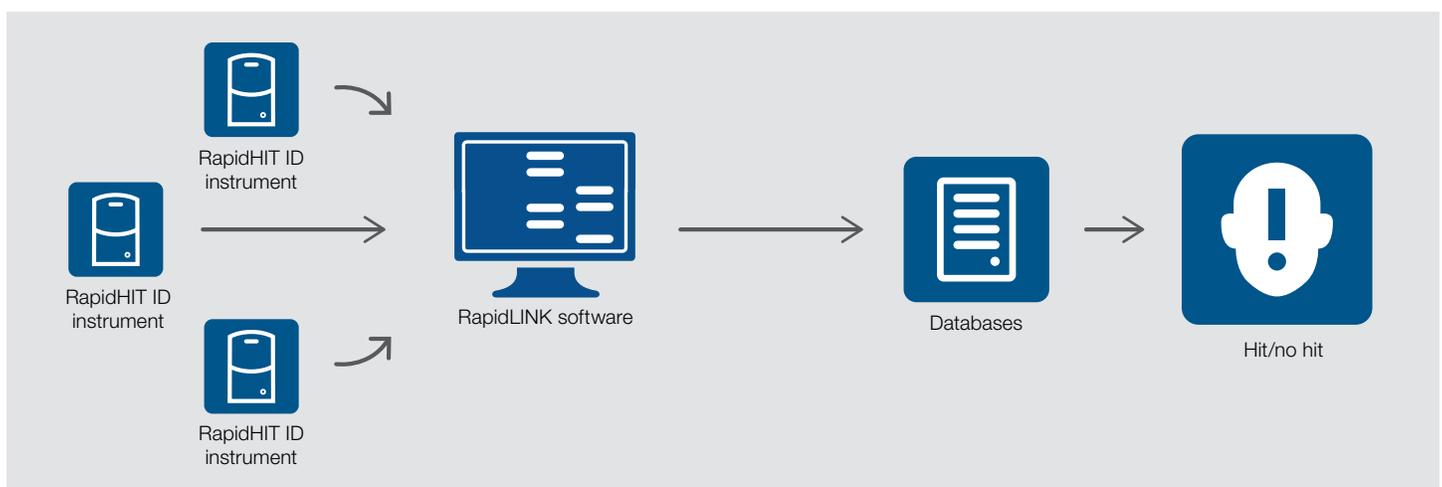
Rapid DNA generates multiple types of investigative leads

While the quick identification of suspects is the primary benefit of rapid DNA, Papakanakis and Carreiro note other, often surprising, ways that it has been generating leads. One of the first investigative leads obtained using the new technology, for example, was in helping link one crime scene to another—a capability that wasn’t on their radar.

A homicide victim who had been brought to the hospital died there, but the police didn’t know where the crime had taken place. Officers conducting the investigation took DNA swabs from different sites around the city. At one of those sites, the investigators swabbed what turned out to be the victim’s blood and ran it on the RapidHIT ID System.

“In just two hours they were able to say, ‘This is where it happened. Now let’s set up the crime scene and look for evidence to see who did this,’” explains Carreiro.

Rapid DNA workflow



“We had no idea that we’d be doing this, and we didn’t realize how important DNA identification of a crime scene could be to an investigation so early on,” added Papanakis. “For the police departments to have that information within a couple hours? It’s great.”

Another example of rapid DNA’s value is quick victim identification. In a tragic event in Connecticut, the body of a deceased child was unidentifiable. There were no dental records that could help identify the body. With rapid DNA, investigators were able to get a result within two hours and match the DNA to the parents of the missing child, providing critical answers to that family.

“It’s usually not fun stuff that we deal with,” says Carreiro, “but we know we’re making a difference, helping victims and helping the criminal justice system. That’s why we do what we do. That’s why we’re in forensics.”

Connecticut’s rapid DNA program has also been an important tool for crime prevention: by getting information to police so quickly, potential crimes have been prevented. Carreiro says that finding an investigative lead while a homicide or rape suspect is in custody could prevent them from killing or sexually assaulting someone else.

“Having that information so quickly with the rapid program makes a huge impact on preventing crime in the state of Connecticut,” she explains.

Rapid DNA has also enabled the lab to triage evidence and reduce demand. With a major crime like a homicide, an investigation may generate dozens of pieces of evidence. The ability to use the RapidHIT ID System to quickly identify a probative piece of evidence means the lab can prioritize processing the most relevant evidence.

Operational considerations

“To ensure the program met the requirements for participation in the National DNA Index System (NDIS), the team worked together across all stakeholders including the CODIS Administrator and State IT to establish a secure, separate database program,” Carreiro states. “Once we got the okay from all these different groups, that’s when more stakeholders started to say, ‘Okay, we could do this. Let’s do it.’”

The future of rapid DNA in Connecticut and beyond

Connecticut continues to review and enhance the rapid DNA program.

“We know we’re making a difference, helping victims and helping the criminal justice system. That’s why we do what we do.”

“It’s been a great experience seeing what works on the system [and] what doesn’t work on the system,” says Carreiro. “And training the officers to know the difference.”

Papanakis adds, “We’ve had so much excitement about the program that we’re looking to expand across the state.” Currently, there is one RapidHIT ID System at the lab and another at the Waterbury Police Department.

“We’re even looking into fitting a RapidHIT instrument into a mobile van,” says Carreiro. “It’s going to be a mobile rapid DNA unit that lab directors can log into remotely.”

As instruments are added, the plan is to spread them out geographically to make rapid DNA accessible to everyone in the state.

The RapidHIT ID System has demonstrated success in helping reduce backlog and solve more crimes in other jurisdictions as well. To this end, Thermo Fisher Scientific will continue to partner with law enforcement agencies and forensic labs across the country and the world to provide this cutting-edge technology.

Reference

1. NBC Connecticut. 2021. "Police arrest driver accused of seriously injuring Farmington officer." October 21, 2021. <https://www.nbcconnecticut.com/news/local/police-have-arrest-warrant-for-driver-accused-of-seriously-injuring-farmington-officer/2596464/>

Learn more about advancing crime-solving capabilities with rapid DNA at thermofisher.com/rapiddna

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