

GANNETT

Cracking crime in 90 minutes

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The intruder took nothing from the home he broke into but left plenty behind.

On July 11, a 28-year-old Goodyear woman stepped out of the shower to find a stranger in her bedroom. The man had climbed in through a living-room window and appeared to be in a trance, she would later tell police — he stood staring at her, shorts partially pulled down as he exposed and fondled himself.

The woman backed up as the man walked toward her, masturbating. She screamed for him to get out.

Fearing a sexual assault, the woman attacked, striking the man in the chest and groin. He fled out the back door.

Police had their work cut out for them by the time they arrived. Fingerprints stained the windowsill, and the man's seminal fluid remained unwashed from the woman's hand.

After weeks of dead ends, it would ultimately take fewer than two hours to break the case: A Goodyear police detective learned of a new rapid DNA-testing instrument at the Department of Public Safety crime lab, where he brought two swabs of evidence to be run against 350,000 Arizona profiles. It produced a hit.

Christian Morgan, 21, who lived less than a quarter of a mile from the woman's home, was booked on suspicion of voyeurism and indecent exposure. Morgan had prior juvenile convictions and fit the description of a man involved in similar, pending cases, said Goodyear Detective Jeff Streeter.

The woman confirmed the machine's results by picking Morgan out of a photo lineup. Morgan is awaiting trial.

The swift timeline is a familiar template for prime-time dramas and increasingly a reality for Arizona investigators. Instead of waiting weeks or months for the state crime lab, new, automated machines allow officers to test DNA evidence in 90 minutes — a hustle that police say is a boon for investigative leads and, ultimately, public safety.

"It's going to change the face of law enforcement, at least in terms of how DNA technology is leveraged," said Chris Asplen, executive director of the Global Alliance for Rapid DNA Testing.

Although technicians at the Pentagon and the Department of Justice have been testing these devices, experts say it's state and local police that are forging the frontier.

State regulations might allow more latitude in the types of DNA samples they can process, however, federal guidelines limit what can be entered into CODIS, or Combined DNA Index System, the national crime database. As such, the technology is buoyed by localized DNA databases.

While technological advancements march forward, privacy experts are raising concerns about the implications of under-regulated DNA-collection guidelines, sprawling databases and the potential for civil-liberty abuses.

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Last week, about 20 officers from Phoenix, the Maricopa County Attorney's Office, Tucson and other agencies gathered in an unassuming classroom at DPS' Phoenix headquarters. After 36 hours of training, they became certified to swab, clip and run their investigations' own DNA samples without the crime technician serving as a middleman.

"If there is blood on an item — if you can cut it, cut it out. If you can swab it, swab it," DNA technician and trainer Kathy Press told her students. "We've had entire chunks of concrete come in."

Press produced two boxes and split the room into two teams of students to pick the items inside. A handgun, machete, a hunting knife, various T-shirts and Q-tips were doled out.

Arizona's DPS is one of only a handful of agencies in the country to have purchased the machines. And DPS is perhaps the only agency to date that has trained field investigators on how to use the equipment.

Outfitted in surgical gloves and masks, officers swabbed the items for blood and semen and placed the evidence in a five-slot cartridge. The cartridge then slides into a machine with roughly the same dimensions as an office copy machine.

The Rapid Hit 200 quickly analyzes the DNA, but the results don't come cheaply. Each of DPS' three machines cost \$250,000. Plus, it costs \$1,700 to \$1,800 each time the start button is pushed. The instrument can analyze up to five samples at a time. As technology progresses, these costs are expected to diminish.

But any cost-benefit analysis must include investigative man-hours, said DPS Crime Lab Superintendent Vince Figarelli.

"What time would you save if you can identify somebody with DNA within two hours?" he said.

The true value of the technology lies in early apprehension, Figarelli said, particularly for dangerous offenders. Studies have shown that the average perpetrator will continue committing crimes or escalate, he said.

"So if you apprehend them early, you have essentially prevented crimes," he said.

The technology is especially amenable to property crimes, whose priority status often falls behind violent-crime cases on the state crime lab's waiting list. The machine currently only tests single-source DNA — evidence from one person — which is often found at property crime scenes.

Figarelli said the machine and the additional trained personnel will help cut into the state backlog of more than 3,400 cases waiting to be tested, the vast majority of which are property crimes. Rapid DNA testing is suitable for about 40 percent of those cases.

Currently, rapid DNA testing is used primarily for two law-enforcement functions: matching or ruling out a known suspect and running the DNA from a crime scene against the local database. In these scenarios, the system will yield the same results as a traditional lab, with the same impressive billions-to-1 odds that juries expect.

The machine has its limitations, both legal and technological, however.

The results cannot yet stand alone in a courtroom and must be cross-referenced with a traditional lab's results.

And unlike other equipment that can extract multiple profiles from one sample, the DNA evidence to run through the rapid device must come from a single source, meaning that it may not yet be suitable for many sex-assault or homicide cases.

It also cannot yet analyze profiles against that of a suspect's family member. Such links have broken major cases, such as Kansas' "BTK" killer Dennis Rader, who was identified after nearly two decades when his daughter's pap smear was compared to the killer's DNA from crime scenes.

While rapid DNA's limitations will likely dissolve as the technology becomes more advanced, Asplen says there is value in stately progression.

"One of the reasons that we've been so successful with DNA in the U.S. is we've moved steadily forward but not too quickly forward," he said. "We have to approach rapid DNA technology in a way that ensures its reliability and that it continues to maintain its space as the gold standard of forensic technology."

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The reliance on forensic DNA evidence has exploded since 1987, when Tommie Lee Andrews became the first U.S. citizen to be convicted at least partially on the basis of such evidence.

In 1994, the DNA Identification Act authorized CODIS and NDIS — National DNA Index System — that catalog criminal DNA profiles on a national scale.

Stringent federal guidelines dictate what type of DNA profiles can be entered into CODIS — the profiles must be approved by an FBI-accredited lab — but state laws are typically more lenient or silent on the issue.

Accordingly, throughout the past few years many states and municipalities have begun compiling their own databases governed by their own rules, a trend that Asplen said is arguably more invaluable for local crime solving. Arizona investigators employ a database called SmallPond.

"Every now and then you hear about a case you solve across the country, but local databases are also really important in that 95 percent of crime is local," he said. "Burglars, for example, they don't go from state to state, they go from house to house, from neighborhood to neighborhood."

Arizona is among at least 28 states that allow DNA collection upon some arrests, a practice that is expected to expand since a U.S. Supreme Court ruling last year upheld the law.

The case, *King vs. Maryland*, pitted privacy against public safety, with a 5-4 majority decision ultimately concluding that taking and analyzing a suspect's cheek swab was akin to fingerprinting, "a legitimate police booking procedure that is reasonable under the Fourth Amendment."

Asplen said federal, rather than local, DNA regulations need to evolve.

Language needs to be amended that allows CODIS to link to a booking station, where many of the rapid DNA devices will be located, he said, instead of current CODIS regulations that permit testing only from an accredited lab.

"Quite frankly, if we can get somebody who's arrested, we should be able to treat that like every other piece of evidence," he said. "Right now, (local databases) are much more efficient and denser. They are really able to solve a lot more crimes quickly."

While few would discount the significance DNA has played in forensic science — both for netting guilty criminals and exonerating the innocent — civil liberties and privacy experts are raising concerns about the implications of quick, cheap DNA matching and its limitless storage.

In his dissent, Supreme Court Justice Antonin Scalia wrote that although *King vs. Maryland* would have a beneficial effect on crime solving, so would taking DNA samples from anyone who flew on an airplane, applied for a driver's license or attended a public school.

"But I doubt that the proud men who wrote the charter of our liberties would have been so eager to open their mouths for royal inspection," he wrote. "I therefore dissent, and hope that today's incursion upon the Fourth Amendment ... will some day be repudiated."

Julian Sanchez, a senior fellow at the CATO Institute, who studies privacy, technology and civil liberties, worries that the increasing use of DNA profiles might lead to more pretextual arrests and warrantless searches.

"If your DNA is run the same way your license is run, you can imagine a much more unsettling system, where people are trackable by every cell they set, everywhere they go," he said.

Phoenix defense attorney Russ Richelsoph said additional safeguards should be put in place to prevent DNA usage to be allowed to slip outside the scope of criminal justice.

"We don't want the data to be sold to private companies for marketing ... or ... commercial purposes," he said. "We want ... to limit the purpose of this database solely for law-enforcement identification."

Q&A

Jeff Heimburger, vice president of marketing at IntegenX, a company producing rapid-DNA technology, explained some of the issues surrounding the use of these devices.

Question: What is the difference between rapid DNA and traditional testing devices?

A: The traditional approach involves multiple instruments — typically seven to eight different instruments — and a highly skilled technician. It takes quite a long time to go through that process, in addition to the logistics of sending to a centralized lab, which extends the process even further. Rapid DNA allows testing to be done close to where the results are required, in a rapid manner, such that the results can be used to affect law-enforcement quickly."

Q: How many agencies have purchased one of these machines?

A: IntegenX has manufactured and shipped more than 100 of these instruments now in more than a dozen countries.

Q: Where has it been used so far?

A: Palm Bay, Fla., Richland County, S.C., and Arizona DPS have all been utilizing the instrument in real-world applications.

Q: What are potential applications, other than forensics?

A: There are people investigating a number of applications, (including) kinship software to identify families of unaccompanied minors, testing green-card applicants and disaster recovery for identifying remains.

Q: How will these devices evolve?

A: We're going to continue to make it smaller, faster, cheaper and easier to use and more accessible. I think one day it will be come as ubiquitous as fingerprints.

Cases cracked

Since the machines went live in late April, certified DPS and other Arizona law-enforcement officers have been able to generate investigative criminal leads based on DNA evidence in 90 minutes. The product is in its infancy but has already yielded impressive results, said DPS Crime Lab Superintendent Vince Figarelli. Several of the cases have not yet been adjudicated, so identifying details were not released.

- Investigators from the Pima County Sheriff's Department found a spot of blood after a burglary case in which the suspect likely cut himself on the window. The sample was run through the state database and produced a hit.
- Pima County investigators were able to identify a burn victim who later died of her injuries. Detectives had an idea of her identity and were able to confirm it through DNA from her toothbrush.
- In a single-vehicle crash on Interstate 10, investigators were able to link the victim to blood he left on the vehicle's airbag.