

Canada's Databank Need Addressed

The RCMP bank on crime-fighting success

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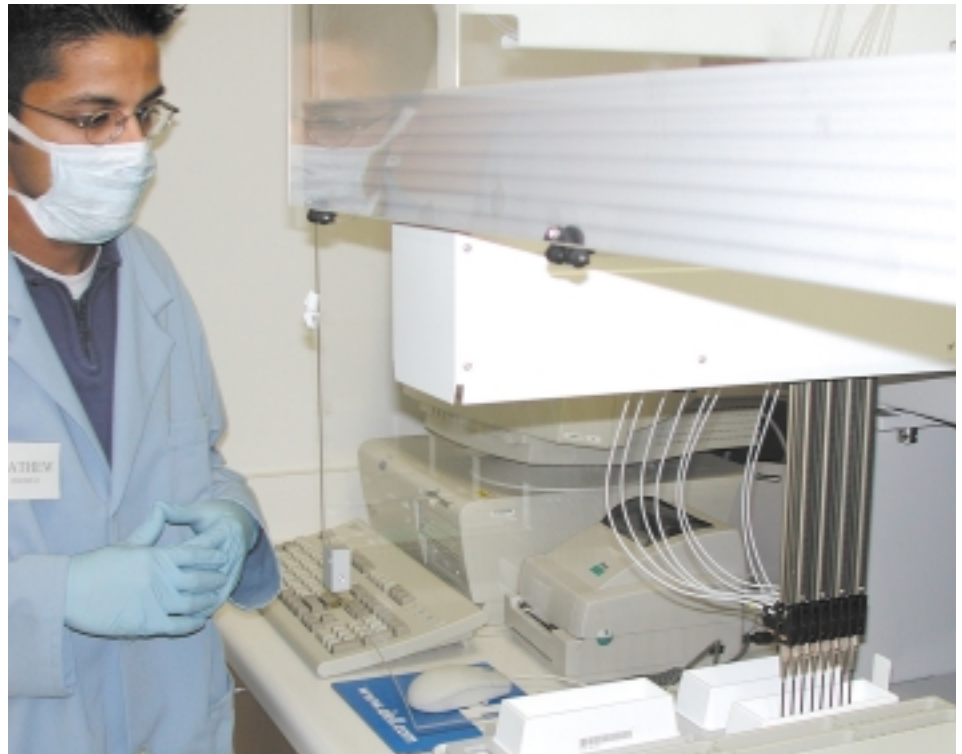
Beverly Perrin, 55, was a wife and mother of four who taught grade one and two students at Tapleystown School in Stoney Creek, Ontario. Her semi-nude body was found in a field on Feb. 15, 1989—two days after she was last seen alive. She had been raped and strangled with a nylon rope, her wedding band taken from her finger.

Following 15 months of investigation, Hamilton-Wentworth police made an arrest based largely on the testimony of three key witnesses, two of whom recanted a year later. On Dec. 18, 1991, Christopher McCullough, then 22, began his sentence of life in prison with no chance of parole for 18 years at Millhaven maximum security penitentiary.

Five months after an appeals court ordered a new trial, the Crown withdrew all charges in June 2000. That decision was based largely on DNA evidence found in two tissues taken from the crime scene—one soaked with semen, the other containing several pubic hairs. This evidence, which was initially ruled of no importance, did not match McCullough's DNA when later tested by Ontario's chief crime lab.

This has hardly been the first triumph for DNA evidence pronouncing the innocence of the wrongfully convicted: David Milgaard, Guy-Paul Morin and Steven Truscott are a few of the more high-profile examples.

Deoxyribonucleic acid has quickly become a more trusted and refined tool in providing evidence of both innocence and guilt. April 1989 saw the first use of DNA analysis in a RCMP investigation—a case of sexual assault where the suspect initially denied involvement in the crime, despite the victim's identification of him as her attacker. When faced with a positive match through DNA analysis, the suspect



Mathew Cheriyan in the pre-PCR room where DNA is extracted and samples are prepared for PCR analysis. Cameras were only allowed in the facility on opening day so as to alleviate the possibility of contamination.

switched to a guilty plea. Also in that same year was the first RCMP conviction using forensic DNA analysis.

Canada's National DNA Databank

This past summer the RCMP opened the National DNA Databank at their headquarters in Ottawa. Three years since its conception in the form of Bill C-3, the bank incorporates two main divisions: the Convicted Offenders Index, which

contains the DNA profiles of offenders convicted of serious crimes; and the Crime Scene Index, which contains DNA profiles from evidence left at crime scenes.

With the advent of the bank, Canada joins the US, Great Britain, Germany, Norway, Finland, Belgium and Denmark in employing such a tool for investigating and solving crimes, albeit one that processes samples faster and more cost efficiently than most. There is an international information exchange in place that allows bank

information to be shared with other databases (i.e. FBI database) for cross-border law enforcement. Although there has not been a true cold case match in Canada yet, evidence in other countries shows that cold cases are solved when a DNA databank is established.

The main goals of the bank are simple: link crime scenes across jurisdictional lines; help identify suspects; eliminate suspects; deter offenders from re-offending; and determine if a serial offender or multiple offenders are involved. Use of the databank is expected to become routine procedure for future casework and save time and money by helping to focus investigations, says Staff Sgt. Andre Guertin.

According to Dr. Ron Fourney, chief scientist and officer in charge of the DNA databank, there were 848 samples in the Convicted Offender Index and 410 in the Crime Scene Index as of November 2000—a remarkable achievement for such a young bank, he noted. Indeed it is, considering there are approximately 2,100 currently sentenced serial murderers, dangerous offenders and repeat sex offenders that will contribute a DNA sample to the bank.

Add to that list persons convicted of other serious offences like kidnapping, rape, arson and child pornography, and the number of sample additions to the bank—through a judge-issued court order—swells to an anticipated 28,000 in its first year of operation.

Criminal lawyer Ricardo Federico focuses particularly on DNA evidence and his duty remains to make certain that every Canadian citizen's rights are "jealously guarded," he says, especially when judges exercise their option to request a DNA sample collection.

Federico points to a costly mistake with the bank in the United Kingdom where Raymond Easton was the one in a 37-million-to-one chance that police had arrested the wrong man after a cold hit connected him to a burglary. He was cleared of all charges after his lawyer requested that a more sophisticated DNA test be used. Since then, the more accurate identification process has replaced the former version of a six-suite marker system as standard protocol.

While knowing that the UK and Canadian models differ in terms of the number of markers used for identification, Federico's concerns remain. Not too long ago, he notes, using fewer markers in DNA identification was classified as leading edge.

Dr. William Davidson, Dean of Science at Simon Fraser University and the medical genetics representative on the databank's advisory committee, on the other hand, is confident in the integrity of the results offered by Canada's method of DNA identification.

"I can see how if you didn't have a full suite of markers using the—it sounds strange to say the old methodology, because it's only 10-years-old—but it has been surpassed by this polymerase chain reaction methodology. And so, that would not happen now with these 13 markers," Davidson says.

How it works

All collected samples are catalogued and bar-coded upon entry to the DNA databank. Sample matching is done using a unique network and software program developed by the FBI and the US Department of Justice, called the Combined DNA Index System (CODIS). Also on the software front is RCMP-developed intellectual property for security that has sparked the interest of eight different countries.

Guertin stresses that the bank will be used for law enforcement purposes only. In fact, great efforts are being made to ensure that privacy, legal and ethical rights will be protected and held in top priority. An advisory committee has been set up to represent interests from police, biomedical ethics, human rights, law, medical genetics, privacy, population biology and RCMP.

Everything is done anonymously—no names attached. The barcoded data is sent to fingerprints, which are then sent to criminal records. "It sounds highly convoluted and so it should be," Davidson says. "People who are working on this never know whose DNA they're working on."

"I guess more importantly the potential for solving crimes and providing closure for people has been enhanced. I think at the end of the day that's probably what we're all looking for."

Over 1,200 officers across Canada have received specialized training by Forensic Identification Services to ensure safe handling of the biological samples. Use of collection kits, gloves, a mask and a special sealed envelope, help prevent contamination of the samples.

Two-to-three drops of blood are squeezed onto each of four separate circles on a collections card—a methodology based on a diabetic's blood-glucose level test. The card is made of FTA paper, which contains some common chemicals

similar to those used for preserving cosmetics. The combination of chemicals cause the cell membranes to rupture, leaving the DNA, along with all components of the cell, trapped in the fibres of the paper.

The samples are rendered inert, as well as heat and cold resistant. Any bacteria or viruses present are neutralized, preventing their transmission to anyone processing the sample.

Because personal information is separated from each biological sample, Fourney stresses that, "the science only supports anonymous pieces of DNA markers that can detect differences between people but not other aspects such as physical appearance or medical predispositions."

DNA samples and profiles from convicted adult offenders will be retained indefinitely. However, upon reversal of a conviction, samples will be destroyed, unlike the US model which does not administer responsibility to anyone to destroy or remove DNA profiles from crime databases after acquittal. Young offenders will also contribute DNA samples to the bank dependent upon their crime. Their samples will be retained in a similar fashion to the retention of their criminal records.

As for proving the innocence of wrongfully convicted persons such as McCullough and Milgaard, the databank is prepared for DNA analysis requests. Following US statistics as an example, Fourney estimates that roughly 23 per cent of tests will involve eliminations where the sample DNA profile does not match the key evidence.

"It's actually easier to prove that someone is innocent using DNA than it is to prove that they are guilty," Davidson points out. "The ability to exonerate somebody, or to exclude them from an investigation is probably even more valuable than getting somebody included, because DNA evidence alone is really unlikely to convict somebody."

Guertin reminds that, "In a democratic society, guilt or innocence represents a decision-making process before a jury of your peers. It is never done by a scientist or a piece of evidence."

The databank's ability to be effective and important in establishing the guilt or innocence of a person at the investigation stage is cause for pride in those who use the technology—neither capability is understated.

"It's a powerful tool," Guertin says. "It serves both sides of the law, there's no doubt about that."