

# NEW ZEALAND'S DNA PROFILE DATABANK – CELEBRATING 20 YEARS OF SUCCESS

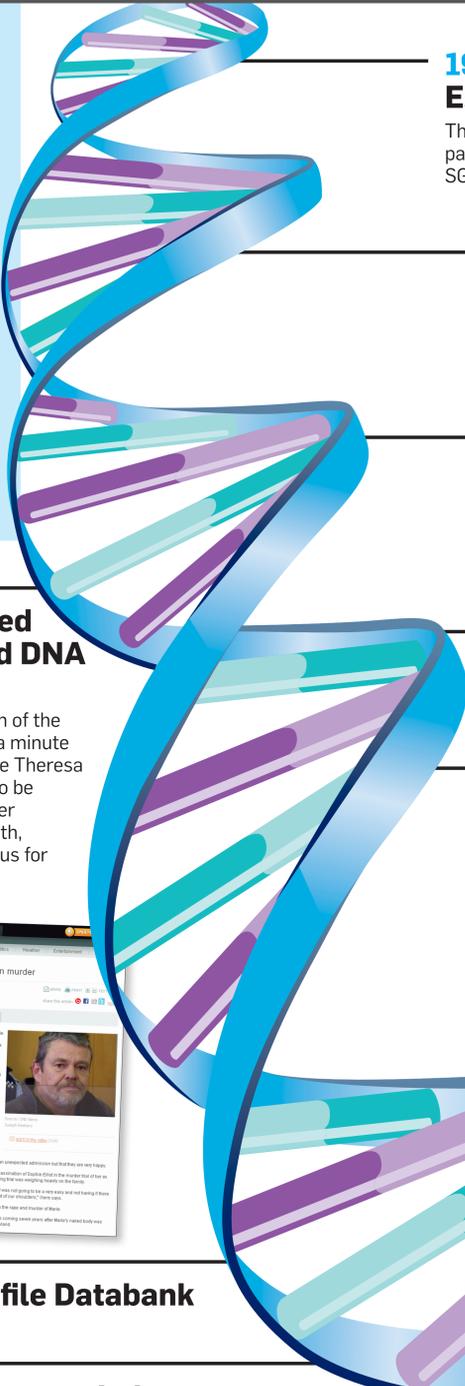


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## INTRODUCTION

In 1995 the Criminal Investigations (Blood Samples) Act (New Zealand) was passed into legislation. Since that time more than **158,000 profiles from individuals and 33,800 case sample profiles** have been added. Maximising the effective use of the information held and updates to the legislation have enabled more effective use of the data, ensuring efficient and targeted collection of samples from individuals. This presentation summarises the successful technical operation and outcomes of the DNA Profile Databank since 1995, demonstrating its effectiveness in crime solution in New Zealand and suggests options for future development.



## 1995 – 1996

### Establishment of the DNA Profile Databank

The DNA Profile Databank was established after the Criminal Investigations (Blood Samples) Act (New Zealand) was passed into legislation in 1995. The second National DNA Profile Databank in the world after the UK. Uses the 6 locus SGM multiplex and the ABI PRISM® 377 Genetic Analyzer.

## 1999

### DNA Profile Databank solves its first homicide case

Operation Sundown – the first homicide case solved by identifying the suspect via the DNA Profile Databank when DNA caught under the deceased's fingernails yielded a mixed profile that could be resolved, entered and matched on the DNA Profile Databank.

## 2000

### Introduction of more sensitive and discriminating multiplex

AmpFLSTR® SGM Plus® PCR Amplification Kit was introduced to the casework and databank operations.

## 2001



### Cold case solved using improved DNA technology

Following the introduction of the AmpFLSTR® SGM Plus®, a minute sample of semen from the Theresa Cormack case was able to be profiled. Fifteen years after 6 year old Cormack's death, police arrested Jules Mikus for her murder.

## 2002

### New purpose built laboratory

Included the implementation of ABI PRISM® 3100 Genetic Analyzer.

## 2004

### Legislation amended and expanded

The Criminal Investigations (Blood Samples) Act 1995 was amended to the Criminal Investigations (Bodily Samples) Act 1995.

The new provisions allowed:

- Person samples to be obtained from current prison inmates convicted prior to 1995
- Samples to be collected from convicted offenders at any time, removing a 6 month post-conviction limit
- Buccal scrapes to be used as samples for the Databank
- For the removal of requirement for "compulsion" court order to obtain samples from individuals.

These changes facilitated the use of the DNA databank increasing its role in crime solution.



## 2008

### Familial searching solves murder case

Familial searching of DNA databases to identify suspects using genetic association between close relatives was first implemented in 2004. By 2008, it was an automated feature of the DNA Profile Databank and successfully led to the apprehension of a suspect in an historic homicide.



## 2009

### 100,000th individual to DNA Profile Databank

## 2010

**Legislation amended and expanded** Enactment of the Criminal Investigations (Bodily Samples) Amendment Bill 2009 in 2010 created a "temporary DNA Databank" where profiles are held of persons with an "intent to charge" with an imprisonable offence. Profiles can be matched but are removed if the charge is not laid or the person is acquitted. On conviction, profiles are entered onto the DNA Profile Databank. The list of relevant offences is expanded.

## 2013

### Mixture matching on the DNA Profile Databank

Using STRmix™ we can search complex, mixed DNA profiles directly against the DNA Profile Databank. This is a major advance for cases where there are no suspects and there is DNA from a number of contributors in one sample.

## 2012

### Introduction of STRmix™

STRmix™ is expert forensic software that can resolve previously unresolvable mixed DNA profiles. Developed by world leaders in the field, it uses a fully continuous approach for DNA profile interpretation, resolving complex DNA mixtures of any number of contributors and/or comparing profiles against a person of interest and calculating a likelihood ratio. [www.strmix.esr.cri.nz](http://www.strmix.esr.cri.nz)



## 2014

**Updating technology** Globalfiler® PCR amplification kit and 3500 Genetic Analyzer from Life Technologies are implemented.

## 2015 VITAL STATISTICS

**>158,000 profiles**  
National DNA Databank  
(approx. 3.5% of the population)

**> 33,800**  
Crime stain profiles on  
Crime Sample Database

**29%**  
Crime to crime  
link rate

**70%**  
Crime to person  
link rate

**25**  
Longest string of linked  
cases with suspect identified

**>10,000**  
Crime to crime  
links to date

**>24,000**  
Crime to person  
links to date

**5 days**  
Average sample  
turnaround

## 2016 – 2020 THE FUTURE

Development and implementation of Massively Parallel Sequencing for the analysis of case samples, to be integrated with the DNA Profile Databank.

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