

AUDITOR-GENERAL'S REPORT PERFORMANCE AUDIT

Managing Forensic Analysis Fingerprints and DNA

NSW Police Force
NSW Department of Health



The Legislative Assembly
Parliament House
SYDNEY NSW 2000

The Legislative Council
Parliament House
SYDNEY NSW 2000

In accordance with section 38E of the *Public Finance and Audit Act 1983*, I present a report titled *Managing Forensic Analysis - Fingerprints and DNA: NSW Police Force, and NSW Department of Health*.

A handwritten signature in black ink that reads 'Peter Achterstraat'.

Peter Achterstraat
Auditor-General

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Foreword

The use of forensic science to solve crime has become increasingly popular.

Police around the world are spending more and more on the latest forensic technologies and, because of the influence of television dramas such as *CSI*, the public now expect that every criminal case will rely on forensic evidence to catch an offender.

DNA and fingerprints are the key forms of forensic evidence used to identify criminals. While fingerprints have been used in NSW for more than 100 years, DNA has only been available since 1989.

The increasing demand for DNA analysis to help solve crimes has led to lengthy delays in getting samples processed.

This problem exists in many jurisdictions. At least 350,000 DNA samples from murder and rape cases lie untested in police laboratories across the United States. And in NSW the number of cases in the DNA backlog has ranged from 3,500 cases to over 10,200 in the past five years. The backlog was around 6,400 cases on 30 November 2009 and is expected to be almost 7,400 cases by 30 June 2010.

The problem with delayed analysis is that while police wait for results, crimes remain unsolved and criminals remain at large.

In an attempt to reduce delays, the approach to DNA analysis in NSW has been the subject of a number of reviews. These reviews have generally resulted in one-off funding to reduce the backlog. However, as soon as the money is spent, the backlog re-emerges.

This audit looks at both sides of the DNA issue. That is, what have Police done to manage demand for analysis as well as what has been done to increase capacity at the laboratory to cope with the increasing number of cases.

I believe this review will help improve the management of both fingerprint and DNA evidence and, in particular reduce delays in DNA analysis, to better serve both the interests of justice and the people of NSW.

Peter Achterstraat
Auditor-General

February 2010

Audit conclusion and recommendations

The focus of our audit

Fingerprints and DNA (genetic material contained in human cells) are the key forms of forensic evidence used today to solve crimes.

The NSW Police Force (police) collects both fingerprint and DNA evidence. The Police Forensic Services Group (FSG) develops policies and protocols to control the collection and analysis of evidence. It also analyses all fingerprints in NSW. Most DNA evidence is analysed by scientists at NSW Health's Division of Analytical Laboratories (DAL) with the remainder outsourced to a private company.

While fingerprints have been used by police for over 100 years, DNA analysis has been available in NSW since 1989. Since 2001 it is estimated that more than 300,000 DNA samples have been analysed in NSW.

The complexity of DNA analysis and its growing use has led to delays in analysis and a backlog of cases in NSW. Similar situations exist, or have existed, in many other jurisdictions.

In this audit we assessed how well fingerprint and DNA evidence was managed to reduce delays by considering whether:

- Police effectively screens, prioritises and manages fingerprint evidence
- Police and DAL effectively screen, prioritise and manage DNA evidence.

The audit did not review the quality of testing or results as FSG, DAL and the outsourced provider are accredited by the National Association of Testing Laboratories (NATA). NATA conducts accreditation reviews every two years.

Audit Conclusion

Fingerprints and DNA play a critical role in solving crime and serving justice, but DNA evidence can result in more arrests, more prosecutions and more convictions.

We found that while police effectively prioritise fingerprint evidence, it could better manage the screening and analysis of both fingerprint and DNA evidence to reduce delays. In particular, we found:

- demand for DNA analysis has grown by nearly 40 per cent over the past five years and more items are submitted than can be analysed
- police may be submitting and analysing more fingerprint and DNA evidence than they need to
- outsourcing DNA analysis increases capacity and is fast but expensive.

Fingerprints are the traditional method of identifying offenders.

Police do not screen fingerprints but analyse all images of sufficient quality, regardless of their relevance or evidentiary value. This may mean they are analysing more than they need to.

Demand for fingerprint analysis is steady and being met with current resources. However we found delays in fingerprint analysis, especially for crimes committed in regional areas where officers may wait for around eight weeks for a result.

We also found police has not set times for the return of fingerprint analysis results to investigating officers, it does not know the unit cost of fingerprint analysis, and it does not consistently monitor performance.

We found that police does not screen DNA evidence to ensure the best items are submitted for analysis and it does not effectively control the number of items sent per case. Today, more DNA items are being submitted per case than five years ago.

DAL's capacity to analyse DNA has not increased with police demand. Its capacity is currently 18,000 DNA case items a year, however in 2008-09 demand was more than double this at around 43,000 DNA case items submitted by police.

The result is delays in analysis. Any case not started within 30 days becomes part of the backlog. The backlog peaked in 2007 at over 10,200 cases but as at 30 June 2009, it was around 5,500 cases with more than 28,000 DNA items waiting to be analysed. The backlog had increased to around 6,400 cases by 30 November 2009 and is forecast to reach almost 7,400 cases by 30 June 2010.

Police has tried a number of ways to address these delays but with mixed success. Firstly, police generally limits officers to only one DNA item for analysis for less serious property crimes (these crimes are known as volume crimes). However, we found an average of nearly three DNA items per case being submitted to DAL.

Secondly, police has provided temporary funding to DAL to increase capacity and reduce the backlog. This has had some success but as soon as the temporary funding ceases, the backlog returns.

Thirdly, police has contracted with the private sector to analyse around 5,500 DNA items a year since January 2008. This has provided some relief but it comes at a significant cost. Outsourced analysis costs \$412 an item which is almost twice as expensive as work being done by DAL.

None of these approaches have addressed the problem of police's demand for DNA analysis continuing to outstrip capacity.

Police needs to make some decisions on how much it wishes to spend on this aspect of policing. It should screen evidence so that only those items that provide the best evidentiary value are submitted for analysis. And it needs to make sure that capacity better matches demand.

It is critical that police reduces delays which impact on crime rates: the offender remains on the street able to commit more crimes while the evidence waits to be analysed.

Both Victoria and Queensland seem to have largely overcome a backlog in DNA analysis through increased resourcing and different approaches to the management of inputs and capacity. DNA analysis in Queensland used to take an average of five months in 2007-08 but was reduced to two months by December 2009. We should at least aim for a similar result in NSW.

Recommendations

1. **To ensure capacity matches demand** it is recommended that the NSW Police Force and NSW Health sign a Service Level Agreement for DNA analysis by June 2010 that includes:
 - a) a user pays framework to be piloted over 12 months and reviewed in June 2011 (page 23)
 - b) detailed service standards including performance measures (page 24) and turnaround times (page 23).
2. **To better manage demand** it is recommended that the NSW Police Force by June 2010:
 - a) find out what's the best evidence in a case and analyse that first (fingerprints - page 15, DNA - page 24)
 - b) set a limit on the number of fingerprint images sent for analysis for each volume crime case and monitor compliance (page 14)
 - c) improve compliance with DNA submission limits (page 17).
3. **To prevent crime**, it is recommended that the NSW Police Force by December 2011 assess DNA evidence from the most recent cases first in less serious property crimes (known as volume crimes) (page 24).
4. **To get better value for money**, it is recommended that the NSW Police Force by June 2010:
 - a) review the cost effectiveness of its DNA outsourcing arrangements (page 20)
 - b) assess and monitor the unit cost of fingerprint analysis (page 16).
5. **To speed up processing**, it is recommended that the NSW Police Force by June 2010:
 - a) remove items when DNA analysis is no longer needed (for example, where the offender has been convicted) (page 17)
 - b) review the criteria used to determine whether DNA analysis is still required (page 17).
6. **To better manage cases**, it is recommended that the NSW Police Force by December 2010:
 - a) measure, report and set targets for the time taken to analyse fingerprint evidence (page 15)
 - b) review the sub-sampling project to assess its effect on both the cost and timeliness of DNA analysis (page 25).
7. **To improve monitoring of performance**, it is recommended that the NSW Police Force report the time taken to analyse fingerprint and DNA evidence for different crime types in its annual reports commencing with its 2010-11 report (page 23).

Response from the NSW Police Force

The NSW Police Force welcomes the findings of the Audit Office which validate our proposed future direction of forensics.

Forensic Science (commonly known as forensics) is a term used to describe the way in which science is used to resolve legal issues. It is a broad term which covers a range of scientific disciplines and its application extends beyond law enforcement.

The NSW Police Force Forensic Services Group provides a range of specialist services to police investigators including crime and incident scene examination, expert scientific, technical and criminal psychology advice, interpretation, recording scenes and a broad range of analysis services (including fingerprint, mark recovery, biology, botany, microbiology, ballistics, forensic medicine, documents, handwriting, illicit drugs from clandestine laboratories, explosives, chemical warfare agents and physical evidence). A range of identification services to police, courts and external agencies is also performed.

This Performance Audit focused on two areas, fingerprints and DNA, and provides a comparative analysis on how well this evidence is managed to reduce delays in NSW.

Although the demand for DNA analysis has been increasing in the last 10 years, fingerprint identifications have remained reasonably steady and continue to outnumber the linking of DNA profiles in forensic investigation. For example, in 2008/09 12,589 fingerprint identifications relating to 4,474 persons of interest were made compared to more than 7,000 DNA profiles from crime scenes matched to other crime scenes in NSW and to people in NSW or around Australia.

It is well known that many national and international jurisdictions have struggled with matching capacity and demand to cope with the increased use of DNA in law enforcement. Whereas fingerprinting, a well established discipline within the NSW Police Force, has not experienced the significant capacity constraints to the degree witnessed in the DNA arena.

The Audit Report notes that in Queensland DNA backlogs have been overcome through an injection of significant funding by government for additional resources, improvements to facilities, IT and technology, new procedures and a cultural shift within the agencies that clearly delineates roles and responsibilities.

In NSW, many of the issues relating to capacity and backlogs have been the subject of ongoing negotiations between the NSW Police Force and NSW Health's Division of Analytical Laboratories (DAL) and are currently being oversighted by an executive interagency committee. Apart from recurrent funding for DAL and capital funding for the government's DNA Advancement Program, the NSW Police Force has diverted around \$3.67M between 2004/05 to 2008/09 to increase DAL's capacity, with much of this funding still ongoing.

From a policing perspective, the NSW Police Force recognises the necessity for review of business rules and practices to embrace the advances of science and technology and achieve value for money for the people of NSW.

The Forensic Services Group Strategic Plan 2009-2012 articulates a range of strategies to re-focus investigative efforts, streamline forensic evidence management and achieve optimal corporate fiscal responsibility and efficacy through policy development, technology and government funded capital projects.

Consequently, the NSW Police Force supports the majority of Audit Report's recommendations. However, the Report's assessment of the associated costs of the outsourcing arrangements must be measured against the benefits derived to the community through the improved turnaround times of the availability of results to investigators.

The complete list of Recommendations and the position of NSW Police Force is attached. However, I would like to make the following comments on three key areas of the Audit:

Partnership Arrangements

An important aspect in managing DNA forensic analysis in NSW is the inextricable partnership between the NSW Police Force, as the agency responsible for the conduct of criminal and forensic investigations, and the NSW Health Division of Analytical Laboratories (DAL), as the primary provider of DNA analysis services.

To move forward, the NSW Police Force considers that the roles and responsibilities of each agency need to be clearly defined, recorded and understood; that there is bipartisan support for principles and objectives that best serve the community; and that open and transparent communication to inform policy development and resource allocation prevails.

The NSW Police Force should be the lead agency in formulating policies and protocols regarding the submission, prioritisation and analysis of exhibits from incidents and crime scenes. Conjointly, the DAL should be responsible for the timely analysis of items within the laboratory and in communicating results and data to police.

Although past attempts to renegotiate a Service Level Agreement with DAL have been challenging, in an environment of existing backlogs, the NSW Police Force does not consider this to be an impediment to setting targets, identifying turnaround times and measuring performance. Whilst the NSW Police Force continues to support negotiating such an agreement, it should be noted that fixing the price of a service will not address capacity within the laboratory which is already exceeding its constraints. A pilot of 12 months for a user pays framework is considered a reasonable time to collect and share financial information regarding costs.

In order to better manage demand and to assist police in determining where best to focus investigative efforts, a partnership in which strategic information is shared is critical.

Managing Demand

The Forensic Services Group (FSG) Strategic Plan 2009-2012 outlines several key initiatives to better manage demand for analysis services and provide key statistical information to inform management decisions.

The NSW Police Force recognised several years ago that our corporate systems did not provide the platform and flexibility to monitor and report on performance in forensic services across NSW. This was the genesis of a business case for the development of a Forensic Information Management System (FIMS), which was funded by government in 2008 and is expected to be implemented in May 2010.

The core strategy of the FIMS initiative is to improve the operational efficiency of the NSW Police Force in managing the forensic process and information resulting from the forensic analysis performed and improving timely access to that information. It will deliver a capability for police to request, track and monitor forensic jobs and evidence across the State and in the laboratory.

FIMS will underpin the principle of fiscal responsibility and efficacy highlighted in the FSG Strategic Plan 2009-2012 by limiting and prioritising items submitted for DNA analysis through inbuilt business rules. Sitting alongside this functionality will be the introduction of a 'Test of Essentiality' and Schedule of Fees Policy for analysis beyond essential and volume control for fingerprints in volume crime cases such as housebreaking. This will ensure that efforts are being focused on those exhibits which will provide the greatest evidentiary value. The Forensic Services Digital Imaging Project will also assist in addressing quality and demand.

A key component of the FSG Strategic Plan 2009-2012 is customer service. The Forensic Services Group intends to identify service standards for all business services including target timeframes for the return of results to investigators.

The Audit findings interpret the average turnaround times of around 6 weeks for fingerprint analysis as a 'delay'. This conclusion takes no account of the complexity of the analysis side of forensic work. Analysis requires scientific and quality assurance processes to ensure accurate and validated results are returned to investigators.

The factors which determine the priorities for processing are extensive and varied. There are times when competing priorities stretch capacity, and where significant events require re-prioritisation and reallocation of resources. Such matters like multiple homicides and support to our law enforcement counterparts for incidents like devastating bushfires and counter terrorism operations draw specialist resources for short periods of time. This is the reality of major crime response and for these reasons there is no standard turnaround time. This is a common approach taken by jurisdictions nationally and internationally.

Fast operational response and bringing offenders to justice is what police want and what the community expects. However, it is also our duty to achieve these aims without compromising quality and attention to the level of detail necessary for a quality forensic response to serve the community and the justice system. The implementation of FIMS will provide the necessary data for the NSW Police Force to consider the reasonableness of target timeframes and provide the capability to monitor performance.

The NSW Police Force is also trialling a new field based triaging process which will streamline evidence collection and retrieval process at crime scenes. Triage streamlining will improve the end-to-end management and workflow of biological/DNA evidence. By triaging these items at the crime scene, there is significantly less process and effort required in the laboratory to make the sample ready for robotic DNA analysis. Taking the laboratory to the field in this way and through the implementation of two mobile forensic laboratories in 2010 will result in faster operational responses and better management of demand on DAL's services.

Value

For the last three years, the simple samples from high volume crime have been outsourced to a company contracted by government to provide DNA services. The aim of the project was to assist in reducing backlog items at DAL and enable DAL staff to concentrate on major crime items as well as improving its turnaround times. The Audit concludes that this arrangement has provided some relief to the backlog but comes at a significant cost that is 'twice as expensive as work being done by DAL'.

While the NSW Police Force accepts the assessment of the outsourcing figure, assessing the cost of items through DAL continues to be far more complex and the true cost benefit does not appear to have been addressed. Notwithstanding this, the key benefit to the NSW Police Force and the community through the outsourcing arrangements has been the availability of results within 10 days whereas DAL turnaround times are significantly longer. This is an enormous benefit to investigators and the community in terms of solving and preventing further crimes.

There may well be other models that could provide greater economy and value for money. For example, the Canadian model with 6 laboratories each regarded as a Centre of Excellence in a particular field such as biology, toxicology etc delivers services nationally. Another option could consider the use of the National Criminal Investigation DNA Database (NCIDD) with accredited national laboratories competing for work through a tender process. This would allow the cost to be dictated by the market which should drive costs down and could be utilised by law enforcement agencies nationally, where the need exists. Legislative amendment and accreditation of laboratories would of course be needed to facilitate such an approach.

Another conclusion in the Audit report is that the NSW Police Force needs to improve compliance with the single DNA sample policy for volume crime. The current rate for outsourced volume crime is 1.2 items per case with DAL receiving 2.6 and 2.7 items per case for housebreaking and stolen motor vehicles respectively. The conclusion drawn by the auditors does not appear to take into account that the policy does not apply where there are circumstances which warrant a second sample. This is common in complex volume crime cases which are handled by DAL.

In conclusion, I would like to take this opportunity to acknowledge the work of the Audit team and the collaborative manner in which this Performance Audit was conducted.

(signed)

*D J Owens APM
A/Commissioner of Police*

Dated: 22 January 2010

Audit Recommendation	NSW Police Force response
<p>1. That NSWPF and DAL sign a Service Level Agreement for DNA analysis by June 2010 that includes:</p> <p>(a) a user pays framework to be piloted over 12 months and reviewed in June 2011,</p> <p>(b) detailed service standards including turnaround times.</p>	<p>Agreed - requires cooperation from NSW Health DAL.</p>
<p>2. That by June 2010, NSW Police:</p> <p>(a) using identification rates, determine what is the best evidence in a case and analyse that first,</p> <p>(b) set a limit on the number of fingerprint images sent for analysis for each volume crime case and monitor compliance,</p> <p>(c) improve compliance with DNA submission limits.</p>	<p>(a) Agreed - requires cooperation from NSW Health DAL. While the Forensic Information Management System (FIMS) has been designed with inbuilt business rules for prioritisation of items for analysis, additional data is needed from DAL on success rates for different evidence types to inform the use of police investigative resources.</p> <p>(b) Agreed - this has already been identified by NSW Police Force as part of the strategic direction for optimal use of resources and technology.</p> <p>(c) NSW Police Force will monitor compliance with the DNA submission policy on volume crime through the implementation of the FIMS and review, if necessary.</p>
<p>3. By December 2011, NSW Police assess DNA evidence from the most recent cases first in volume crimes.</p>	<p>Agreed - although it is envisaged that implementation will occur by December 2010.</p>
<p>4. By June 2010, NSW Police:</p> <p>(a) review the cost effectiveness of its DNA outsourcing arrangements,</p> <p>(b) assess and monitor the unit cost of fingerprint analysis.</p>	<p>(a) Agree with qualification - the outsourcing arrangements are for a limited time only and DAL will receive the work back once robotics are up and running at Lidcombe, so this may not be necessary.</p> <p>(b) Agreed - consideration will be given to the use of an external expert for this purpose.</p>
<p>5. By June 2010, NSW Police:</p> <p>(a) remove items when DNA analysis is no longer needed (for example, where the offender has been convicted),</p> <p>(b) review the criteria used to determine whether DNA analysis is still required.</p>	<p>(a) The implementation of FIMS will allow a system based approach to the removal of items when DNA analysis is no longer needed, rather than the current 'one-off' approach. FIMS will also allow the reallocation of resources currently within the Forensic Procedures Implementation Team to progress this task. The timeframe should more appropriately be adjusted to December 2010 to enable this to occur in a systematic way.</p> <p>(b) Agreed - progressed as part of this project.</p>
<p>6. By December 2010, NSW Police:</p> <p>(a) measure, report and set targets for the time taken to analyse fingerprint evidence.</p> <p>(b) review the sub-sampling project to assess its effect on both the cost and timeliness of DNA analysis.</p>	<p>(a) Agreed - the FIMS will deliver a capability to monitor and track forensic jobs and evidence across the state and provide necessary management information to set targets.</p> <p>(b) Agreed.</p>
<p>7. That NSW Police report the time taken to analyse fingerprint and DNA evidence for different crime types in its annual reports commencing with its 2010-2011 report.</p>	<p>Agreed.</p>

Response from the NSW Department of Health

Thankyou for the opportunity to provide a response to the performance audit report 'Managing Forensic Analysis - Fingerprints and DNA'.

NSW Health supports the recommendations in the report and will work closely with NSW Police Force on their implementation.

(signed)

*Professor Debora Picone AM
Director-General*

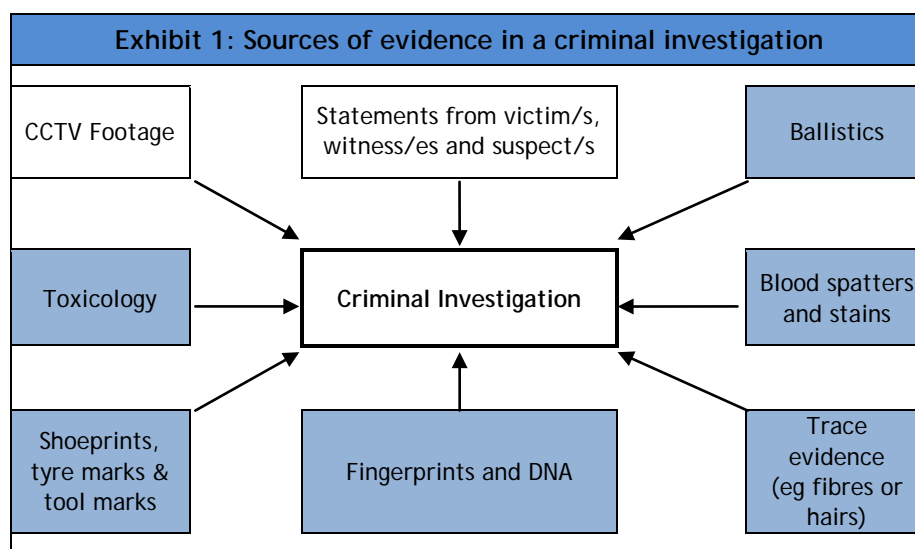
Dated: 27 January 2010

Key findings

1. What is forensic science?

Forensic science is the use of scientific techniques to solve crimes. It includes the collection and analysis of fingerprints, blood, bodily fluids, hair, fibres and even footprints or tyre marks.

Forensic science may be used to support other evidence such as witness or victim statements or it may be the key evidence in a police case.



Source: Audit Office Research
 Key: Shaded areas represent forensic evidence.

DNA is short for deoxyribonucleic acid and is found in most human cells. A criminal wearing gloves will not leave behind fingerprints but may still leave behind DNA. Only a few cells, invisible to the naked eye, may be enough to obtain a DNA profile.

If a criminal leaves fingerprints at a crime scene, police use powders or other chemicals to make them easier to see. Police take images of fingerprints found at the crime scene for later analysis.

2. How do fingerprints and DNA help solve crime?

Fingerprints and DNA are the primary forms of forensic evidence used to establish and confirm the identity of offenders in most types of crime. While fingerprints have been used by police for more than 100 years, DNA analysis started in NSW in 1989. Since 2001 there have been more than 300,000 DNA samples analysed from people and crime scenes in NSW.

In 2000-01, just over 13,000 DNA items from crime scenes were submitted for analysis. By 2008-09, this had increased by 230 per cent to around 43,000 DNA items. By comparison, the number of fingerprint jobs has remained stable at around 21,550 in 2008-09.

Exhibit 2: How DNA is helping police investigate crime

A Queensland study found homicide cases with DNA evidence were 14 times more likely to reach court than cases without it. It also found incriminating DNA evidence had a powerful influence on juries' decision to convict - juries were 23 times more likely to convict in cases with DNA than cases without DNA evidence.

In Western Australia, in cases where DNA is collected, it is providing police with investigative leads for at least one in every four property crimes.

A review of property crime in the USA found that where DNA evidence was analysed, there were more than twice as many suspects identified, twice as many suspects arrested, and more than twice as many cases accepted for prosecution, compared with traditional investigations.

A study by police in Denver USA found that for every \$1 invested in DNA forensics there were \$90 in benefits from reduced police and crime costs.

Source: Audit Office Research

The complexity of DNA analysis and its growing popularity has led to DNA backlogs in many countries. For example, at least 350,000 DNA samples from murder and rape cases are untested in police crime laboratories across the United States.

3. Fingerprints: Does the NSW Police Force screen and prioritise fingerprint evidence for analysis?

Conclusion

Police do not screen fingerprints but analyse all images of sufficient quality, regardless of their relevance or evidentiary value. This may mean they are analysing more than they need to.

Police have clearly defined the procedures to prioritise jobs waiting for fingerprint analysis and these are consistently applied. The order that evidence from major crimes is analysed is based on case characteristics including risk to the community. For example, cases that appear to involve a serial offender may be given priority to prevent further crime. Less serious property crimes such as break and enter or car theft are known as volume crimes and are processed in date order with the oldest jobs being analysed first.

Details of how fingerprints are analysed are in Appendix 2.

Police do not screen fingerprint evidence

Demand for fingerprint analysis has been steady over the past five years at around 21,500 jobs a year.

Police eliminate images that are not clear enough to be analysed. Police then analyse all remaining images, regardless of what help they provide in identifying a suspect.

Police have not limited the number of fingerprint images per job that may be submitted for analysis because demand is steady and has been met using existing resources.

Police plans to limit the number of fingerprints submitted for analysis from mid 2010. Police advise this will help ensure the best result is achieved from existing resources and may free up resources for additional cold case work (that is non-current, unsolved crimes).

Recommendation That by June 2010, the NSW Police Force set a limit on the number of fingerprint images sent for analysis for each volume crime case and monitor compliance.

Police effectively prioritise fingerprint evidence

Prioritisation determines the order in which cases are processed and, therefore, the time taken to identify suspects. Cases are classified as major or volume crime.

In major crime, cases are prioritised based on factors such as the type of crime and the risk of further crime. In volume crime, cases are processed in date order, with oldest processed first.

Alternatively, senior police may identify any case that requires immediate attention.

We found definitions of what constituted a major crime differed across police operational units causing inconsistencies in setting priorities for some cases. In response, police are introducing a standard definition of the offences included in major crime. This should be in place by the time this report is released.

We found that police prioritise jobs waiting for fingerprint analysis by crime type and the risk of further crime and that this approach is consistently followed.

4. Fingerprints: Does the NSW Police Force effectively manage the analysis of fingerprint evidence?

Conclusion We think police could better manage the analysis of fingerprint evidence.

Police has not established service standards for fingerprint analysis. It has not set times for the return of results to investigating officers, it does not know the unit cost of fingerprint analysis, and it does not consistently monitor performance.

Analysis of charge prints is fast

When fingerprints are electronically scanned from a suspect at a police station (referred to as charge prints or Tenprints), police have set a target of 20 to 40 minutes to return a result. Police reports it consistently meets this. Police advise this eliminates the risk of a charged person being bailed when wanted for questioning by police elsewhere.

Analysis of crime scene fingerprints could be quicker

There are, however, no targets for the analysis of crime scene prints for major or volume crime. The time taken depends on the nature of the crime and the volume of evidence. Police does not have data on the average turnaround time for major crime. Police advises that volume crime in metropolitan Sydney is processed in four to six weeks. Turnaround time in regional NSW is four to eight weeks.

We found few police forces report the time taken for fingerprint analysis. One study found, however, that the median time for analysing volume crime fingerprints was 18 days in the United Kingdom and Wales.

Police monitor the number of outstanding cases rather than the time taken to complete analysis. That is, there are generally 50-100 outstanding metropolitan major crime cases. When there are more than 100 cases on hand, staff are shifted from analysing volume crime cases to help with major crime.

Police report that the time taken to analyse fingerprints is affected by the availability of fingerprint experts and that the situation is more difficult in rural and regional NSW.

Much of the reason why police have little knowledge about the delays in analysing fingerprints is because data is currently difficult to capture.

Police advise that the introduction of the Forensic Information Management System (FIMS) in 2010 will make it easier to measure the time taken for fingerprint analysis in both major and volume crime.

Fingerprints are identifying more criminals but there is room for improvement

Fingerprint evidence is not available at all crime scenes. Where fingerprint evidence is submitted, the identification rate (that is, the proportion of cases where a person of interest is identified) has increased from nearly one in five cases in 2004-05 to more than one in three cases in 2008-09 in metropolitan Sydney. Police advise the identification rate has increased because of improvements in fingerprint matching technology, better training and improved evidence collection. Police do not currently measure identification rates in regional NSW.

Fingerprint identification rates are a useful indicator of the quality of collection techniques and analysis.

However, police reports it has not set targets for increasing the identification rate beyond one in three because the quality of a fingerprint - and therefore its ability to identify a suspect - depends on a range of factors outside their control. For example, whether the fingerprint is a full or partial print and the type of surface it has been retrieved from.

Recommendation

That by June 2010 the NSW Police Force, using identification rates, determine what is the best evidence in a case and analyse that first.

Fingerprint analysis could be better managed

Fingerprint evidence is analysed at various locations. In 2008-09, more than 12,000 fingerprint jobs were analysed in metropolitan Sydney and more than 9,000 were analysed at ten locations in regional NSW. At some locations, different approaches are used to measure and report performance.

We found that some centres use the number of jobs on hand as a measure of workload. Others report the age of their oldest job. This makes it difficult for police to compare performance and identify delays.

We also found that police has not set timeframes for providing results to investigating officers. As timely analysis of fingerprints is important for solving and preventing crime, we think police should set time standards in consultation with investigating officers.

Recommendation

That by December 2010, the NSW Police Force measure, report and set targets for the time taken to analyse fingerprint evidence.

Cost of analysing fingerprints is not known Police advises that administrative arrangements make it difficult to separate the cost of collecting fingerprint evidence from the cost of analysing it. As a result, police does not know the cost of fingerprint analysis per image or per case.

Police should know how much fingerprint analysis costs. This information will support decision-making to ensure only evidence of value to solving the case is analysed.

Recommendation That the NSW Police Force by June 2010 assess and monitor the unit cost of fingerprint analysis.

5. DNA: Do the NSW Police Force and NSW Health screen and prioritise DNA evidence for analysis?

Conclusion We found more DNA items are submitted by police than can be analysed by DAL.

Police do not always advise DAL scientists of the order in which items in a case should be analysed based on the importance of each item to the case. If police do not provide enough information, analysis will be delayed.

In the laboratory, cases are prioritised from one to five within crime types. Police request changes to priority but, while they often request faster processing to meet milestones such as court appearances, they rarely advise DAL when DNA evidence is no longer required. This means DAL may be doing unnecessary analysis, reducing the resources available to identify criminals and prevent further crime.

Details on how DNA is analysed are in Appendix 2.

Police do not effectively screen DNA evidence Although the number of offences committed in NSW has decreased over the past five years, the number of cases with DNA items increased by ten per cent and the number of DNA items submitted for analysis increased by 37 per cent. This reflects a growth in the number of DNA items per case.

Police tried managing this by limiting DNA items submitted for analysis from volume crime scenes to one item, or two items where there is evidence of more than one offender. However, in June 2009 an average of:

- 2.6 items per case were submitted to DAL for break, enter and steal cases
- 2.7 items per case were submitted to DAL for stolen motor vehicles.

Police advise that the average items per case submitted to DAL are impacted by:

- outsourcing of items from some simple volume crimes, that typically have fewer items per case (average 1.2)
- more complex volume crimes that may require the analysis of more DNA items.

Police should collect all appropriate evidence available at a crime scene. Police should then select the item that they believe best supports the case and get that analysed first. A positive result means they may not need to send further items.

In 2008-09 police submitted more than 43,000 DNA case items for analysis. In addition, more than 8,000 non-case related DNA samples were submitted for analysis. This was more case items than could be analysed and this has occurred for at least the past five years, causing delays and backlogs. Demand and capacity need to be better matched and this is discussed in Section 6.

Police advise that limitations in existing information systems mean FSG cannot track the number of items being submitted by individual commands or stations, making it difficult to enforce DNA item limits.

Police advise that FIMS has been designed to ensure all items are tracked using barcodes and includes some limits on the number of items per case that can be submitted for DNA analysis. Investigating officers will be able to exceed these limits to meet specific case requirements with approval from FSG.

Recommendation That by June 2010 the NSW Police Force improve compliance with DNA submission limits.

There has been a recent increase in priority one DNA cases DAL scientists work in dedicated teams dealing with particular crime types - either armed robbery, sexual assault, major crime or volume crime. Team leaders prioritise cases within 24 hours of receipt using a matrix with five priority levels. For example, priority one is reserved for immediate turnaround while priority five cases have the least significance in solving the crime. Each DAL team has their assigned cases ranked in priority order.

The problem with this approach using dedicated teams is that a priority two volume crime may be started before a priority two sexual assault, meaning police officers working on more serious crimes may be waiting longer for results.

Another issue is the recent increase in priority one cases. Priority one cases must be approved by FSG. All items nominated by police are examined and analysed as soon as they are received by DAL. DAL reports this is achieved by shifting resources to process these cases. From July to December 2008, DAL received an average of two priority one cases per month. This has significantly increased to an average of 13 cases per month from July to October 2009.

These issues need to be addressed as part of the service standards under the user pays model discussed in Section 6.

DNA cases stay in the queue even if they are no longer required Investigating officers do not routinely inform DAL of case developments that result in DNA analysis becoming less critical. By comparison, police in Queensland will withdraw DNA case items awaiting analysis where other evidence has led the offender to plead guilty.

In addition, while police review whether DNA is still needed for items that are in the queue for more than 12 months, DAL reports that the criteria used for this review mean few cases are withdrawn.

Recommendation That the NSW Police Force by June 2010:

- remove items when DNA analysis is no longer needed
- review the criteria used to determine whether DNA analysis is still required.

6. DNA: Do the NSW Police Force and NSW Health effectively manage the analysis of evidence?

Conclusion There is a significant and increasing gap between capacity and demand for DNA analysis in NSW, leading to ongoing delays and backlogs. At 30 June 2009, there were more than 5,500 cases in the backlog. This had increased to around 6,400 cases by 30 November 2009 and is forecast to reach almost 7,400 cases by 30 June 2010.

While there have been one-off investments to reduce the backlog that have been successful, along with outsourcing DNA analysis of volume crime, core funding for DNA analysis at DAL has declined in real terms. Once temporary funding ceases the backlog returns.

And while outsourcing has provided additional capacity to identify criminals, it is expensive, costing almost twice as much per sample as DAL.

Funding for DNA analysis does not match demand DAL's core funding is not based on the number of items submitted for analysis. In 2008-09, DAL estimated that it could analyse 18,000 DNA case items with its core funding. With the addition of temporary funding, around 32,000 DNA case items were analysed. However, police submitted more than 43,000 DNA case items, as well as more than 8,000 non-case related DNA samples. The remaining DNA case items were added to the backlog or were not analysed.

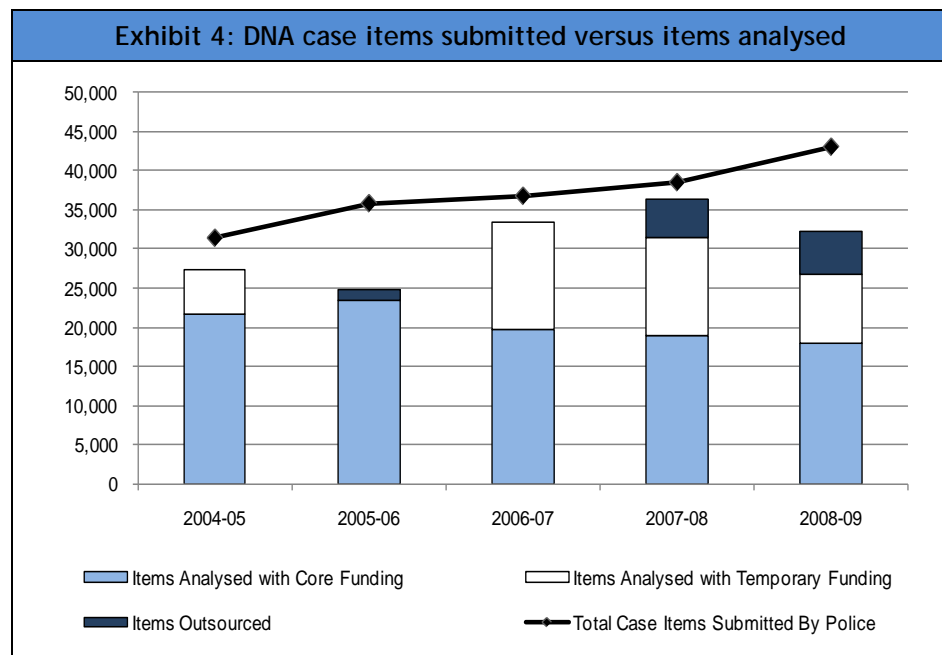
Exhibit 3: Funding for DNA analysis						
Year	DAL Core Funding			Temporary Funding		Total Annual Funding \$
	NSW Police Force \$	NSW Health \$	Total \$	Backlog Reduction \$	Outsourcing ¹ \$	
2004-05	3,847,608	1,142,700	4,990,308	219,237	-	5,209,545
2005-06	4,048,163	1,268,974	5,317,137	-	-	5,317,137
2006-07	4,057,295	1,221,367	5,278,662	566,545	-	5,845,207
2007-08	4,100,000	1,389,000	5,489,000	689,734	1,322,456	7,501,190
2008-09	4,100,000	1,415,623	5,515,623	1,227,492	2,977,802	9,720,917

Source: NSW Police Force and NSW Health

¹ Outsourcing costs include DAL expenses, police expenses and amounts paid to the private contractor.

Although core funding for DNA analysis at DAL has increased by 10.5 per cent in the past five years, this is a decline in real terms.

In 2004-05, DAL's core capacity was almost 70 per cent of DNA items received, today it is just over 40 per cent.



Source: NSW Health

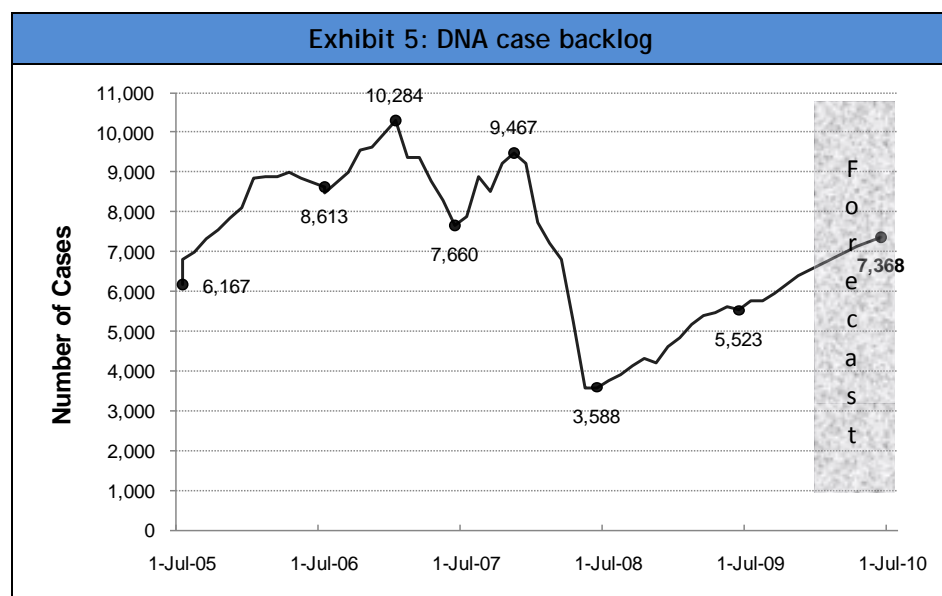
Note: The number of DNA case items submitted does not include non-case related DNA samples such as those taken from convicted offenders.

In 2008-09 there were 8,039 of these samples.

Delays and backlogs are increasing

A case that is not started 30 days after receipt is classified as part of the backlog. Cases remain in the backlog until they are completed.

On 30 June 2009, there were 5,523 cases in the backlog. This represented almost 28,200 DNA items, or more work than DAL can do in a year with its core funding. By 30 November 2009, the backlog had increased to 6,405 cases. Of these, 31 per cent were submitted in 2008 and 69 per cent were submitted in 2009. In terms of crime type - 54 per cent of backlogged cases were volume crimes, 37 per cent were major crimes and nine per cent were sexual assaults.



Source: NSW Health

In 2007-08, the backlog was reduced by nearly 6,000 cases through several strategies including \$2 million in temporary funding and a police review and cull of cases in the backlog. In 2008-09, despite \$4.2 million in temporary funding, the backlog actually increased by nearly 2,000 cases.

Even with temporary funding, currently around 154 cases are being added to the backlog each month. At this rate, DAL forecasts the backlog will reach 7,368 cases by 30 June 2010, a 33 per cent increase in a year.

Outsourcing increases capacity

NSW is the only Australian jurisdiction to outsource DNA analysis to a private company. Police entered a three year contract in January 2008. Outsourcing is limited to simple volume crime samples (for example, swabs and cigarette butts) where no suspect has been identified. These samples are processed by the company which then returns DNA profiles to DAL.

Results are returned from the outsourcing company to DAL within ten days. However, outsourcing costs are almost twice the cost of processing at DAL.

In 2007-08 and 2008-09, police spent \$4.3 million to outsource 10,447 items. This equates to \$412 an item. By comparison, DAL analysed 58,158 items at a cost of \$12.9 million over the same period. This equates to \$222 per item. And DAL needs to do more work per item as it analyses complex exhibits and interprets DNA results.

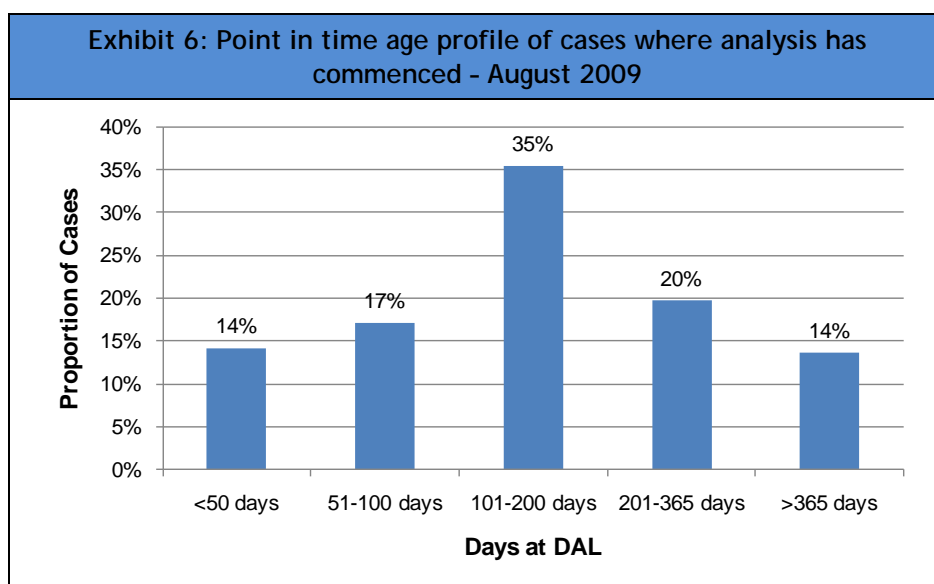
Recommendation

That by June 2010, the NSW Police Force reviews the cost effectiveness of its DNA outsourcing arrangements.

Delays in completing analysis

While DAL measures its backlog and provides monthly reports to police, processing times for cases that are started within 30 days (and are therefore not counted in the backlog) but remain incomplete are less well understood.

In August 2009, we reviewed the age profile of more than 740 cases where analysis had commenced. We found almost 70 per cent of these cases had been at DAL for more than 100 days.



Source: Audit Office Research

The age profile of incomplete cases that are not counted in the backlog varied for different crime types. In August 2009, we found 30 per cent of major crimes had been at DAL for more than a year - compared to seven per cent of sexual assaults, ten per cent of armed robberies and three per cent of volume crimes.

Delays occur while evidence waits in queues for work to commence

DAL measures the processing time from the date a case item is received to the date a verbal result is provided to police. DAL does not report this turnaround time to police because they have not been able to reach agreement on time standards due to the gap between capacity and demand.

In 2008-09, 45 per cent of items analysed from murders and manslaughters were completed within a month of receipt and almost 90 per cent were completed within six months. For sexual assault, the results were 33 per cent and 76 per cent respectively.

Exhibit 7: Time from receipt at DAL to result returned to police - selected crime types - 2008-09					
	Months				
	<1	<3	<6	<12	>12
Murder and Manslaughter	45%	75%	87%	94%	6%
Sexual Assault	33%	58%	76%	87%	13%
Break, Enter and Steal	12%	38%	56%	71%	29%
Stolen Vehicles	7%	32%	53%	71%	29%
All Offences	24%	53%	74%	87%	13%

Source: NSW Health

The results for volume crime are slow. In 2008-09 only 12 per cent of items analysed for break, enter and steal cases were completed within a month of receipt.

Exhibit 8: Role of DNA evidence in volume crime
<p>The Forensic Services Department of Victoria Police surveyed investigating officers to find out when they needed DNA results to achieve the best outcome in terms of solving and preventing volume crime.</p> <p>They found that, ideally, DNA results should be available in less than four weeks although results provided within eight weeks were still useful.</p> <p>Investigating officers advised that there was limited value in getting an identification on a volume crime case that was one or two years old as it was likely the offender may have committed other offences. In such instances the identification may resolve the case, but it would do nothing to reduce crime.</p>

Source: Victoria Police

Delays are often caused by items waiting for work to commence rather than the analysis itself. If DAL had the capacity to start work on cases as soon as items arrived in 2008-09, police would have had a result within a month for 80 per cent of items analysed from murder and manslaughter cases. This would help police solve crimes and catch criminals more quickly.

Exhibit 9: Time from commencement of DNA casework to result returned to police - 2008-09				
	Months			
	<1	<3	<6	<12
Murder and Manslaughter	80%	95%	98%	100%
Sexual Assault	85%	97%	99%	100%
Break, Enter and Steal	45%	81%	96%	100%
Stolen Vehicles	25%	74%	94%	98%
All Offences	67%	91%	98%	100%

Source: NSW Health

DAL's funding model needs fixing

Delays in DNA analysis have been highlighted in public reports by the Public Accounts Committee in 2002 and the NSW Ombudsman in 2006. There have also been numerous internal government reviews of DNA analysis since 2002.

Government responses to the delays in analysis found in these reviews have focused on providing one-off funding to reduce backlogs rather than better managing demand and capacity.

The number of core DNA processing staff at DAL is low. In 2009 there was only one DNA processing staff member at DAL for every 275 police officers which was a lot less than other states.

Exhibit 10: DNA processing staff compared to police numbers and population, 2009				
State	DNA Processing Staff (A)	Police Force (B)	Total Population (C)	Ratio A:B:C
NSW (DAL)	57	15,661	7,076,500	1: 275: 124,149
Victoria	75	11,039	5,402,600	1: 147: 72,035
Queensland	75	10,645	4,380,000	1: 142: 58,405

Source: Audit Office Research

In July 2008, in considering the persistent backlog, Cabinet determined that DNA analysis should be delivered on a user pays basis. That is, police pay DAL per unit of service and these payments should allow DAL to recover its costs. This approach has not been implemented.

User pays will support better management of DNA casework. Firstly, DAL could better match resources to workload while meeting service standards set by police. Secondly, funding constraints would help ensure the items submitted by police have a high evidentiary value.

Recommendations That the NSW Police Force and NSW Health sign a Service Level Agreement for DNA analysis by June 2010 that includes:

- a user pays framework to be piloted over 12 months and reviewed in June 2011
- detailed service standards including turnaround times.

That the NSW Police Force report the time taken to analyse fingerprint and DNA evidence for different crime types in its annual reports commencing with its 2010-11 report.

Better performance measures are needed

DAL and police use the number of cold links to measure DNA's contribution to solving crime. A cold link occurs when a suspect or crime scene is linked to another unsolved crime by the DNA database when there is no previous evidence linking the two. Since 2001, there have been more than 23,000 cold links in NSW leading to more than 7,000 charges and almost 4,600 convictions for offences ranging from stealing to murder.

Exhibit 11: DNA cold links solving crime

Examples of successful cold links include:

- blood samples taken from an armed home invasion in suburban Sydney provided a DNA sample that linked the crime to a person on the Queensland database
- in July 2008 police laid charges for several sexual assault offences that occurred in 2001 following a national DNA profile link. The offender has been convicted and sentenced to four years of imprisonment
- a NSW/Queensland taskforce was established following the link between a break and enter crime scene in NSW and a murder in Queensland and led to a person being charged with murder in Queensland.

Source: NSW Police Force

This is a good measure but only part of the picture. Other measures are needed to understand how much of the DNA evidence that is submitted and analysed supports criminal prosecutions. This information will help police and DAL to use their resources more effectively.

For example, DAL scientists told us they may only analyse 40-45 per cent of items submitted for a case. Given this, police may wish to work with DAL to ensure they only submit the best items for analysis, freeing up resources for use on other priorities.

Police measure the fingerprint identification rate and could also measure the DNA identification rate - that is, the percentage of cases where DNA evidence is submitted where a person of interest is identified using DNA.

NSW Health suggests that the DNA success rate could be measured as a percentage of DNA samples that provide a DNA profile. This is different for different sources of DNA. Samples of blood have a success rate of more than 90 per cent compared to trace DNA from door handles with around 16 per cent. Police should use this to determine the best evidence to analyse in a case.

Recommendation That the NSW Police Force and NSW Health by June 2010 develop and monitor performance measures for DNA analysis and ensure the best items in a case are analysed first.

Backlogs were reduced in Victoria Other jurisdictions in Australia have reduced or eliminated their backlogs by increasing resources and changing their processes. This has allowed them to change the way DNA evidence is managed to better support investigating officers.

In Victoria, the recruitment of additional scientists and the introduction of robotics has increased capacity and reduced the backlog for volume crime cases. Police have also changed the way they manage volume crime cases so that investigating officers get results within four weeks in most cases.

At the start of each month, Victoria Police Forensic Services Department starts analysing volume crime items from the previous month. Once this work is complete, the volume crime team moves onto processing backlogged cases for the rest of the month.

This means that the backlog continues to be reduced while DNA results for current volume crimes are being fast-tracked. As some burglars commit nine burglaries a month, early identification is important for crime prevention.

This contrasts with the approach in NSW where the oldest volume crimes are analysed first and more recent cases continue to be added to the backlog. As at 30 November 2009, 69 per cent of cases in the backlog were received in 2009.

Recommendation That the NSW Police Force by December 2011 change its approach to analysing DNA evidence from less serious property crimes (known as volume crimes) to assessing new cases first.

A different approach is used successfully in Queensland Police advise they are investigating ways to reduce the amount of casework DAL scientists need to do.

A sub-sampling project was trialed in 2009. During the trial, police Scene of Crime Officers converted complex DNA evidence (for example, clothing) to simple samples (for example, swabs or swatches) at the crime scene. This is called sub-sampling and is usually done by DAL scientists. The samples were then sent to DAL with information on how and why they had been taken to support their analysis. Police advise the project will be rolled out statewide for volume crime in 2010.

The project is based on practices in Queensland. Queensland Health Forensic and Scientific Services analyses DNA items for Queensland Police. In 2005, Queensland had a backlog of 23,000 DNA items. By March 2008, the backlog was reported to have been eliminated through:

- the provision of an additional \$11 million over three years to double forensic staff
- improved police prioritisation and liaison
- a new information system
- improved facilities, including robotics.

The average turnaround time in Queensland in 2007-08 was five months. Queensland Police have sub-sampled items for major and volume crime since 1 July 2008. The average time for DNA analysis was two months in December 2009.

In NSW there is potential for police to have a great deal of success with this approach. However, police will need to monitor and manage:

- the quality of samples submitted
- overall cost of DNA analysis including police sub-sampling
- impacts on obtaining profiles and identifications
- impacts on the use of DNA evidence in court.

Recommendation That the NSW Police Force by December 2010, review the sub-sampling project to assess its effect on both the cost and timeliness of DNA analysis.

Appendices

Appendix 1: About the audit

Audit objective This audit examined how well fingerprint and DNA evidence was managed to reduce delays.

Lines of inquiry In reaching our opinion against the audit objective, we sought to answer the following questions:

1. Does the NSW Police Force and NSW Health/DAL have an effective process to screen and prioritise fingerprint and DNA evidence for analysis?
2. Does the NSW Police Force and NSW Health/DAL effectively manage the analysis of fingerprint and DNA evidence?

Audit criteria In answering the lines of inquiry, we used the following audit criteria (the 'what should be') to judge performance. We based these standards on our research of current thinking and guidance on better practice. They have been discussed, and wherever possible, agreed with those we are auditing.

For line of inquiry 1, we assessed the extent to which:

- there were clearly defined procedures regarding the screening and prioritisation of fingerprint and DNA evidence before analysis and that these were consistently applied
- there were clearly defined procedures determining how new items were prioritised vis a vis items that were already queued for analysis and that these were consistently applied
- police and DAL monitor whether analysis priorities are being applied in compliance with procedures
- police monitored the effectiveness and economy of fingerprint and DNA analysis.

For line of inquiry 2, we assessed the extent to which:

- there were clearly defined time standards for the analysis of fingerprint and DNA evidence and these were consistently met
- there were appropriate mechanisms for keeping the investigating officer informed of where the item is (physical location), progress in analysis and when results are expected
- there were appropriate mechanisms for the investigating officer to raise concerns (eg delays, laboratory assistance and communication) with FSG regarding the analysis of fingerprint and DNA items
- there were clear definitions of work load, delays and backlogs at fingerprint and DNA facilities
- police knew the cost of analysing fingerprint and DNA evidence
- appropriate service standards were clearly defined and consistently implemented.

Audit scope	<p>The audit did not examine:</p> <ul style="list-style-type: none">▪ the collection, recording or tracking of fingerprint and DNA evidence before it arrives for analysis▪ the use of results to resolve criminal investigations and preparation of the brief of evidence▪ the return of evidence to the investigating officer▪ coronial investigations▪ scientific methods and standards. <p>The audit did not review the scientific standards set and observed for analysis because FSG, DAL and the outsourced provider are accredited by the National Association of Testing Laboratories (NATA). NATA accredits laboratories to an international standard that covers management and technical requirements including: sample handling; record control and control of non-conforming testing work; internal audits and management reviews; staff competence and proficiency; and the testing and calibration of equipment. NATA conducts accreditation reviews every two years.</p> <p>In addition, DAL is the subject of an independent external review of its DNA analysis function following the recent discovery of three errors dating from 2002. One of these errors resulted in the prosecution of a person for a crime they did not commit. Health advises improved mandatory checking procedures have been introduced since 2002 and that the review will assess whether quality assurance processes at DAL meet best practice. The review was completed in November 2009.</p>
Audit approach	<p>We acquired subject matter expertise by:</p> <ul style="list-style-type: none">▪ interviewing staff responsible for screening evidence in a case to select items that should be analysed▪ interviewing staff responsible for deciding the priority level assigned to the evidence to be analysed▪ interviewing staff involved in managing interactions between police and the analysis facilities▪ reviewing performance reports▪ reviewing previous reports that considered DNA analysis in NSW. These included the Public Accounts Committee, Inquiry into Court Waiting Times (2002) and NSW Ombudsman, DNA Sampling and Other Forensic Procedures Conducted on Suspects and Volunteers Under the Crimes (Forensic Procedures) Act 2000 (2006)▪ analysing performance data.

We also examined how fingerprint and DNA analysis was managed in other jurisdictions to identify best practice and issues that may impact on the screening, prioritisation and analysis of evidence. We examined the following jurisdictions:

- Victoria, Queensland and Western Australia
- New Zealand
- United Kingdom
- Canada
- United States.

We visited the NSW Police Force Forensic Services Group at Pemulwuy and Parramatta and the NSW Health Division of Analytical Laboratories (DAL) at Lidcombe.

We also visited Victoria Police, Queensland Police and Queensland Health Forensic and Scientific Services.

We spoke to stakeholders in the Local and District Courts, the Attorney General's Department, the Office of the Director of Public Prosecutions, Legal Aid and the NSW Bureau of Crime Statistics and Research.

Audit selection	We use a strategic approach to selecting performance audits which balances our performance audit program to reflect issues of interest to Parliament and the community. Details of our approach to selecting topics and our forward program are available on our website.
Audit methodology	<p>Our performance audit methodology is designed to satisfy the Australian Audit Standard on Assurance Engagements ASAE3500 Performance Engagements.</p> <p>We produce our audits under a quality management system certified to International Standard ISO 9001. Our processes have also been designed to comply with the auditing requirements specified in the <i>Public Finance and Audit Act 1983</i>.</p>
Acknowledgements	We gratefully acknowledge the co-operation and assistance provided by the NSW Police Force, NSW Health and the Division of Analytical Laboratories. We would particularly like to thank our liaison officers - Assistant Commissioner Carlene York at the NSW Police Force and Mr Kevin Forward at NSW Health.
Audit team	Our team leader for the performance audit was Giulia Vitetta, who was assisted by Belinda Archer. Jane Tebbatt provided direction and quality assurance.
Audit cost	Including staff costs, printing costs and overheads, the estimated cost of the audit is \$200,000.

Appendix 2: Fingerprint and DNA Analysis

How are fingerprints analysed?

Fingerprint evidence is analysed by the Forensic Services Group (FSG) of the NSW Police Force.

Sometimes chemical processes are needed to make fingerprints visible. The FSG Fingerprint Laboratory at Pemulwuy in Western Sydney treats exhibits collected at crime scenes in metropolitan Sydney so fingerprints can be seen and identified.

The FSG Fingerprint Operations Branch at Parramatta analyses crime scene fingerprints from metropolitan Sydney and fingerprints taken from people who have been arrested (known as Tenprints) from across NSW.

The FSG Crime Scene Services Branch provides fingerprint recovery and analysis for crimes outside the Sydney metropolitan area. Crime Scene Services has ten accredited evidence examination locations in rural and regional NSW.

Fingerprints from crime scenes and individuals are compared to the National Automated Fingerprint Identification System (NAFIS). NAFIS is administered by the Commonwealth Government and contains 4.4 million ten print records and 600,000 prints from unsolved crime scenes from every Australian state and territory. Once NAFIS generates a candidate list, the actual match is made by a fingerprint technician.

The process is relatively simple for Tenprints. This is because most charge prints are scanned electronically by Livescan units in police stations and are high quality. This means NAFIS will usually only provide one matching candidate.

Fingerprints taken from crime scenes may, however, be incomplete or unclear. This means NAFIS may generate a relatively long list of potential candidates to be checked by a fingerprint technician.

Depending on the quality of the crime scene print, establishing and documenting a match can be complex. If a match is made it must be checked by a fingerprint expert and then by a verification expert. Fingerprint experts take up to five years to train and verification experts must have even more experience.

How is DNA analysed?

Skin, hair follicles, semen, saliva and blood are common sources of DNA at a crime scene.

Simple DNA samples - such as a cigarette butt or a blood swab - are relatively easy for the laboratory to process. Other exhibits are more complex. For example, if police believe a suspect grabbed a victim's shoulder they may submit the victim's shirt for DNA analysis. A forensic scientist - using information from police - will have to recover a sample of DNA from the shirt. Such trace DNA is invisible and may consist of just a few cells, making it difficult to remove enough for examination. Analysis may also be inhibited by dyes in the fabric. As a result, samples may need to be processed and analysed a number of times.

DNA samples from crime scenes go through a number of scientific processes:

- extraction - separates the DNA from the material containing it
- quantification - measures the amount of DNA in a sample
- amplification - creates multiple copies for analysis
- analysis - converts the invisible DNA profile into a series of graphs and readouts that can be interpreted
- interpretation - a scientist compares the profile to another profile from a suspect, another crime scene or a database. Two databases are used in NSW - the NSW DNA Database and the National Criminal Investigation DNA Database.

The scientist does not look at the entire DNA code - this would take years because the molecule is so large - and, in addition, a lot of DNA is common between humans (and indeed between humans and other species). Rather, specific "hyper-variable regions" or loci are targeted to see if they match. In Australia, nine loci are examined plus a test to determine the sex of the sample's donor. This is expected to increase to 16 loci over the next few years. Scientists then use statistical models to determine the likelihood that one profile matches another.

This is known as the match probability and is the estimated frequency of the profile in the general population. For example, the laboratory may state: The accused has the same profile as the DNA recovered from the crime scene sample. This profile is expected to occur in fewer than one in ten billion individuals in the general population.

This does not mean that the sample could not come from someone other than the accused but that there is only a one in ten billion chance of finding someone with the same profile if you chose someone at random from the general population. Unlike fingerprints, DNA is not entirely unique - identical twins will have identical DNA and close relatives may have similar DNA characteristics.

Interpretation also becomes more difficult where there is a mixture of a number of people's DNA.

Appendix 3: Glossary

DNA Case Items and Samples	A number of items (for example, pieces of clothing) may be submitted as part of a case. Scientists, using information from police, examine items and isolate DNA samples for analysis. A number of samples may come from one item.
Fingerprint Jobs and "Graphs"	A criminal case may include a number of fingerprint jobs. Each job may contain a number of "graphs" (photographs) from a crime scene and each graph may include images of a number of fingerprints.
Major Crime	Major crimes are usually crimes against people such as murder, manslaughter and assault. High value property and drug offences may also be classed as major crimes.
Prioritisation	Prioritisation is the process used to determine the order of analysis. Both cases and items within cases may be prioritised.
Screening	Screening is: <ul style="list-style-type: none">▪ the determination of the quality of items to ensure the "best" are submitted for analysis, and▪ the limitation of the number of items analysed to the level needed to establish a suspect's identity.
Volume Crime	<p>Volume crimes are less serious property crimes such as break and enter, motor vehicle theft or steal from a motor vehicle.</p> <p>In terms of DNA analysis, police classify volume crimes as simple or complex. A simple volume crime is:</p> <ul style="list-style-type: none">▪ where there are no clothing items or implements recovered - such items are more complex to analyse▪ a recovered stolen vehicle that has not been used in another offence▪ a steal from motor vehicle or malicious damage offence. <p>Police advise simple volume crimes tend to have fewer items for DNA analysis.</p>

Performance Audits by the Audit Office of New South Wales

Performance Auditing

What are performance audits?

Performance audits determine whether an agency is carrying out its activities effectively, and doing so economically and efficiently and in compliance with all relevant laws.

Performance audits may review a government program, all or part of a government agency or consider particular issues which affect the whole public sector.

Where appropriate, performance audits make recommendations for improvements.

If you wish to find out what performance audits are currently in progress, visit our website at www.audit.nsw.gov.au.

Why do we conduct performance audits?

Performance audits provide independent assurance to Parliament and the public that government funds are being spent efficiently and effectively, and in accordance with the law.

Performance audits seek to improve the efficiency and effectiveness of government agencies so that the community receives value for money from government services.

Performance audits also assist the accountability process by holding managers to account for agency performance.

What are the phases in performance auditing?

Performance audits have three key phases: planning, fieldwork and report writing.

During the planning phase, the audit team will develop audit criteria and define the audit field work.

At the completion of field work we will meet with agency management to discuss all significant matters arising out of the audit. Following this, we will prepare a draft performance audit report.

We meet with agency management to check that facts presented in the report are accurate and that recommendations are practical and appropriate. Following this, a formal draft report is provided to the CEO for comment. The relevant Minister is also provided with a copy of the final

report. The final report, which is tabled in Parliament, includes any comment made by the CEO on the conclusion and the recommendations of the audit.

Depending on the scope, performance audits can take several months to complete.

Copies of our performance audit reports can be obtained from our website or by contacting our Office.

How do we measure an agency's performance?

During the planning phase, the team develops the audit criteria. These are standards of performance against which the agency or program is assessed. Criteria may be based on best practice, government targets, benchmarks, or published guidelines.

Do we check to see if recommendations have been implemented?

Agencies are requested to report actions taken against each recommendation in their annual report so that we can monitor progress.

The Public Accounts Committee (PAC) may conduct reviews or hold inquiries into matters raised in performance audit reports. These inquiries are usually held 12 months after the report is tabled.

Who audits the auditors?

Our performance audits are subject to internal and external quality reviews against relevant Australian and international standards. This includes ongoing independent certification of our ISO 9001 quality management system.

The PAC is also responsible for overseeing the activities of the Audit Office and conducts a review of our operations every three years.

Who pays for performance audits?

No fee is charged for performance audits. Our performance audit services are funded by the NSW Parliament and from internal sources.

Further information

Further information can be obtained from our website www.audit.nsw.gov.au or by contacting us on 9275 7277.

Performance Audit Reports

No	Agency or Issues Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
195	NSW Police Force NSW Department of Health	<i>Managing Forensic Analysis - Fingerprints and DNA</i>	February 2010
194	Department of Premier and Cabinet Department of Services, Technology and Administration NSW Treasury	<i>Government Advertising</i>	10 December 2009
193	Roads and Traffic Authority of NSW	<i>Handback of the M4 Tollway</i>	27 October 2009
192	Department of Services, Technology and Administration	<i>Government Licensing Project</i>	7 October 2009
191	Land and Property Management Authority Maritime Authority of NSW	<i>Administering Domestic Waterfront Tenancies</i>	23 September 2009
190	Department of Environment, Climate Change and Water NSW Environmental Trust	<i>Environmental Grants Administration</i>	26 August 2009
189	NSW Attorney General's Department NSW Department of Health NSW Police Force	<i>Helping Aboriginal Defendants through MERIT</i>	5 August 2009
188	NSW Department of Health	<i>Tackling Cancer with Radiotherapy</i>	23 June 2009
187	Roads and Traffic Authority of NSW	<i>Improving Road Safety - Heavy Vehicles</i>	13 May 2009
186	Grants	<i>Grants Administration</i>	6 May 2009
185	Forests NSW	<i>Sustaining Native Forest Operations</i>	29 April 2009
184	NSW Police Force	<i>Managing Injured Police</i>	10 December 2008
183	Department of Education and Training	<i>Improving Literacy and Numeracy in NSW Public Schools</i>	22 October 2008
182	Department of Health	<i>Delivering Health Care out of Hospitals</i>	24 September 2008
181	Department of Environment and Climate Change	<i>Recycling and Reuse of Waste in the NSW Public Sector</i>	11 June 2008
180	Follow-up of 2003 Performance Audit	<i>Protecting Our Rivers</i>	21 May 2008
179	NSW Office of Liquor, Gaming and Racing; NSW Police Force	<i>Working with Hotels and Clubs to reduce alcohol-related crime</i>	23 April 2008
178	Greyhound and Harness Racing Regulatory Authority	<i>Managing the Amalgamation of the Greyhound and Harness Racing Regulatory Authority</i>	3 April 2008
177	Office of the Director of Public Prosecutions	<i>Efficiency of the Office of the Director of Public Prosecutions</i>	26 March 2008
176*	Better Practice Guide	<i>Implementing Successful Amalgamations</i>	5 March 2008

No	Agency or Issues Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
175	Department of Commerce Department of Primary Industries	<i>Managing Departmental Amalgamations</i>	5 March 2008
174	Department of Education and Training	<i>Ageing workforce - Teachers</i>	13 February 2008
173	NSW Police Force	<i>Police Rostering</i>	5 December 2007
172	Department of Primary Industries	<i>Improving Efficiency of Irrigation Water Use on Farms</i>	21 November 2007
171	Department of Premier and Cabinet Department of Commerce	<i>Government Advertising</i>	29 August 2007
170	RailCorp	<i>Signal Failures on the Metropolitan Rail Network</i>	15 August 2007
169	NSW Police Force	<i>Dealing with Household Burglaries</i>	27 June 2007
168	Ministry of Transport	<i>Connecting with Public Transport</i>	6 June 2007
167	Follow-up of 2001 Performance Audit: Ambulance Service of New South Wales	<i>Readiness to Respond</i>	6 June 2007
166	Follow-up of Performance Audit Department of Education and Training	<i>Using Computers in Schools for Teaching and Learning</i>	9 May 2007
165	Homelessness	<i>Responding to Homelessness</i>	2 May 2007
164	Department of Juvenile Justice NSW Police Force	<i>Addressing the Needs of Young Offenders</i>	28 March 2007
163	Legal Aid Commission of NSW	<i>Distributing Legal Aid in New South Wales</i>	13 December 2006
162	NSW Health	<i>Attracting, Retaining and Managing Nurses in Hospitals</i>	12 December 2006
161	Follow-up of 2003 Performance Audit	<i>The Police Assistance Line</i>	6 December 2006
160	NSW Health	<i>Helping Older People Access a Residential Aged Care Facility</i>	5 December 2006
159	NSW Health	<i>Major Infectious Disease Outbreaks: Readiness to Respond</i>	22 November 2006
158	Department of Education and Training	<i>Educating Primary School Students with Disabilities</i>	6 September 2006
157	Roads and Traffic Authority	<i>Condition of State Roads</i>	16 August 2006

* Better Practice Guides

Performance audits on our website

A list of performance audits tabled or published since March 1997, as well as those currently in progress, can be found on our website www.audit.nsw.gov.au.

If you have any problems accessing these reports, or are seeking older reports, please contact our Office Services Manager on (02) 9275 7116.