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Review

Review of the PathWest Forensic Biology Department

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Introduction

This review into the State's pathology department, the Forensic Biology Department (the Department) of PathWest Laboratory Medicine WA (PathWest) was initiated following the discovery that an individual, Mr Alan Stephen Staines had been given a suspended sentence for a burglary based on an incorrect DNA match. The match was later identified as DNA belonging to another individual with the same first name and surname. The error in this case, was not due to a scientific error. The DNA sample identified the correct reference sample. However, there appears to have been an administrative error where the wrong person's file was manually retrieved. Both person's DNA reference sample files were received in the same batch of files on the same day for analysis.

Following discussions with the Director General of the Department of Health, the Public Sector Commission commenced a review into the matter in May 2017. This report has reviewed the original Staines case files to confirm when the identification error had occurred and also conducted an audit of additional randomly chosen case files to determine whether any similar errors had occurred. Of the 448 Database Hit Reports assessed by the Review Team, no other cases contained identification errors.

The Review Team also looked at the relevant policies and procedures within the Department since the establishment of the State DNA Database in 2002 and how these have evolved over time. At the time of the Staines identification error, many of the processes were manual, including file retrieval. This increased the likelihood of errors occurring. Since this time, the Department's processes have become increasingly electronic and automated to reduce this risk.

The Department is also regularly audited by the National Association of Testing Authorities (NATA) Australia. NATA is an independent authority that accredits laboratories and provides independent technical assurances that facilities comply with Australian and international standards. The Review Team examined each accreditation report issued since 2004 and confirmed that the Department are compliant with the industry standards.

Background

This report

This report documents the outcomes from a review of the State Government's pathology service, the Forensic Biology Department of PathWest Laboratory Medicine WA (the Department) undertaken for the Public Sector Commissioner (Commissioner), in accordance with Section 24B of the *Public Sector Management Act 1994* (PSM Act).

Catalyst for the review

The Commissioner initiated the review following discussions with the Director General of the Department of Health, after an error in the reporting of a DNA profile match was identified in April 2017. The error involved the provision of information to Western Australia Police (WA Police) in 2004, which incorrectly listed a named individual leading to that individual pleading guilty and being convicted. This raised the possibility that adequate governance arrangements may not be in place to provide an assurance that the Department has complied with procedures and protocols. The Department also initiated its own internal review of the DNA profile match.

Jurisdiction

The North Metropolitan Health Service is the authority responsible for the management of business processes and of staff employed in the Department. Under Section 24B(1) of the PSM Act, the Commissioner is authorised to undertake a review of public sector bodies. The Public Sector Commission (Commission) is authorised to access identifying information as prescribed under Section 5A(b) under the *Criminal Investigation (Identifying People) Amendment Regulations 2002*.

Approach

In summary, the review examined:

- the circumstances that—gave rise to and—contributed to the error in the Staines matter.
- relevant information and experience from other jurisdictions in relation to DNA identification errors

The review also undertook:

- an assurance audit to test the likelihood of the existence of other Staines identification errors
- a review of the development of procedures and protocols to address the risk of a Staines identification error.

This report describes the examinations and actions undertaken by the Review Team in detail.

Terms of reference

The Commissioner conducted the review under Section 24B of the PSM Act into the Department. The review:

1. Examined a random sample of Database Hit Reports issued by the Department during the period 2002– to 2017, to ensure compliance with protocols and procedures.
2. Considered the circumstances surrounding the provision of a Database Hit Report to WA Police in 2004 which incorrectly listed a named individual leading to that individual's conviction.
3. In relation to a DNA database as defined in Section 76 of the *Criminal Investigation (Identifying People) Act 2002* (the Act), reviewed:
 - a) the effectiveness of the quality controls system
 - b) compliance with Part 10 of the Act
 - c) reporting mechanisms that monitor compliance with protocols and procedures.
4. Considered the adequacy of internal and external communication mechanisms in relation to routine results and where breaches of protocols occur.
5. Identified and reported on any non-compliances or breaches found to have occurred.
6. Made recommendations for improvements to governance, management, training and probity controls to enhance the services provided as they pertain to the integrity of forensic results.

Terms used

DNA

Deoxyribonucleic Acid (DNA) refers to hereditary genetic information which determines physical characteristics.

DNA sample collection

A DNA sample is a collection of cells from the body that is usually collected as a buccal swab (mouth swab) by swiping the inside of the mouth. Section 56 of the *Criminal Investigation (Identifying People) Act 2002* states that only doctors, nurses, dentists or qualified persons¹ including police officers are authorised to take a buccal swab. WA Police can take samples from people charged with, or suspected of, committing a serious offence that carries a statutory penalty of 12 months or more, regardless of the actual sentence imposed.²

Crime scene sample

A DNA sample collected from a crime scene. Crime scene samples can be collected from anything that may have been touched or worn by the person of interest including: clothing, hats, weapons, tools, cups and cigarettes.

Reference sample

A DNA sample taken from an identified individual used for subsequent comparison against other DNA reference samples and crime scene samples. The amount of time a sample is kept on file and can be used varies according to its classification. For example, a person may request that their sample is destroyed after two years if they have not been charged with an offence, or were found not guilty of an offence originally charged³.

Database Hit Reports

Database Hit (DBH) Reports are intelligence reports that contain information necessary for particular individual/crime scene DNA samples to be identified by the WA Police. They are issued as preliminary reports for intelligence purposes only. If a matter proceeds to trial, a full trial report is prepared and undergoes a full technical review.

¹ Defined under Section 4 of *Criminal Investigation (Identifying People) Regulations 2002* as police officers, forensic scientists, forensic technicians and approved fisheries officers appointed under Section 11 of the *Fish Resources Management Act 1994*.

² Western Australia Police (2015) *DNA samples*

³ Western Australia Police (2015) *DNA samples*

Database Link

Database links occur when two DNA samples match on the State DNA Database. This is different to a DBH Report as samples can be linked without a file being created. For example, a match between a crime scene and a witness sample.

FTA Cards

Flinders Technology Associates (FTA) Cards are the global industry standard used to collect and store DNA samples, blood, and cell cultures for analysis.

Staines identification error

An error in the identification of the individual, where a reference DNA sample has been scientifically correctly matched to a crime scene sample but the incorrect file has been retrieved. This is explained in more detail in the [Staines case section of the report](#).

Previous forensic services reports

The Western Australia DNA database was established in July 2002, with DNA analysis quickly becoming an important tool to assist in the identification and analysis of crime scene evidence. By 2012, the Department was receiving 30,171 requests for analysis per year.⁴ This section outlines findings and recommendations from previous reports into forensic services in Western Australia and other jurisdictions to identify trends in the field.

Western Australia

WA Department of Health - Ross Inquiry into PathWest Laboratory Medicine WA

The Department of Health inquiry examined whether a past Department Reporting Scientist who had engaged in misconduct had compromised evidence, results or reports provided to the WA Police or the Office of the Director of Public Prosecutions (ODPP). The inquiry undertook a forensic review of 19 cases, involving 27 persons of interest. The inquiry found 11 anomalous results, comprising eight transcription errors, two typographical and one which was the subject of a further Department review⁵.

The main findings from the review related to the Staines case were that the anomalous results were not detected by the existing peer review process and that typographical errors were an indicative risk when using manual processes. New electronic systems introduced since have automated many of these processes and reduced the risk of similar errors occurring. Where these manual elements could not be removed, it was recommended to emphasise these as particular risk points for the peer review and to be included in the Case Record Review form⁶. Furthermore, it recommended that the Department Case Report Management System be configured to not allow reports to be issued without a peer review.⁷

⁴ Auditor General for Western Australia (2013) Follow-up Performance Audit of Behind the Evidence: Forensic Services, Report 8 June 2013, p9

⁵ Department of Health (2017) Ross Inquiry into PathWest Laboratory Medicine WA, p20

⁶ Department of Health (2017) Ross Inquiry into PathWest Laboratory Medicine WA, p29-31

⁷ Department of Health (2017) Ross Inquiry into PathWest Laboratory Medicine WA, p30-31

WA Office of the Auditor General Report 2006

This report examined the efficiency and effectiveness of forensic investigation and analysis conducted by WA Police, PathWest and Chemistry Centre with a focus on DNA evidence. It found forensic service agencies were not successfully working together to provide services in a timely and effective manner to meet the needs of the justice system⁸.

Some of the main recommendations from the report, which are relevant to the Staines case included reducing the backlog of cases by identifying the analyses that were no longer required and agreeing on priorities for analysis requests⁹. The report noted how a priority system aligned with client needs would assist in the allocation of resources. This was supported by a WA Police analysis of forensic exhibits to identify exhibits more likely to provide DNA results. This information was used to reduce the number of requests for analysis to the Department and increase the rate of DNA matches¹⁰.

Further examination of the backlog would lead to a more efficient use of resources with studies in other states finding that a significant number of analyses were no longer needed for reasons including the offender had plead guilty, the charges were dropped or the conviction was secured using other evidence¹¹.

The report also noted the importance of managing the demands for forensic services. It found a lack of effective inter-agency consultation on resource allocation leading to bottlenecks and no adequate consideration of the flow-on effects to other agencies¹².

This report was delivered shortly after the Staines identification error had occurred, but had not yet been identified. It relates to the case by noting how resources were stretched between organisations and how this increased backlog could have led to mistakes.

WA Office of the Auditor General Report 2013

This report followed up on the 2006 report above to determine whether there had been improvements in the effectiveness, efficiency and delivery of forensic services in Western Australia. It found that communication and coordination between agencies had improved service delivery and reduced duplication.

This was facilitated through the creation of the Joint Consultative Committee comprised of WA Police, PathWest, Chemistry Centre and the Office of the Director of Public Prosecutions for Western Australia (ODPP) to coordinate forensic activities between

⁸ Auditor General for Western Australia (2006) Behind the Evidence: Forensic Services, Report 4, p5

⁹ Auditor General for Western Australia (2006) Behind the Evidence: Forensic Services, Report 4, p10

¹⁰ Auditor General for Western Australia (2006) Behind the Evidence: Forensic Services, Report 4, p14

¹¹ Auditor General for Western Australia (2006) Behind the Evidence: Forensic Services, Report 4, p10

¹² Auditor General for Western Australia (2006) Behind the Evidence: Forensic Services, Report 4, p15

agencies and discuss better use and allocation of resources levels¹³. An example of the increased cooperation was the establishment of the Forensic Analysis Coordination Team (FACT) in 2009 to establish strategy, policy, procedure and business processes for forensic analysis management. The FACT comprises police investigators and case managers, forensic scientists from PathWest or ChemCentre and the ODPP¹⁴.

The report's findings noted that processing times were largely being met and the backlogs identified in 2006 had been eliminated. This was partly due to changes in WA Police processes to make them more selective in determining items to be tested, which helped mitigate the increase in demand for forensic services¹⁵. The backlog reduction was also assisted by increasing automation, recruiting and training more staff, structural reorganisation, electronic submission of reports and introducing summary reports.¹⁶ The introduction of FACT also assisted with the reduction in the backlog of items to test, by evaluating all forensic evidence to determine whether there is value in submitting an exhibit for testing. This was previously decided by officers in charge and could result in all items collected being submitted for testing¹⁷.

One issue highlighted by the report, was that each agency still allocated their own identifiers to exhibits in addition to those in the Forensic Register, meaning data had to be manually transferred between systems. This created a potential transcription error risk as exhibits were moved between agencies and could lead to results being attributed to the wrong exhibit.¹⁸ The report noted these risks were managed by regular independent audits by the National Association of Testing Authorities (NATA) Australia.

New South Wales

NSW Ombudsman Report 2006

This report focused on compliance by police officers and others involved in performing forensic procedures. The report identified concerns in the field and made a variety of

¹³ Auditor General for Western Australia (2013) Follow-up Performance Audit of Behind the Evidence: Forensic Services, Report 8 June 2013, p14

¹⁴ Auditor General for Western Australia (2013) Follow-up Performance Audit of Behind the Evidence: Forensic Services, Report 8 June 2013, p14

¹⁵ Auditor General for Western Australia (2013) Follow-up Performance Audit of Behind the Evidence: Forensic Services, Report 8 June 2013, p17

¹⁶ Auditor General for Western Australia (2013) Follow-up Performance Audit of Behind the Evidence: Forensic Services, Report 8 June 2013, p17

¹⁷ Auditor General for Western Australia (2013) Follow-up Performance Audit of Behind the Evidence: Forensic Services, Report 8 June 2013, p19

¹⁸ Auditor General for Western Australia (2013) Follow-up Performance Audit of Behind the Evidence: Forensic Services, Report 8 June 2013, p23

recommendations relating to a number of processes for DNA sample collection, storage and analysis.

One concern identified by the report was the potential implications of having inaccurate information in the State DNA Database. For example, incorrect details resulting in a person being unnecessarily investigated by the Police. The report found 180 out of 10,000 forensic procedures had discrepancies between information held by the Police and information in the State DNA Database¹⁹.

In response to these findings, the report recommended an audit to verify that personal details were correct. It recognised this would be a considerable task and was seen as the NSW Police's responsibility to ensure the State DNA Laboratory (DAL) were provided accurate information²⁰. The report provided an example similar to the Staines case, where a police officer had merged two records believing they were the same person, however they had different DNA profiles and fingerprints. Police later arrested and charged the wrongly identified person through a crime scene link to this merged profile and they were held on remand²¹.

Like the 2006 Office of the Auditor General WA report, this report identified a backlog of unexamined crime scene samples in NSW, leading to delays in processing, investigations and court proceedings. The DAL were aware of this and were implementing strategies to address the issue. However to do so, additional resources were required to increase staff numbers, improve infrastructure and upgrade facilities²².

NSW Auditor General Report 2010

This audit focused on what the Police had done to manage the demand for analysis, as well as what had been done by the State laboratory to increase capacity in line with the increasing number of cases. An example of the increased demand for DNA analysis was that in 2000–2001, 13 000 items were submitted and by 2008–2009 this had increased by 230 per cent to 43 000 items submitted for analysis²³.

This issue of backlogs was found to be partly attributed to the Police not effectively screening DNA evidence. In response, it was recommended upon collection of all appropriate evidence at a crime scene, items believed to best support the case be

¹⁹ NSW Ombudsman (2006) DNA sampling and other forensic procedures conducted on suspects and volunteers under the Crimes (Forensic Procedures) Act 2000, p255

²⁰ NSW Ombudsman (2006) DNA sampling and other forensic procedures conducted on suspects and volunteers under the Crimes (Forensic Procedures) Act 2000, p255

²¹ NSW Ombudsman (2006) DNA sampling and other forensic procedures conducted on suspects and volunteers under the Crimes (Forensic Procedures) Act 2000, p16

²² NSW Ombudsman (2006) DNA sampling and other forensic procedures conducted on suspects and volunteers under the Crimes (Forensic Procedures) Act 2000, p16

²³ NSW Auditor General (2010) Performance Audit, Managing Forensic Analysis Fingerprints and DNA, p12

analysed first. In doing so, this would potentially reduce the need for further items to be assessed²⁴. To support this, it was also recommended items in the queue for assessment were regularly reviewed and removed when assessment was no longer required. For example, when the offender had been convicted²⁵.

The issue of sample processing backlogs was not limited to Australia, with the report noting that approximately 350 000 DNA samples from murder and rape cases in the United States were awaiting testing²⁶. This backlog puts a strain on resources, potentially increasing the likelihood of errors occurring.

United Kingdom

National DNA Database

When comparing DNA databases between jurisdictions, Australia's contained 1 005 322 records at the end of the 2015–2016 financial year²⁷, and the United Kingdom's as one of the largest in the world, contained 5 860 642 subject profiles as at 31 March 2016²⁸.

To manage the database and reduce the likelihood of errors, Police forces and forensic service providers established guidelines to ensure the standards set by the National DNA Database Strategy Board (the Board) are followed²⁹. Daily integrity checks for records entered are performed by Administrators, the National DNA Database Delivery Unit (NDU), with direct access restricted to vetted staff. Even with these safeguards, errors do still sometimes occur with the Board's report noting the four main error types were:

1. Police handling or recording error – An error performed by police such as where two samples collected at the same time are put in the incorrect DNA kits, or when incorrect information is entered into the DNA Database.
2. Forensic service provider collection or recording error - Can include some of the actions above, but refers to only forensic officers. These errors can also include sample mix-ups or contamination occurring during DNA processing.
3. Forensic science provider processing interpretation error.

²⁴ NSW Auditor General (2010) Performance Audit, Managing Forensic Analysis Fingerprints and DNA, p16

²⁵ NSW Auditor General (2010) Performance Audit, Managing Forensic Analysis Fingerprints and DNA, p17

²⁶ NSW Auditor General (2010) Performance Audit, Managing Forensic Analysis Fingerprints and DNA, p13

²⁷ Australian Criminal Intelligence Commission (2016) CrimTrac Annual Report 2015-2016, p41

²⁸ UK National DNA Database Strategy Board (2017) National DNA Database Strategy Board Annual Report 2015/16, p7

²⁹ UK National DNA Database Strategy Board (2017) National DNA Database Strategy Board Annual Report 2015/16, p24

4. NDU transcription or amendment errors³⁰.

An audit of the error rates was undertaken with no miscarriages of justice having arisen, but further work was being conducted by the NDU to gain greater understanding of the reasons behind the errors³¹. Reports such as this highlight the potential for errors to undermine the integrity of databases and the need for provisions to reduce the likelihood of them occurring.

Each of these reports have highlighted identification errors which can occur with DNA databases and the potential impacts of backlogs putting a strain on resources. Establishing oversight groups such as the FACT have assisted in developing best practice guidelines and improving the management of resources to meet demands of all parties. However, despite the implementation of these initiatives, the potential for human error remains. The importance of embedding checks and balances within processes to mitigate this risk should therefore not be underestimated.

³⁰ UK National DNA Database Strategy Board (2017) National DNA Database Strategy Board Annual Report 2015/16, p24-25

³¹ UK National DNA Database Strategy Board (2017) National DNA Database Strategy Board Annual Report 2015/16, p24-26

Staines case

Case overview

In 2003, one year after the establishment of the State DNA Database, the Department was receiving an average of 415 reference samples once or twice a week from WA Police for DNA analysis. Each was a unique reference sample from a person and was received with an associated Identifying Particulars System (IPS) form, containing the reference sample donor's details. During this time the Department was also receiving an average of 515 crime scene samples a week for analysis.

The Department's filing system for reference samples is based upon a batch processing of the requests. The reference samples and their associated request forms are allocated a sequential case number within each given calendar year. Each case / delivery is then further broken up into sequential batch numbers, with each batch typically containing between 10 to 12 reference samples. Each reference sample and its associated request form possesses a unique bar code number allocated by the WA Police at the time of collection. The allocation of the reference samples into batches is done for ease of filing and retrieval purposes and to record the chain of custody.

Reference samples are not filed alphabetically, e.g. by the reference sample donor's name, as filing by reference to case and batch number is faster and reduces the risk that identities are misallocated in the reporting process.

On 16 May 2003, the Department received a delivery of over 300 reference samples for analysis from WA Police. All of the reference samples in this delivery were allocated the reference number 03N0034. The delivery was further broken up into sequentially numbered batches. Of these, batch 13 contained ten reference samples and their associated IPS forms.

The fifth reference sample within batch 13 related to Alan Stephen Staines, with barcode number 62098310 assigned by WA Police. The form indicated the reference sample was provided by Alan Stephen Staines and that his date of birth was ■■■ January 198■■■³².

³² Date of birth redacted for privacy reasons

Coincidentally, the eighth reference sample in batch 13 related to Alan X Staines³³ with barcode number 62125591. The associated IPS form indicated Alan X Staines had provided the reference sample and his date of birth was ■■■ August 197■■■³⁴.

On 22 May 2003, all of the reference samples, including the samples pertaining to the two Staines individuals were analysed, with the DNA profiling results for each sample being recorded in the State DNA Database. There is no issue with the accuracy of the analysis, nor were the reference DNA profiles from the two men ever determined to be incorrect.

On 14 January 2004, the Department received, from WA Police, a delivery of 74 exhibits for analysis. These 74 exhibits were from 26 separate crime cases, including both serious and volume (property) crimes. One of the volume crime cases was a home burglary and was represented by a single swab labelled as “Exhibit PMH1 – *Swab of blood found on wall beside point of entry, inside second bathroom at address*”. The sample was allocated the unique Forensic Biology Case number 04V0126 and no person of interest had yet been identified.

The swab was examined on 17 March 2004. The light red/brown stain gave a positive reaction with a screening test for blood and was submitted for DNA profiling. The DNA profile was available and loaded into the State DNA Database on 22 April 2004.

An automated search of the State DNA Database then made a link between the DNA profile recovered from the 04V0126 burglary and the reference sample of Alan X Staines (barcode 62125591, case number 03N0034.13). There is no issue with the accuracy of this match.

As per Departmental protocol, the linked reference sample from Alan X Staines (barcode 62125591) was re-tested on 21 June 2004 to confirm the DNA profile. The re-tested reference DNA profile was confirmed as matching Alan X Staines (from the previously tested result) and the DNA profile recovered from the 04V0126 burglary.

How the error occurred

Once the reference DNA profile had been confirmed, a Clerical Officer was tasked with the retrieval of a copy of the paperwork relating to the burglary 04V0126, as well as a copy of the IPS form for Alan X Staines, barcode 62125591. The case file and batch number associated with the reference sample (03N0034.13) were used by staff to quickly identify the approximate location of the relevant IPS form. Once the Clerical Officer had located the area within the filing system where the 03N0034.13 IPS forms were located, they have incorrectly retrieved the first IPS form they came across relating to an ‘Alan

³³ Middle name redacted for privacy reasons

³⁴ Date of birth redacted for privacy reasons

Staines'. The IPS form that was retrieved related to Alan Stephen Staines (Barcode 62098310), the fifth file within 03N0034.13.

A file containing copies of the paperwork was then handed to a Forensic Scientist who prepared a draft Database Hit Report. In doing so, Departmental protocols required the scientist to cross reference names, date of birth, reference numbers, sample details and barcodes across three sources. The first source was the IPS form for Alan X Staines (barcode 62125591, case number 03N0034.13). The second source was the paperwork associated with the burglary case 04V0126 and the final source was the database match details generated by the computer search.

The scientist failed to identify discrepancies between middle names, dates of birth and barcode numbers. In accordance with Departmental protocols, the draft Database Hit Report was referred to a second Forensic Scientist who completed an Administrative Case Record Review form which certified that the identifying particulars had been reviewed and that there were no errors. The second scientist also failed to identify discrepancies between middle names, dates of birth and barcode numbers. The Clerical Officer and the two scientists all left the Department several years ago.

Consequence of the error

On 23 July 2004, the Department issued a Database Hit Report to the WA Police which incorrectly confirmed that the burglary sample (04V0126) matched the DNA reference sample relating to Alan Stephen Staines Barcode 62098310. WA Police subsequently arrested and charged Alan Stephen Staines with the burglary offence.

Despite Alan Stephen Staines protestations of innocence, on advice from his legal representative, Mr Staines pleaded guilty to the offence and received a suspended sentence.

If Mr Staines had pleaded not guilty and had the matter been listed for trial, Departmental protocol would have required preparation of a detailed Court Report to be tendered in evidence. Given the detail contained in such reports, and the senior peer review involved in their preparation, it is likely the Department would have identified its identification error in the course of preparing such a report and immediately withdrawn the erroneous Database Hit Report.

Error Identification

The error was identified in April 2016 when the Department recovered a new DNA profile from a 2016 burglary case that linked to the DNA profile previously recovered from the 2004 burglary. When preparing an addendum to the Database Hit Report, the error in the original report was detected by Forensic Biology staff. The error was detected on 11 April 2016, and the incident was reported to the WA Police the following day, including a retraction of the original report. A replacement report was drafted 13 April 2016 and issued 26 April 2016. Formal written communications regarding the error were sent to both the WA Police and PathWest management on 27 April 2016.

The automated search of the State DNA Database had matched the correct reference sample, however, the source documents for the incorrect reference sample were manually retrieved and then relied upon for the preparation of the Database Hit Report. The error was not detected in 2004 by the Department staff involved in the original reporting process by checking relevant identifiers including the reference sample barcode, middle name and date of birth. The error in this case was attributed to manual misidentification when retrieving the personal particulars for the incorrect Mr Alan Staines.

The Department was asked why the document storage system containing sub-batch 13 had not been marked to alert staff that it contained documents relating to two individuals who had the same first name and surname. The Department suggested such a control measure was not necessary as the unique barcode number allocated to each sample was an adequate control measure. Further, as demonstrated by the internal audit undertaken in April 2017, the frequency of documents relating to two individuals with the same first name and surname being received on the same day and placed into the same batch was so low that implementation of a further control measure was considered to be disproportionate to the likelihood of the risk. The subsequent internal audit revealed that of the hundreds of thousands of database reference samples there were only 37 relevant instances of two individuals having the same first name and surname being filed in the same case and batch.

What has happened since to address errors identified

PathWest Forensic Biology Department internal audit

The Department undertook an internal audit of all reference samples received between July 2002 (when the State DNA Database was created) and April 2017, to identify if any manual misidentification errors similar to the Staines case had occurred. In order to undertake the audit, the Department searched its database of reference samples to identify records that met the following criteria:

- Two or more reference samples received on the same day; and
- These people had the same surname and first name.

The audit identified 199 instances of reference samples matching the criteria (including both Mr Staines), resulting in 94 groups of surnames. Of those, 37 were associated with Database Hit Reports that had been issued by the laboratory. These Database Hit Reports were then reviewed by the Department to verify the names and barcode details, with all confirmed to be free from error. This included the replacement report issued for the Staines case following the initial error.

Policy and procedure changes

The complete review of relevant policy and procedure changes within the Department are outlined in the [Policies and Procedures since 2002 section](#). The major procedure changes to have occurred since the initial Staines identification error are:

- In March 2009, guidelines for Reporting Database Search Results were developed and added to search method procedures to clarify criteria for Database Hit Reports versus Intelligence Information Reports.
- In April 2012, identifying information received from WA Police on CD was directly imported into Department IT systems to reduce manual data entry.
- In June 2012, a new report template was created to highlight discrepancies in identifying particulars between multiple reference samples of the same individual.
- In June 2015, – the auto filling of case information and names into the Database Hit Report template from a State DNA Database query was implemented.

It is also important to note that since the Staines identification error, increased automation of all steps of the DNA analysis process has occurred. Prior to this, many steps in the analytical process were manual, including file retrieval. It appears this manual retrieval was a contributing factor to the incorrect identification of Mr Alan Stephen Staines. Since 2004, the Department has been increasingly automating each part of the DNA analysis process so that all of the information is electronically linked at the time a match occurs. As per protocols, these matches are still checked by several Department staff, however the process does not involve anywhere near the same degree of manual handling and retrieval processes that were used in 2004.

Audit of random of Database Hit Reports

Overview

In accordance with the [terms of reference](#), the Review Team undertook an audit of random Database Hit (DBH) Reports issued by the Department between the creation of the State DNA Database in July 2002 and 30 April 2017. The purpose of this audit was to examine whether other DBH Reports were free of Staines identification errors.

Information required by the Review Team to undertake this audit was provided in accordance with Section 24D of the *Public Sector Management Act 1994* and Regulation 5A of the *Criminal Investigation (Identifying People) Amendment Regulations 2002*. No personal identifying information of files assessed will be disclosed in this section to maintain privacy provisions

Search parameters and criteria

To conduct the audit, the Review Team considered the main personal identifiers collected in a DBH Report. The Staines case highlighted the issue of the same surname and first name leading to an incorrect identification. At the time of the Staines identification error in 2004, DBH Reports contained the full names of the individual (including any given names), date of birth and gender.

The [Department's internal audit](#) following the Staines identification error had looked for multiple records with the same first name, surname and profiles received on the same day for processing. The Review Team expanded these parameters to include any database links that matched the following:

- Initial sample population identification - a match made between a Reference sample³⁵ to Crime Scene Sample³⁶ from the establishment of the State DNA Database in July 2002 up until 30 April 2017.

³⁵ DNA Sample previously collected by the Police and stored in the State DNA Database.

³⁶ DNA Sample collected from a crime scene. Can include anything believed to have been touched or worn by the person of interest including: clothing, hats, weapons, tools, cups and cigarettes.

- Potential test sample - identify all persons in the State DNA Database where their details were similar to the persons identified within the initial population above, whereby:
 - I. The first four letters of their surname matched;
 - II. The first initial of their given name matched; and
 - III. Their gender matched.

Whilst the physical separation of files reduced the likelihood of a Staines identification error between batches, a conservative approach was taken to increase assurance that the misidentification of similar names had not occurred in other database links, and to cover a wider range of scenarios where an error could occur. If no errors were found under these conditions then it could provide a greater degree of assurance that no similar Staines identification errors had occurred.

Sample size

This criteria was sent to the Department to extract matching records from the State DNA Database and resulted in a total of 479 589 records, representing 22 123 unique database links. A Database Link differs from a DBH Report as it merely confirms a link between two DNA profiles and could include reports outside the scope of the review. A DBH Report requires a link between a Reference sample and a Crime Scene Sample which resulted in the production of an intelligence report for WA Police.

The Database retrieval did not identify whether a DBH Report had been issued in response to the link. The only way the Review Team could determine if a Database Link had resulted in the production of a DBH Report was to physically review the physical link file. Assessing a larger range of files than those previously examined as part of the [Department's internal audit](#) would also provide greater assurance that no Staines identification errors had occurred.

To determine an appropriate sample size, the Review Team consulted multiple sampling resources before agreeing that a random sample of approximately 400 DBHs would be appropriate. To test this, the Review Team engaged an accredited statistician, Dr John Henstridge from Data Analysis Australia for expert advice. All facets of the review methodology were considered by Dr Henstridge and it was agreed that the initial sample size would be appropriate to conduct the DBH assessments.

Sample selection

Each database link that met the Review Team's criteria (22 123 files) were allocated a number between 1 and 22 123, from earliest to most recent database link. To negate sampling bias, a random number generator was used to create groupings of 100 database links. Each group was numbered, with requests sent to the Department one at a time for retrieval, to then be assessed by the Review Team. The file assessments were conducted at a Department facility to ensure that confidential files did not leave the premises and maintained a clear chain of custody.

In total, the Review Team requested six groups of database links (600 files), with 508 physical files assessed. Of these, 448 were DBH Reports. This exceeded the initial sample size of 400 DBH Reports to provide a low probability of further Staines identification errors. There was also no reason to believe that the 152 Reports not assessed would have had a higher probability of error, and hence the 448 that were assessed can be considered representative. The remaining 92 database links could not be assessed due to either no physical file being created or the file was active at the time of review.

Assessment type	Count	% of sample
Total DBH Reports assessed	448	74.7%
File assessed but was not a DBH Report	60	10.0%
No Report created	86	14.3%
File Active and could not be assessed	6	1.0%
Grand Total	600	100.0%

File assessment

When assessing the DBH Reports the Review Team looked for matches between the identification documents provided by WA Police to the Department and the DBH Report prepared by the Department confirming a match between crime scene and reference samples. To confirm a match and that no Staines identification errors had occurred, the following fields were assessed within the DBH Reports:

- ✓ DNA Barcodes³⁷ matches
- ✓ Surnames matches
- ✓ First names and any given names matches
- ✓ Date of birth matches.

Data analysis

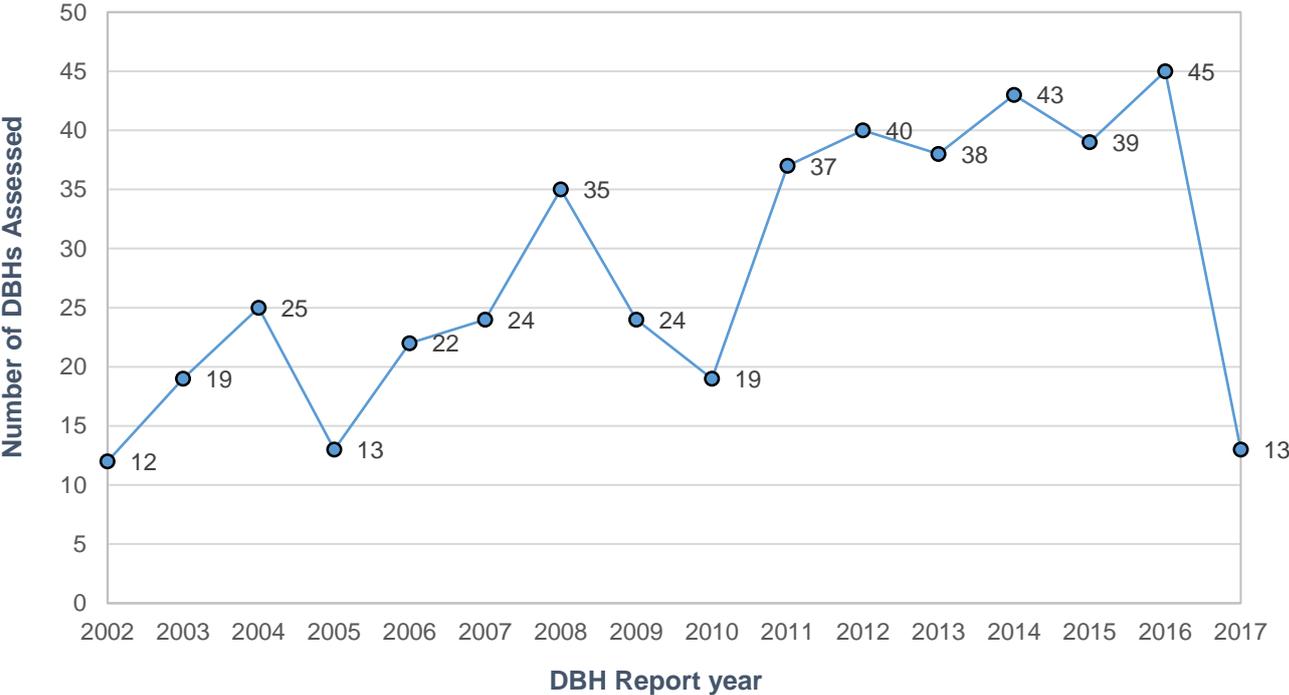
448 DBH Reports were assessed by the Review Team with all found to have reported the correct details in each case and no instances of a Staines identification error identified. In cases where incorrect information had been included in the draft report, it

³⁷ The unique identifier applied to each DNA Sample collected and stored within the State DNA Database. If a person has had their DNA taken multiple times then each sample will have its own unique barcode that is linked to them.

was identified and resolved by either the reporting officer or the reviewer before the DBH report was finalised³⁸. There were also instances where the Department had identified aliases between profiles not previously linked and notified WA Police to update their records before the report was finalised.

The chart below provides a summary of the assessed random DBH Reports by the year that the DBH Reports were originally created:

DBH Reports Assessed by Year



Statistical expert’s review of statistical sampling methodology and analysis

An accredited statistician, Dr John Henstridge from Data Analysis Australia was engaged to provide expert advice on the initial sampling methodology proposed and to then review the work undertaken. The final assessed sample size of 448 was deemed to be appropriate when compared to the *American Institute of Certified Practicing Accountants (AICPA) Auditing Standard 39*³⁹ which provides guidelines on sample sizes based upon the concept of tolerable errors. The method of drawing the sample was considered to be statistically sound, with the use of random numbers to allocate files deemed to be

³⁸ All DBH Reports are initially peer reviewed by a Forensic Scientist, Scientists in Charge or a Principal Scientist before a final review by a Laboratory Assistant, Property Officer, Technical Assistant, Medical Scientist, Forensic Scientist, Scientists in Charge or Principal Scientist prior to the final report being sent to Police.

³⁹ <http://www.aicpa.org/Research/Standards/AuditAttest/Pages/SAS.aspx>

particularly appropriate. The variation between years was also found to be consistent for random sampling. The summation of Dr Henstridge's written advice to the Review Team was:

I understand that no errors were found in any of the procedural elements for any of the sample.

(a) This indicates that the probability of a combination of procedural errors of the types reviewed occurring together would be very low and hence the likelihood of further errors having occur [occurring] due to these types of procedural failures would be similarly low.

(b) Having said that, it is not appropriate to quantify what these probabilities might be since they are so low. It is not feasible with such low probabilities to empirically confirm the assumptions of statistical independence without considering a very large sample, negating the benefits of the sampling approach.

In summary, subject to the discussion above I believe that the sampling approach has met the aims of confirming that there is only a very low probability of further errors similar to that relating to Staines.⁴⁰

⁴⁰ Extract of letter from Data Analysis Australia to the Public Sector Commission dated 22 September 2017

Department accreditation

Meeting national standards

To ensure the Department's facilities and procedures are compliant with best practices, it is regularly assessed by the [National Association of Testing Authorities](#) (NATA), Australia.

National Association of Testing Authorities, Australia

Established in 1947, NATA is an independent authority responsible for accrediting laboratories, calibration services, producers of certified reference materials and proficiency testing scheme providers throughout Australia. They provide independent technical assurances that facilities comply with international and Australian standards. This includes providing testing, calibration, measurement and inspection data to government, industry and the wider community⁴¹.

NATA is a not-for-profit company operating as an association owned and governed by its members and representatives from industry, government and professional bodies. NATA is largely self-funded and has memoranda of understanding with the Australian Government and various state and territory governments that recognise its role in Australia's technical infrastructure⁴².

Obtaining NATA Accreditation

NATA provide accreditation to facilities to demonstrate compliance with systems and product standards. Accreditation is based on a peer review process and requires regular assessments. Their criteria is based on a facility displaying competence based on international standards on topics including: staff training and development, equipment calibration and maintenance procedures, quality assurance processes and appropriate sampling practices⁴³.

⁴¹ <https://www.nata.com.au/nata/about-us/our-history>

⁴² <https://www.nata.com.au/nata/about-us>

⁴³ <https://www.nata.com.au/nata/accreditation-info/how-to>

NATA's reports on assessment can also provide recommendations for best practice moving forward. Reassessments are regularly conducted to monitor compliance including a complete review of the facility's technical competence together with a limited review of management requirements. Due to the often highly specialised focuses of many facilities, NATA accreditation is one of the only ways for a facility to receive independent technical assessments by peers of their processes and performance against international standards⁴⁴.

NATA accreditation checks all aspects of a facility's operations to ensure they produce accurate and dependable data. At the conclusion of an assessment, the facility is provided with a report outlining areas for improvement, with follow-ups by the facility also reviewed to ensure they meet the requirements. An accreditation differs from a certification as it focuses on technical competence instead of compliance with systems and protocols⁴⁵.

NATA Accreditations provided to the Department

At the commencement of the review, the Review Team contacted NATA to obtain copies of all accreditations provided to the Department between 2002 and 2017.

The team reviewed the eight Accreditation Reports issued from 2003–2017 and noted that when issues were identified by NATA they were promptly addressed by the Department. The most commonly listed concern from NATA was a high caseload and backlog of samples as cited by reports in 2003, 2005 and 2007. However, since this time, the Department has put measures in place to refine processes, automated elements, hired additional staff and increased development opportunities.

During the last three reports by NATA (2013, 2015 and 2017) the Department was found to be performing at a satisfactory standard. These reports included a complete review of the facility's management system together with a review of selected technical matters conducted by review of records.

NATA have noted that the Department's facilities comply with the requirements of the international standard: [ISO/IEC 17025:2005](#), the general requirements for the competence of testing and calibration laboratories.

⁴⁴ <https://www.nata.com.au/nata/accreditation-info/how-to>

⁴⁵ <https://www.nata.com.au/nata/accreditation-info/how-to>

Relevant department procedures and protocols since 2002

A key component of this review involved the Review Team sourcing and examining all relevant department procedures and protocols since 2002 to see how these have evolved. Areas of particular interest include what has changed following the Staines case and changes made following assessments from the National Association of Testing Authorities (NATA). This section outlines the main Department policies and procedures implemented since 2002.

Database Hit Reports

Database Hit Reports (DBH Report) are intelligence reports prepared by the Department to provide the information necessary for identification by the WA Police. DBH Reports are used purely for intelligence purposes and a full report is prepared if the matter proceeds to court.

To prepare a DBH Report, DNA samples are uploaded to the Western Australia DNA database⁴⁶ to search against existing reference samples if it complies with the requirements of the *Criminal Investigation (Identifying People) Act 2002*. If a match between a Crime Scene to Reference sample occurs then a DBH Report can be created. To be considered a match, at least six autosomal loci (chromosome positions) must match and indicate consistent non-reportable alleles⁴⁷ at the remaining loci. This is verified individually by a scientist and then given to a second scientist for review.

The results of verified links are then recorded in the State DNA database as either a new link or an addition to an existing link. This link may be a crime scene-crime scene link, a person-crime scene link or 'unlimited volunteer' Police Officer-crime scene link. Each DBH Report number created is as unique as a DNA profile, with each profile only ever linked to one DBH Report. If the result matches an existing DBH Report, then an

⁴⁶ Access to the State DNA Database is restricted to only persons defined under *Criminal Investigation (Identifying People) Regulations 2002*

⁴⁷ Different forms of a gene and occupy the same position on a chromosome

amendment to the original DBH Report is prepared. Before a report is finalised, it is reviewed by an authorised officer and this process is outlined in [Case Record Reviews](#).

Examples of Database Hit Report procedure changes since 2002

Database Hit Reports (DBHs) were introduced in 2003 to replace volume crime reports and are reviewed annually, with the latest update occurring on 28 September 2016. The steps to prepare each part of the DBH Report are continually reviewed, with some very specific elements included in supporting documentation. An example was the introduction of a dedicated guideline for reporting database search results in March 2009. This was added to clarify the criteria for the difference between a DBH Report and an Intelligence Information Report.

There has also been an increase in automation to improve processes. In June 2015, scannable 2D barcodes were introduced to auto fill case information and names based on information obtained from WA Police when preparing reports. This reduced the time needed to prepare reports and reduced the likelihood of data entry errors and potential incorrect identifications.

The amount of information displayed on a report summary page has also changed to now display all previous database links associated with the DBH Report. Previously, only the most recent link was displayed. When adding new links to an existing DBH Report this can lead to a review of links within the report. In the Staines case, the original error was identified when a new database link was made in 2016, leading to an amendment of the original DBH Report and the discovery of the incorrect documentation within the file for the wrong Mr Staines.

FTA Card Receival procedures

Flinders Technology Associates (FTA) Cards have long been the global industry standard used to collect and store DNA samples for years without deterioration from multiple sources including: blood, buccal (cheek) cells and saliva. The Department has dedicated procedures for each part of the process. The current procedures at the time of this review include:

- Sample receipt – DNA samples are received daily from WA Police and assigned in batches of 10-12 samples. Before samples are accepted, the Department checks that the details match between the electronic list and the physical samples.
- Checking samples – DNA samples are received in Tamper Proof Bags (TPBs) and these are checked to ensure their seals are unbroken when received. All barcodes and labels are also checked to ensure they match each sample and are cross checked by a second authorised officer.
- Creating a delivery report – Once the checks have been performed and all details match, a PDF report is prepared containing the batch details and is sent to WA Police exhibits to update the chain of custody. This report is also kept on the DBH Report for internal records.

A sample is only accepted by the Department if all details match and the TPB is still sealed. If the sample is not accepted it is returned to WA Police. This is outlined fully in the Department's policy 'Criteria for Acceptance of Intelligence Samples'.

In the Staines case, the two same name DNA samples were received on the same day and were assigned within the same batch. The samples were accepted and processed as per usual protocols. The incorrect identification has arisen with the retrieval of the incorrect documents for the DBH Report and not in the DNA sampling process.

Examples of FTA Card Receival procedure changes since 2002

These procedures relate to the Staines case as this is how samples are received by the Department from WA Police in batches for assessment, with matches between Crime Scene and Reference Samples leading to the creation of DBH Reports. The Department has had protocols for FTA Card Receival in place since 2002 with the procedures reviewed annually. Since inception, the Department has had protocols to reject samples that did not meet requirements. For example, rejecting TPBs if the tamper seal is missing or damaged.

As Department processes have evolved, the protocols for receiving and processing samples have developed including increasing the digitisation of each part of the process. For example, enhancements to the DNA Database to allow the input of comments to explain why a sample was rejected within the database. This was previously collected through supporting forms.

Case Record Reviews

Once the results of the DBH Report have been confirmed, the completed DBH Report is prepared according to the requirements of the Department's internal procedures and submitted for review by an authorised department reviewer⁴⁸. To maintain integrity, reporting scientists are unable to review their own work and scientists are responsible for all reports they write. The reviewer checks the report and case file, with any changes noted for the author to make before the file can be finalised.

The review process is split into four parts and is outlined in the following table showing the review stage and authorised reviewer:

⁴⁸ Refers to Laboratory Assistants, Property Officers, Technical Assistants, Medical Scientists, Forensic Scientists, Scientists in Charge & Principal Scientist

Review stage	Authorised reviewers
1. Preliminary Case File Check	Forensic Scientists, Scientists in Charge and Principal Scientist
2. Preliminary Draft Report Check	
3. Technical Review & Database Check	
4. Final Check	Laboratory Assistants, Property Officers, Technical Assistants, Medical Scientists, Forensic Scientists, Scientists in Charge and Principal Scientist

The Department has a Case Record Review Form to outline the steps to take and must be part of the report. The main components of the review process are:

- Checking names and dates
- Identifying spelling or grammar mistakes
- Rechecking results
- Checking the chain of custody
- Checking for no presumptive statements
- Reviewing statistics.

If any discrepancies are identified, they must be resolved before the report can be finalised. If agreement cannot be made, it is referred to the Chief Scientist for review.

Examples of Case Record Reviews changes since 2002

The case record review process procedures were formalised into a separate policy in June 2008, having previously been captured as part of reporting procedures as either administrative or technical reviews. Administrative reviews were required for all reports before being finalised. Technical reviews were conducted on a sample of reports to ensure conclusions of examiners were reasonable and fell within the constraints of scientific knowledge.

The introduction of the case record review and supporting checklist form standardised the four stage process that all reports were required to undertake before being finalised. These documents are reviewed annually with minor amendments made including laboratory assistants being added to the authorised officers list to perform the final check.

When the Staines case happened, reports were still peer reviewed by authorised officers with processes in place for administrative reviews, but the identification error was not detected by either of the reviewing officers.

Observations and recommendations

Overview of findings

Since the initial Staines identification error, significant changes within the Department have reduced the likelihood of similar errors occurring. This has included an increase in automation of processes and other technological advances. Quality assurance will always be required, but the reduction in manual file retrieval and data entry have significantly reduced the risk of incorrect identification errors.

The audit of DBH files returned no additional Staines identification errors with the parameters expanded beyond the original conditions of the Staines case. The Review Team looked at over 400 files from between 2002–2017 and the changes in processes and technology were evident. When an error had been made during the analysis stage of the report preparation, it was identified, noted in the case notes and resolved before the report was finalised.

These findings also support the Department's own internal audit which returned no additional identification errors when replicating the same conditions as the Staines case. The Review Team reviewed this audit and confirmed the findings.

Separate to the audits, both Staines Database Hit Reports were reviewed. The process for how the original error occurred was observed and the subsequent amendment following the update in 2016 was noted.

To ensure best practice, the Department also review their key policies and procedures annually and are regularly assessed by NATA to provide an independent assessment of practices and procedures. Each time the Department has been assessed by NATA, they have implemented any recommendations. Additionally, recent NATA reports have returned no significant findings.

Recommendations

1. Upgrade State DNA Database to differentiate between DBH Reports and DBH Links

The system does not specify the difference between a Database Link and a DBH Report. Upgrading the DNA database to include this field would enable more accurate reporting of exactly how many DBH Reports versus Database Links have been created each year and over time. The DBH Report and Database Links have different purposes, with a link confirming two DNA samples matched, whereas the DBH report is a preliminary intelligence report issued for WA Police following a link between a crime scene and reference sample.

2. Staff training on Case Record Review Requirements

The Department already have [Case Record Review procedures](#), which are a four stage peer review process required for all reports before completion. Reviews can only be performed by authorised reviewers⁴⁹ and the steps are documented in a Case Record Review checklist form. Training sessions for authorised reviewers would highlight high risk areas in the process and the potential for incorrect identification or matching errors.

3. Highlighting manual actions as high risks and removing where possible

Since the initial Staines case, processes and systems have become increasingly automated, including in June 2015 where 2D barcodes were introduced to auto fill case information and names based on information received from WA Police. This removed a manual data entry component in the process, but there are still some other manual actions in the process which cannot currently be removed. In these cases it is vital to highlight them as high risks in all documentation and training to reduce the likelihood of a similar identification error reoccurring.

⁴⁹ Refers to Laboratory Assistants, Property Officers, Technical Assistants, Medical Scientists, Forensic Scientists, Scientists in Charge and the Principal Scientist.

Appendix A - References

For all Public Sector Commission publications, please refer to the Commission's website at www.publicsector.wa.gov.au

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