
7.0 FORENSIC BIOLOGY – ISSUES

7.1 Background

Forensic Biology receives crime scene samples, including swabs, clothing and other miscellaneous items as well as various samples from prisoners, suspects and volunteers for DNA analysis and comparisons.

The use and reliance on DNA within the criminal justice system has been steadily increasing since its introduction in the mid 1990's. The introduction of DNA analysis has been described as one of the greatest advancements in forensic science since the introduction of fingerprints over one hundred years ago.

In 1999, a comprehensive multi-agency business plan, outlining the establishment of a Queensland DNA database, was submitted to Government. Approval and expenditure was granted for the establishment of the database and funding was provided for the collection and analysis of person samples.

The Government allocated funding to QPS to purchase person sampling services from QHSS on a 'user pay' basis. Approximately 88,000 DNA person samples have been collected from prisoners, suspects and volunteers since the introduction of DNA legislation in 2000.

The CrimTrac Agency has established NCIDD to support matching of DNA samples between jurisdictions. At the time of this report, Queensland has loaded more than 61,000 DNA person samples and 5,000 DNA crime scene samples onto NCIDD and conducts intra-jurisdictional DNA linking in this environment.

In analysing the effectiveness of the operations of Forensic Biology, it is necessary to examine not only the processes, resourcing and systems at QHSS, but also the policies and processes at the crime scene and within QPS which lead to the delivery of samples to Forensic Biology.

7.2 Crime Scene - Sample Collection

Crime scenes can be categorised as either Major Crime or Volume Crime. Major Crime generally involves serious injury or death. It also includes offences such as sexual offences or other offences requiring significant investigative resources. Volume Crime includes property crime, such as break and enter offences, unlawful use of motor vehicles and wilful damage offences.

In serious crime, detectives, SOCO's, fingerprint experts and scientific officers are called to the scene as well as the initial response officers. The investigating officer, in conjunction with SOCO's and scientific officers, will determine what samples will be collected from the crime scene. In many instances samples can number up to 100. Scientific officers will often conduct presumptive testing for blood, semen or other substances. QPS staff are attempting, wherever possible, to conduct a presumptive test and sub-sample rather than forward an entire exhibit to QHSS. Discussions are ongoing between QPS and QHSS to formalise this process.

Samples are packaged, sealed and bar-coded at the scene with a QHSS number before being transported by the scientific officer back to their office where further examination and presumptive testing may occur. Details of all samples are entered onto the Forensic Register and all samples within a case are given a Forensic Register number. In addition QPS forensic staff are required to enter details into a QPS Exhibit Register. This results in the same item having three separate numbers associated with it. Forensic staff have expressed concern about having to enter the same information on the Forensic Register and the Exhibit Register in designated QPS forensic property points.

In instances of Volume Crime, these are attended by first response officers and later by a SOCO. The SOCO, based on information forwarded by the initial response officer and from discussions

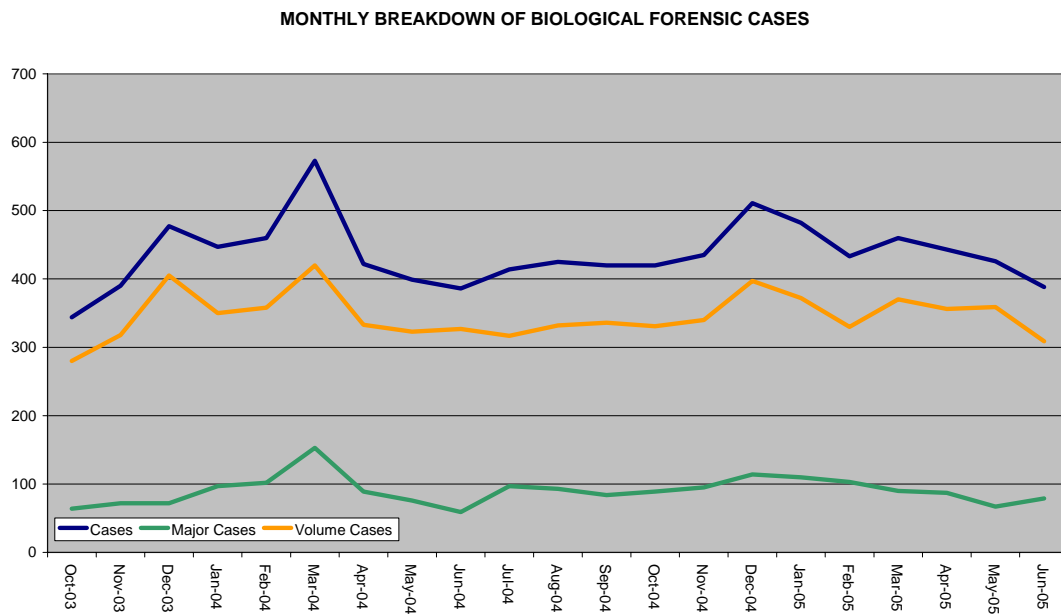
with the complainant, will generally check for fingerprint evidence and may take one or more samples for DNA testing. Often no forensic samples are taken from volume crime scenes.

The decision about whether to collect or lodge a sample at all or whether to send all of the samples collected is sometimes being done on an inconsistent basis. Since October 2003, 66% of Major Crime exhibits and 52% of volume crime exhibits collected by QPS staff have been forwarded to QHSS. This reflects both the triage process carried out by QPS forensic staff and the lengthy delays in receiving results.

There are concerns among a number of SOCO's, particularly inexperienced officers, that they may be challenged in Court by defence counsel for failing to have samples analysed. This concern has been exacerbated by a recent Appeal Case where a conviction was overturned after a DNA test was conducted post conviction which implicated another person. The possibility of challenge may lead to over-sampling at crime scenes.

It is not possible to accurately determine the variation between the number of exhibits collected by QPS staff and the number of cases/samples received by QHSS. Within QPS, "case" refers to a crime report while at QHSS "case" refers to a particular crime scene or person sample. There can be a number of QHSS cases associated with a single crime report. Terms such as "exhibit" and "sample" are also used interchangeably by agencies.

The number of DNA crime scene samples collected by forensic officers throughout Queensland has also been increasing in recent years, though it has been reasonably consistent in 2004/05 as illustrated by the graph below.



Source: Queensland Police Forensic Register

Of the exhibits forwarded, 52% in Major Crime and 75% in Volume Crime have been swabs. This has implications for both the cost of testing and the workload of scientists.

Recommendation 9:

It is recommended that the Chief Executive Officer of the Institute in consultation with the Superintendent, Forensic Services Branch, Queensland Police Service develop standard terminology and statistical counting measures for forensic evidence by 31 July 2006.

Recommendation 10:

*It is recommended that the Commissioner, Queensland Police Service reviews the requirement for forensic exhibits to be entered in an Exhibit Register within designated Queensland Police Service forensic property points **immediately**.*

7.3 Sample Transportation

Major Crime samples are generally transported to the QHSS Central Property Point by a SOCO, the scientific officer or an investigating officer. This occurs as soon as possible and generally within a week of the incident. With volume crime samples, the timeframes applied are much more flexible and usually depend on the proximity to QHSS. QPS officers have indicated that on occasions, volume crime samples are not sent to QHSS at all due to the extensive delay in analysing the cases.

Outside the metropolitan area, samples are retained in local QPS Property Offices until either an officer is attending Brisbane for any reason, there is a scheduled exhibit transport to Brisbane (often at 6 – 8 weekly intervals and in extreme cases up to several months), or due to the large quantity of samples, a special transport trip is arranged. Ideally samples should be forwarded to QHSS as soon as possible after collection but no more than 30 days.

All samples are transferred by QPS staff. This has resulted in staff being occupied for many hours at QHSS lodging samples, as well as travel time and costs in transporting samples.

Delays in transporting items from Regional areas have a negative impact on workload management at QHSS particularly in relation to the timely prioritisation of cases.

There is concern from an evidentiary perspective about using commercial transport alternatives. However the Taskforce notes that police regularly accompany exhibits on commercial aircraft where the exhibit is lodged in the luggage compartment of the aircraft rather than in the direct possession of the officer.

Consultation with police and scientific staff in a number of other Australian jurisdictions revealed that there is currently widespread use of locked receptacles, and transportation by commercial operators, to deliver unescorted samples for forensic analysis. This methodology will result in the timely and safe transportation of DNA exhibits for analysis and will free up some QPS resources, in particular police officers' time.

Recommendation 11:

It is recommended that the Commissioner, Queensland Police Service:

- (i) Ensures that forensic exhibits requiring analysis are transported to Queensland Health Scientific Services as soon as possible after collection but no more than 30 days by 30 April 2006; and*
- (ii) Introduces a system for transporting unescorted forensic samples through the use of locked receptacles and commercial transport where appropriate by 30 April 2006.*

7.4 Receipt/Destruction of Samples at Queensland Health Scientific Services

All samples (except clan labs) are delivered to the Central Property Point at QHSS. The recent establishment of this facility has improved efficiency as all forensic samples are now delivered to one location rather than separate laboratories around the campus.

While the achievements to date are acknowledged, there are further enhancements which need to be pursued. Those include standardisation of procedures between the laboratory groups and efficient destruction processes to eliminate the storage pressures for completed/unrequired samples.

Receipting procedures have been implemented at the Central Property Point based on historical practices for each laboratory group. Now this is centralised, all procedures (unless there is justification not to) need to be standardised to ensure efficiency is achieved.

Storage of completed/unrequired samples is becoming a concern due to delays in authorisation from QPS investigating officers to destroy samples. The DNA & Forensic Sample Management Unit is endeavouring to obtain authorisations, however their endeavours are not resolving the current storage problems. It is incumbent on the QPS investigating officer to assist in this matter. To achieve this, QPS will need to ensure the current policy relating to destruction of forensic exhibits is complied with.

Recommendation 12:

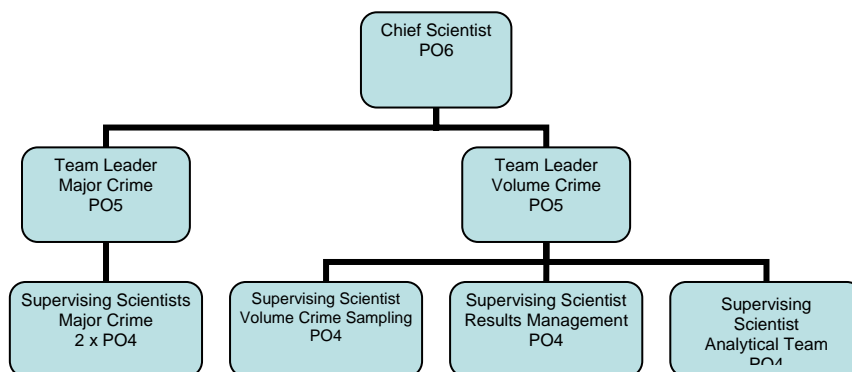
It is recommended that the Chief Executive Officer of the Institute implements standardised procedures within the Central Property Point by 31 January 2006.

Recommendation 13:

It is recommended that the Commissioner, Queensland Police Service ensures compliance with existing policies in relation to the notification and subsequent destruction of forensic samples by 31 January 2006.

7.5 Workflow in Forensic Biology

Forensic Biology presently has a team structure as follows:



Appendix 10 indicates the workflow for this area.

The above teams are at various stages of implementation of AusLab. Progress reports are provided to QPS through a twice daily download of information from AusLab to the Forensic Register. This information is then downloaded into CRISP (QPS crime reporting system) for the information of investigating officers who do not have access to the Forensic Register. Some of the terminology used by QHSS scientists is not clear to QPS staff, e.g. a positive result does not mean that a profile has been developed or a suspect linked to a crime scene, but that a sample capable of proceeding to profile development has been located.

At QHSS, there is a sampling team for Volume Crime. Where a sample is obtained, it is then forwarded to the Analytical Team for the development of a DNA profile which is then forwarded to the Results Management area for interpretation and loading on to the DNA database. The Analytical Team also processes the person samples. The person samples are being processed in real time, however there is a lag time of two to three months before results are provided back to QPS.

Person samples are undertaken on a fee-for-service basis through a MOU with QPS. In 2004/05 the revenue to QHSS from this service was approximately \$1.28M.

In the Major Crime area, many of the samples which have been presumptively tested by QPS scientists have the same presumptive tests repeated by QHSS scientists, thus risking the dilution of the sample and rendering it unusable for the development of a DNA profile. This duplication of effort also diverts QHSS scientists from other activities.

Staff work one shift per day and as a result, expensive equipment and laboratories are not fully utilised. An examination of workflow practices currently being carried out as part of the Business Enhancement Project will identify opportunities for efficiencies within the workplace to maximise use of existing space and resources. One of the possibilities is the implementation of double or staggered shifts. The Taskforce notes that some international best practice laboratories use double shifts and overtime as appropriate. Hence the Taskforce believes that this is a viable strategy for dealing with workloads.

Recommendation 14:

It is recommended that the Chief Executive Officer of the Institute develops and implements a data dictionary of scientific terminology for use by Queensland Police Service staff to enable the ready interpretation of outcomes and results downloaded from AusLab to the Forensic Register by 31 July 2006.

Recommendation 15:

It is recommended that the Chief Executive Officer of the Institute and the Superintendent, Forensic Services Branch, Queensland Police Service develop and implement protocols to minimise the duplication of presumptive testing by 31 January 2006.

7.6 Future Funding Needs

The Taskforce has endeavoured to assess the sufficiency of the current resource levels within Forensic Biology. As part of this task, management was asked to provide information on current funding and staffing levels, and to indicate what was necessary to cope with the incoming workload.

The response provided by management indicated a current base budget of \$3.3M for 2004/05 plus a further \$2.3M from backlog funding, giving a total budget of \$5.6M.

In relation to the recurrent funding required to meet ongoing work, QHSS management initially indicated that they needed a total of \$7M (i.e. additional funding of \$1.4M) but subsequently increased the estimate to \$8.4M (i.e. additional funds of \$2.8M). Estimates of the additional staff required ranged from 15 (10 technicians and 3 scientists) to 23 (8 technicians, 12 scientists) plus a senior scientist and administrative support.

Within the limitations of the data available, estimates undertaken by the Taskforce indicate that up to \$2M in additional recurrent funding would be required to meet current service delivery demands if productivity levels were to remain static (i.e. a total recurrent budget of \$7.6M). However, given the expected improvements in productivity from the additional staff, once fully trained, business process improvements, and the introduction of automation, the Taskforce is reluctant to endorse this level of resourcing.

In view of pressing service demands, the Taskforce proposes an additional \$1M be allocated to recurrent funding levels immediately, with further funding being subject to the development of a cost model based on the business process review outcomes.

The Taskforce also requested QHSS management to provide information on the resourcing implications of outsourcing Volume Crime cases, including initial sub-sampling by QHSS, analysis by the outsourcing firm, and results management by QHSS. QHSS management indicated that the funding of \$1.5M carried over from 2004/5 would be insufficient to process the outsourced samples, and that funding of \$2.1M was required to process 10,000 samples, including an additional 19 staff in QHSS (i.e. additional funds \$0.6M). When questioned by the Taskforce, management was unable to indicate how the 10,000 samples was estimated, and subsequently revised this to 20,000 samples. The most recent estimates provided by management is a total funding requirement of \$4.07M for all stages of the outsourcing process. This represents an additional non-recurrent funding requirement of \$2.57M.

Based on advice from the DNA & Forensic Sample Management Unit, the Taskforce estimates that up to 15,000 samples are expected to be analysed. Based on this number of samples, the Taskforce estimates additional funding of up to \$1.3M will be required for the outsourced analysis, and staffing and consumables in QHSS, based on productivity data provided by QHSS management. This results in total funding for the outsourcing of Volume Crime samples of \$2.8M.

In addition the Taskforce has identified that there are approximately 14,000 backlog samples in the Major Crime area. There is currently no strategy in place or funding available to deal with this backlog and the Taskforce was advised that QHSS required an additional \$4.8M to address it. However QHSS management subsequently revised this figure to approximately \$2M. Within the limitations of the data available, the Taskforce estimates that addressing this backlog could cost up to \$1.7M.

In addition, the Taskforce believes that further funding to address the Volume Crime and Major Crime backlog should be conditional upon the prioritisation of all samples and the cleansing of backlog data (refer Section 6.4.4) and the subsequent development of a complete outsourcing strategy. To ensure the progress of the outsourcing arrangements the Taskforce proposes that \$1M be provided to QHSS immediately.

The implementation of the above proposals for additional funding and staff to meet incoming work and backlogs could result in the employment of 30 to 40 additional staff in Forensic Biology, albeit many on a temporary basis to deal with the backlog. It is not possible to determine the appropriate mix of staffing disciplines until both the outsourcing strategy and business process review are completed. The increased staffing will place further pressure on existing facilities and require an urgent assessment of the introduction of staggered and/or double shifts.

Subject to the rate of incoming work remaining static, the above funding should see the DNA backlog eliminated by mid-2007, consistent with the Government's election commitment to eliminate the backlog in 3 years.

The table below illustrates the current and proposed funding needs of Forensic Biology:

Table 3: Proposed Funding for Forensic Biology

	2005/06 Recurrent	2005/06 Non-Recurrent	2006/07 Recurrent	2006/07 Non-Recurrent
Current Base Funding	\$3.3M	-	\$3.3M	-
Backlog allocation	\$2.3M	\$1.5M	\$2.3M	-
Proposed additional permanent staff & consumables	\$1.0M	-	(up to) \$2.0M ¹	-
Proposed additional temporary staff & consumables	-	\$1.0M	-	(up to) \$2.0M ²
Total Funding	\$6.6M	\$2.5M	(up to) \$7.6M	(up to) \$2.0M

Source: Ministerial Taskforce

1. The provision of the additional \$1M in recurrent funding (over and above the \$1M recurrent funding provided from 2005/06 on) is contingent on the outcome of the business process review and subsequent funding proposal.
2. The provision of this funding of up to \$2M (additional to the \$1M provided in 2005/06) is contingent on the prioritisation of samples, the cleansing of backlog data and subsequent funding proposal.

Recommendation 16:

It is recommended that the Chief Executive Officer of the Institute:

- Immediately recruit additional staff in Forensic Biology to meet ongoing service demands by **31 October 2005**;
(Estimated recurrent cost: \$1M)*
- Reassess the sufficiency of (i) above in light of a costing model for DNA processing currently being developed through the Business Enhancement Project by **31 January 2006**;*
- Subject to (ii) above recruit additional staff in Forensic Biology to meet ongoing service demands by **31 January 2006**;
(Estimated recurrent cost: up to \$1M, additional to the \$1M recurrent funding provided from 2005/06)*

-
- (iv) *Develop a comprehensive strategy for the processing of the volume crime and major crime backlog once the prioritisation of samples and data cleansing is completed (Recommendation 7(iii)) by 31 January 2006; and*

(Estimated non-recurrent cost: \$1M in 2005/06, up to an additional \$2M in 2006/07)

- (v) *Subject to the above recommendations, develop proposals for the introduction of staggered and/or double shifts by 31 January 2006.*

7.7 Information Management in Forensic Biology

A range of data is collected on the various stages of a sample's progress through the testing process including Cases Received, Cases Started, Cases Reported and Cases Outstanding. Turnaround times are also kept but the data is an average time and fluctuates wildly depending upon whether resources are allocated to current cases, older cases, writing reports etc. There is no pattern and no real explanations for the variations. The Business Enhancement Project will identify key performance indicators which will inform the data collected.

The interim results provided to QPS are not the results of analysis but rather a progress report on whether a sample is proceeding for DNA profile development or is not capable of producing a profile. In addition, the categorisation of these progress reports as "results" means that they are peer-reviewed by another scientist in accordance with NATA requirements.

Much of the information entered onto AusLab is done by scientists rather than by administrative support staff. This and the lack of administration staff means that there are delays in data entry thus creating a situation where it is impossible to identify the current status of work activities, including backlogs. This matter is expected to be addressed through the Business Enhancement Project which will identify tasks being performed and the appropriate mix of staff to match those tasks.

In addition data is not reported in a format which indicates outputs or outcomes which can be used by management to report to government and/or to manage the business.

Recommendation 17:

It is recommended that the Chief Executive Officer of the Institute:

- (i) *Review the terminology used to describe milestones in the analysis process by 31 July 2006;*
- (ii) *Ensure administrative staff undertake data input into AusLab wherever this is deemed to be a more efficient and effective use of resources by 31 January 2006; and*
- (iii) *Ensure data collection and reporting supports government and management needs and priorities by 31 July 2006.*

7.8 Forensic Biology Structure

The nature of the work undertaken by the Major Crime Team and the Volume Crime Team is similar. Both teams examine exhibits of swabs and other physical evidence. The Major Crime Team deals predominantly with crimes against the person whereas the Volume Crime Team deals with property crime.

There are clear advantages in amalgamating these teams allowing Volume Crime to be a training ground for movement to the major crime work. This would allow a more flexible use of resources to provide a higher level of service to QPS.

It is also acknowledged that the Business Enhancement Project is presently examining, among other matters, the tasks and workflows of this area. That process is expected to provide a thorough analysis of the ideal workflows and interrelationships necessary to achieve improved efficiencies. This includes an analysis of the employment of technicians within the laboratory and the skill sets necessary to address all aspects of the workflow. Consequently, any proposed changes to this area at this point may be premature and best left until the conclusion of that project. However, the Taskforce believes that QHSS management needs to address work allocation of this area as a matter of urgency.

Any future work groups for Forensic Biology need to be consistent with the competency based progression strategy and fluid team approach outlined in Section 5.2.

Recommendation 18:

It is recommended that the Chief Executive Officer of the Institute reviews the outcomes of the Business Enhancement Project and implements a new work group approach in Forensic Biology by 31 October 2005.

7.9 Forensic Biology Work Space

Current laboratory workspace is inadequate for current needs if the laboratory was operating at best practice. While senior management has developed a number of options to enhance work space, this has not been done in a way which takes a strategic approach to the task.



Source: Ministerial Taskforce

The Taskforce has concerns about any plans which would involve the decommissioning of existing laboratory space (see photograph) into an administrative work area, and which fails to consider future needs as a result of possible growth in demand. Current planning processes have also failed to be cognisant of other strategies such as the introduction of staggered shifts and the potential for 24/7 operations in the future.

Strategic management of workspace has the potential to substantially improve output without a requirement for additional buildings to be constructed. This issue is further canvassed in Section 16 of this report.