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## 15.0 RESEARCH AND DEVELOPMENT

### 15.1 Background

The form of research most relevant to QHSS is applied research (ie research applied to address a specific problem or issue) and method development (ie to develop new extraction and testing methodologies to provide enhanced client service). At the lower level, method development is not seen as research but part of client service.

QHSS has led the scientific community nationally and internationally in many areas, including:

- The development of methodologies for the testing of anthrax;
- Research into the development of a leptospirosis vaccine;
- The development of statistical methodologies for undertaking DNA testing (used in response to the Asian Tsunami);
- Extraction of DNA from degraded skeletal remains;
- Testing for residues in aircraft fuel tanks;
- Research into the transmission of bat-borne and mosquito-borne viruses (e.g. lissavirus, dengue fever);
- Developing methodologies for testing for viral and residue contaminants in blood and blood products;
- Participation in a national survey of air quality; and
- Development of methodologies to test for algal types.

A number of scientists' professional standing is such that they lecture or tutor in forensic and public health sciences in universities (e.g. Griffith, QUT).

QHSS staff are also involved in numerous forums with peer and research institutions, and other entities, at a local, State, national and international level.

The development of new methodologies is an essential part of providing an enhanced client service. QHSS are often faced with new and unique analytical demands, which require the development of new extraction and testing methodologies. Although this work is undertaken on an ongoing basis, many staff, particularly in Forensic Sciences, have expressed concern that they have inadequate time to write up the subsequent results. This denies the researcher, and QHSS, the opportunities that accrue from scientific publication and peer recognition. Bench research can also identify more efficient work practices and use of new technologies.

Some areas of QHSS have engaged PhD students to undertake specified research, although this has generally been limited in scope.

Public Health Sciences has an active research program in partnership with a range of public and private sector agencies. Many of these projects are part of externally-funded research projects or are undertaken on a fee-for-service basis. For Public Health Sciences, undertaking public health research is an integral part of their business.

QHSS has allocated a sum of \$100,000 per annum to support applications for research grants for public health research, in collaboration with other partners, usually universities. QHSS also provides 'in-kind' support to these research collaborations. Project proposals are assessed and monitored by the Research Management Advisory Group, which is comprised of representatives from QHSS and EnTox management. This Group also oversees projects undertaken by EnTox. There are approximately 120 active projects on the register equally divided between EnTox and

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Public Health Sciences. The Scientific Advisor in Public Health Sciences estimates that there are approximately 10 FTE staff undertaking research in Public Health Sciences, out of a staffing complement of 130.

In contrast, the workloads and lack of priority given to research in Forensic Sciences by senior management makes any research in the forensic area very limited.

QHPSS has recently progressed initiatives to improve the quality, co-ordination, prioritisation and organisational alignment of research within QHPSS. This included the establishment of a Research Co-ordination Unit reporting to the Executive Director, QHPSS (now the Co-ordination, Planning and Research Unit). A Research Issues Paper, Research Survey and Research Forum were progressed in early 2005.

The draft report of the Research Forum (March 2005) concluded that a research framework should be developed in the following areas:

- *Leadership and Direction*, e.g. explicit recognition that research is central to the core business of delivering evidence-based pathology and scientific services;
- *Identifying Research Priorities*, i.e. how to balance the needs of client groups, research interests and skills of staff, and commercial benefits for QHPSS to best provide value for QHPSS and the community;
- *Organisational Capacity*, including better understanding QHPSS's expertise and infrastructure, and strengthening links to external groups;
- *Access to Resources*, as service delivery takes precedence over research activities in the use, for example, of laboratory equipment; and
- *Administrative Support*, e.g. the establishment of an administrative support unit to provide advice and assistance in funding applications and managing research contracts.

The above research framework is yet to be operationalised within QHSS.

## **15.2 National Research Centre for Environmental Toxicology**

The National Research Centre for Environmental Toxicology (EnTox) is co-located with QHSS on the Kessels Road campus. The relationship between QHSS and EnTox is governed by two Agreements which, among other things, provides for free rental of space at QHSS, and financial contributions by QH (\$508 000 per annum), the University of Queensland, QUT and Griffith University.

Both agreements were to expire on 30 June 2005, but have now been extended for 12 months with the option to review the arrangements again by 31 December 2005. It is essential that the senior management of Public Health Services in Queensland Health be involved in these re-negotiations.

Under separate arrangements, QH funds the full salary of the Director of EnTox (joint Director of QHSS).

The Taskforce endorses strong partnering relationships between QHSS and research entities such as EnTox. However, such arrangements must be of mutual benefit to both agencies. In addition, QHSS must ensure that its core business of providing scientific and forensic services is not adversely affected by such relations.

There is a widespread view among QHSS scientists that QHSS receives little or no benefit from the co-location of EnTox with QHSS. Indeed many believe it has had a detrimental impact on QHSS services. QHSS management were unable to demonstrate to the Taskforce any substantive benefits to QHSS from EnTox's co-location with QHSS. Management acknowledged that very few QHSS scientists were actively undertaking research projects at EnTox.

The Taskforce notes with concern that EnTox PhD students are using some 400 square metres of former laboratory space for administrative purposes at a time when QHSS scientists are acutely short of dedicated laboratory space. This matter is discussed further in Section 16.2.

Any future arrangements for research tenants on the QHSS campus needs to be governed by a series of key principles, i.e.:

- The arrangement must be of mutual benefit to both parties;
- In the case of QHSS, the benefits must include genuine joint projects (ie of mutual benefit); real opportunities to enhance the professional development of QHSS scientists; and the development of opportunities for scientific advancement in areas of interest to QHSS;
- The terms of the Agreement must be transparent with all ‘in-kind’ matters identified and costed;
- The arrangements must not detract from the Institute’s service provision; and
- The Agreement must align with the Institute’s core business and future vision.

**Recommendation 56:**

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

- (i) *Ensures that any future arrangements for research tenants on the Queensland Health Scientific Services campus is governed by a series of key principles **immediately**, i.e.:*
  - *The arrangement must be of mutual benefit to both parties;*
  - *In the case of the Institute, the benefits must include genuine joint projects (ie, of mutual benefit); real opportunities to enhance the professional development of the Institute scientists; and the development of opportunities for scientific advancement in areas of interest to the Institute;*
  - *The terms of the agreement must be transparent with all ‘in-kind’ costs identified and costed;*
  - *The arrangements must not detract from the Institute’s service provision; and*
  - *The agreement must align with the Institute’s core business and future vision.*
- (ii) *Undertakes renegotiations in consultation with Queensland Health stakeholders (including Public Health Services representatives), University sector stakeholders and the National Research Centre for Environmental Toxicology (EnTox) with a view to ensuring any ongoing Service Level Agreement in relation to EnTox is compliant with the abovementioned principles by **31 January 2006**.*

### **15.3 Governance Arrangements for Research and Innovation**

There are a number of essential pre-requisites for QHSS to prosper as a scientific campus, i.e.:

- Strong scientific leadership on campus;
- Capacity to attract and retain skilled scientists at all levels;
- Access to ‘state-of-the-art’ facilities and equipment;
- The opportunity for scientists to undertake and publish research; and
- Strong links to relevant academic and peer institutions.

QHSS needs to establish structures, systems and processes to achieve the above. Skilled scientists see scientific excellence, including access to research opportunities, as an essential part of a scientific career. The capacity to undertake method development and applied research is essential to ongoing improvements in client service.

The Taskforce supports the direction of the recent initiatives undertaken by QHPSS management to improve the governance arrangements for research as outlined above. Within the Kessels Road campus, these initiatives need to be led at a senior level for them to be implemented successfully.

There is generally a strong culture of staff commitment to their sciences. This culture remains despite the inadequacy of scientific and business leadership at senior management level. However, the Taskforce is seriously concerned that this lack of scientific leadership cannot continue, and that there is a serious risk, particularly in Forensic Sciences, that service provision will be adversely

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affected if stronger scientific leadership models are not put in place. This problem has been, and will continue to be exacerbated by the inability to attract and/or retain skilled scientists at all levels.

A number of issues relevant to scientific excellence are addressed elsewhere in this report (e.g. revised leadership models, staff recruitment and retention, strategic infrastructure). To fully develop as a scientific campus, QHSS needs to substantially enhance its governance arrangements for research and innovation. These arrangements need to include:

- The development of a strategic approach to research, which will in turn govern research priorities and the development of research partnerships;
- Equitable access to research opportunities for scientists across the campus;
- Access to administrative and contract management support for scientists in applying for, and managing, research grants;
- Maintenance of links to relevant academic and peer institutions on research issues, including strengthened links in the forensic sciences;
- Clear policies on costings for research applications; and
- Management of funding for all research projects.

The governance arrangements also need to strongly link research and innovation activities with staff attraction, development and retention including:

- Mechanisms for staff placements in research institutions;
- Mechanisms for scientific staff to publish research findings; and
- Encouragement to undertake further education in relevant areas.

The proposed position of Chief Scientist, supported by the Research Committee, will be responsible for the above matters.

However, at the current level of resourcing it is not possible to achieve the degree of research commitment which should be expected from the Institute. Consequently, additional funds should be made available to the proposed Chief Scientist, which together with the current funding available within Public Health Sciences should allow a realistic research program.

In practice the proposed Chief Scientist would then be able to allocate funding to units to allow staff to pursue approved research projects. That funding would then allow the release of the officer and enable backfilling for day to day work commitments to continue.

It is therefore considered an additional amount of \$500,000 p.a. needs to be provided which will ensure the appropriate level of research.

***Recommendation 57:***

*It is recommended that the Chief Scientist of the Institute develops and implements governance arrangements for research and innovation at the Institute by 31 July 2006 including:*

- (i) The development of a strategic plan for research, to govern research priorities and the development of research partnerships;*
- (ii) Equitable access to research opportunities for scientists across the campus;*
- (xi) Access to administrative support for scientists in applying for, and managing, research grants;*
- (iv) Maintenance of links to relevant academic and peer institutions on research issues, including strengthened links in the forensic sciences;*
- (v) Clear policies on costings for research applications; and*
- (vi) Management of funding for all research projects.*

*(Estimated recurrent cost: \$500,000 per annum)*

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## 15.4 National Forensic Innovation Facility

The issues faced by Forensic Sciences in their limited ability to undertake research is not unique to Queensland. A report prepared in 2001 for NIFS concluded that “... *forensic science in Australia barely has the resources to attend to core business* (i.e., casework investigation)” and that “... *strong and decisive action* (needs to be) *taken now to ensure the criminal justice system has access to the best available science*”. The paper recommended the establishment of a decentralised facility dedicated to forensic innovation at an estimated annual funding of \$4M to \$5M. The proposed National Forensic Innovation Facility is to be established in ‘nodes’ in various jurisdictions to reflect local expertise.

A Working Party, chaired by Associate Professor Dennis Burns, Griffith University, is co-ordinating Queensland’s input into this strategy.

In response, the Commonwealth funded a *Pilot Project* (Phase 1 - \$350,000; Phase 2 - \$320,000) in relation to the criminal use of explosives. A further round of applications for funding is currently underway.

The Commonwealth Government has indicated that any Commonwealth proposal to fund a National Forensic Innovation Facility would need to be matched by State/Territory funding.

To date, QHSS management has shown little interest in this initiative, with the Director’s focus being on environmental health issues.

The developments in this area provide an excellent opportunity for Queensland to strengthen its skill-base in key areas of forensic research. The proposal is strongly aligned with the Government’s Smart State vision, and the Taskforce’s recommendations to strengthen QHSS’s research capacity and links in the forensic sciences. Progressing this initiative is critical to achieving scientific excellence in the area of forensic sciences, and most particularly, in attracting, developing and retaining quality scientists in QHSS.

### ***Recommendation 58:***

*It is recommended that the Chief Scientist of the Institute include strategies to fully engage in the development of the proposed National Forensic Innovation Facility in the strategic plan for research by 31 July 2006.*

## 15.5 Professional Development

Ongoing professional development needs to play an integral part in management of the QHSS campus. However, the Taskforce found that many QHSS staff are concerned about the limited staff development and training available, especially in Forensic Sciences. Staff in Forensic Sciences have expressed strong concern with the perceived limited and arbitrary decision-making in regard to attendance at key national and international (held in Australia) Conferences. Scientific staff believe these conferences are an appropriate way of keeping their knowledge and skills up to date and provide networking opportunities with interstate peers.

In contrast, the Manager of Public Health Sciences advised the Taskforce that he allocates a set amount of \$10,000 per annum for each team for conference attendances.

Forensic managers advise that scientific training in forensics is invariably done ‘in-house’ by more experienced scientists. Given the recent influx of additional staff in Forensic Biology, a retired forensic scientist was engaged on a part-time basis to assist in the training of the new staff, including giving evidence in court. The Taskforce believes that there would be benefits from introducing a more formalised training and accreditation process for scientists providing evidence in Court.

QPS and DPP staff generally spoke positively of the Court work done by QHSS forensic scientists, especially those more experienced in Court work. However, both QPS and DPP believed there is scope to improve the standard of Court work for less experienced scientists. DPP is willing to assist in this training. The Taskforce believes this would also assist scientists in increasing their confidence to do Court work.

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For QHSS to grow as a scientific institution, it needs to identify and fully utilise the skills, knowledge and facilities on a campus-wide basis. This will promote staff being ‘multi-skilled’ in various areas, and enable equipment and other resources to be used to assist meeting peak demands.

The Taskforce acknowledges that there is some cross-campus sharing of expertise and equipment - for example, the public health science expertise in the Organics area is used to assist Forensic Sciences in certain residue testing (e.g. pesticides) and phycology (algae) in some forensic cases. Equipment is also utilised across campus in some instances.

The movement of staff across the campus is limited. Many staff and managers spoke highly of earlier arrangements where lower level staff would be ‘rotated’ to various areas as part of a career development strategy. Also, it was the previous practice for many forensic scientists to initially work in Public Health Sciences, where, among other things, they would be exposed to the legislative requirements of being a State Analyst. It is the general view of QHSS staff that these types of models have fallen away due to increased work pressures.

It is proposed that the new position of Chief Scientist will be responsible for the development of an overall policy on professional development, with decisions being devolved on a case-by-case basis.

As part of the Business Enhancement Project a capability matrix is being developed to identify the current skill levels across the various classifications in Forensic Biology. In addition the project has mapped the DNA process from receipt to report. This map will enable the development of the specific competencies required.

The Taskforce is supportive of this process continuing and encourages the use of the information to develop a competency acquisition program which will enable scientists and technicians to progress within their sciences. Another use of the data is to identify the skill gaps in the existing workforce which in turn cause “bottlenecks”, thus exacerbating the backlog issue. This would assist in the management of the workflow in the laboratory through the upskilling of identified staff in the required competencies.

## **15.6 Institute Training Model**

The Taskforce acknowledges that there are a range of models suitable for the delivery of training. However in a competency based model the most appropriate trainers are the skilled practitioners within the workplace.

The Taskforce believes that the Institute should adopt a Competency Based Training Framework based on Adult Learning Principles. This framework requires the following:

- Development of “on the job” competency training;
- Provision of mentoring;
- “On-the-job” assessment;
- Accreditation; and
- Post training support.

That is not to say that there is no requirement for a centralised co-ordination of training and professional development. The Taskforce believes that the proposed position of Chief Scientist would be responsible for ensuring that each discipline develops a competency-based training program.

Many staff also felt that they should be given support for further academic advancement (ie, Masters, PhD), and recognition of higher learning. The Taskforce believes that further academic studies should be encouraged and supported in line with current Study and Research Assistance Scheme (SARAS) policies.

Another strategy would include partnering with Universities to encourage Graduate and Undergraduate placements within the Institute. This will assist in progressing research projects and future recruitment and retention strategies.

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**Recommendation 59:**

*It is recommended that the Chief Scientist of the Institute develop and implement by 31 July 2006:*

- (i) A competency based training program across all sciences in the Institute;*
- (ii) A policy for the professional development of Institute scientists incorporating guidelines for:*
  - Attendance at local, national and international conferences and other scientific forums;*
  - Undergraduate and graduate work placements within the Institute; and*
  - Support for further academic advancement, in line with current Study and Research Assistance Scheme (SARAS) policies.*
- (iii) A formal training and accreditation process for Institute scientists to give evidence in Court.*