Department of Health
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PathWest
LABORATORY MEDICINE WA

PathWest Workforce Report

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Executive Summary

Western Australia, along with the rest of Australia, faces significant challenges to provide health services into the future as a result of widespread labour shortages. For Western Australia (WA) this is exacerbated by an unprecedented and prolonged resources boom driven by the needs of the newly industrialising economies of Asia. The massive infrastructure requirements have led to highly competitive and stable employment opportunities outside of the public sector and leaves the providers of human services at a serious disadvantage in the market place for skilled labour. Moreover, the career choices of students entering university are also likely to be affected by the ongoing coverage of career success stories and opportunities in the resources and related sectors. This phenomenon is not new and has been observed on a number of occasions in different parts of the world.[1]

The provision of health services by the public sector is further complicated by its universal service obligation. This puts a continuous strain on its resources and prevents the rationing of services based on price that takes place in the private sector. The public sector also plays a critical role in monitoring the complex postgraduate training of the various health specialisations, particularly in medicine. Combined with the roll-out of new health infrastructure and the difficulties this creates in re-distributing staff around the system, there is also an expectation that WA Health will deliver efficiency and sustainability through the reform of its workforce.

Underpinning the sustainability of WA Health's ongoing provision of services to the community is the timely and efficient provision of world class diagnostic pathology services by PathWest. Any vulnerability realised by PathWest will ripple through the rest of the health system, especially in acute inpatient services. This has been recognised by the PathWest Workforce Committee and in response they have commissioned the work contained in this report to enable them to make decisions on the strategic direction PathWest needs to make in relation to workforce issues.

Australian and International Review

The work undertaken for this report examined a number of issues aimed specifically at workforce sustainability. The first of these was a brief survey of Australian and international literature on supply pressures, areas of growth, role delineation, registration, career pathways and job redesign.

Key findings:

- International Pathologist workforce studies (UK, US and Canada) indicate large shortages in the labour market.
- The Australian Medical Workforce Advisory Committee has identified a need for 100 pathology trainees per annum if Australia is going to maintain a balanced pathology service.

[1] This has been labeled "Dutch Disease" after the impact of North Sea oil discoveries and development on the Dutch economy in the 1960s and 1970s.

- The Royal College of Pathologists of Australasia have identified that there are insufficient training positions and inadequate funding.
- Australian and international studies show that over the next 5-10 years, shortages will be evident in the Laboratory Medical Scientist workforce.
- International literature demonstrates how role delineation and job redesign are strategies currently used to address workforce shortages.

PathWest Workforce

Another priority area was the demographic profiling of PathWest's workforce in order to develop projections and determine potential gaps in overall workforce numbers for a range of supply scenarios. Critical shortages of Medical Scientists and Pathologists are imminent and to address this a number of strategies will be required. This includes increasing graduate recruitment, up-skilling the 60% of Technical Assistants/Laboratory Technicians in PathWest with biomedical university qualifications, and reducing staff turnover.

Key findings:

- Ten (10) Pathologist training positions have been committed to the Western Australian Public Health Service.
- An increase of six graduates per year, 10 up-skilled technicians with relevant university qualifications, a 10% reduction in turnover and reducing demand by 0.5% per year will eliminate near and medium term shortages of Medical Scientists (over 10 years).
- Turnover is relatively high and must receive the highest priority in PathWest workforce strategies to achieve these targets. This is especially the case for males in the 45+ cohorts.
- There will be shortages by 2012/2013 of 81 people and 133 by 2017/2018 if it continues as it is.
- Graduate recruitment at current levels will not provide the required workforce over the longer term.
- Longer term there will need to be ongoing pursuit of more efficient work practices.

Recommendations:

- Maintain pathology training positions within PathWest. Requirements should be reviewed annually by a Pathologist training panel within PathWest. There should be consultation with private sector as part of this process.
- Increase medical science graduate recruitment by at least six per year.
- Up-skill 10 university qualified Laboratory Technicians and Technical Assistants per year with further training to undertake some Medical Scientist functions.
- Reduce turnover by 1.4% (i.e. a 10% reduction in turnover rates).
- Implement LEAN principles to assist with process redesign to help reduce overall demand.

Workshops

In 2006 the WA Health Workforce Climate Survey was conducted, where responses from PathWest indicated overall dissatisfaction with staff engagement and involvement in decision making, improvement and other workplace issues. There was also a belief by the PathWest Workforce Committee that the current way of doing business in laboratories could be improved, and that much could be learned through independent consultation with staff. In response to this, interactive workshop sessions were held with PathWest employees providing a forum to discuss various issues around the following themes: spatial interaction, technology, organisational process, governance processes, communication, scientific processes, human capital and training.

A number of very useful insights were gained from the workshops and it was refreshing to see the level of enthusiasm shown by staff towards this interactive process. It is with great hope that expectations for improvement that arise from this process can be met through decisive action to address the issues that have been identified by the valued employees of PathWest. There were six themes identified during the workshops, with priorities identified in the areas of equipment and communication.

Key findings:

Equipment

There is a range of technologies on the PathWest equipment inventory. Standardisation is lacking across sites, some sites have upgraded equipment while others are operating with older technology or non-automated technology. The IT restrictions faced when interfacing new technologies are a limitation, as well as the servicing contracts/issues that accompany each new purchase. Many laboratories are using old computers with limited capabilities and in most instances there doesn't appear to be enough PCs for the number of staff members within a workspace. Coordinated purchasing and procurement strategies do not appear to be exercised.

Communication

The lack of system wide coordinated communication around sample management has resulted in inconsistencies in sample labelling, codes and test abbreviations; issues with batch transfers; and errors and omissions on request forms. Smaller and regional laboratories feel disconnected from the organisation in terms of decision-making, and the amalgamation of corporate services, Health Corporate Network (HCN), has been viewed to offer a less personalised service. This is increasingly having an effect on turnaround times, staff morale, and ultimately the quality and reliability of results.

Workspace

Most laboratories across PathWest sites are confined within the allocated space of the hospital in which it is located. Many have outgrown this space, as original designs have not allowed for the current volume and nature of laboratory testing. These spatial restrictions have a major impact on workflow, downstream processing and outputs.

ULTRA

ULTRA is the single patient result database routinely used by laboratory staff. The main issues identified with ULTRA include that it is slow and cumbersome, and not congruent with all technologies and instrumentation. There is insufficient and unsuitable IT support when it comes to difficulties associated with ULTRA. Any changes to ULTRA are often not followed up with appropriate support and instruction.

Recommendations:

- Establish a PathWest Improvement Network to stimulate, the sharing of ideas in areas of improvement, and solutions for these improvements.
- Implement standardisation across all PathWest sites in relation to labelling, equipment and procedures.
- Replace, upgrade and begin a process of continuous improvement with respect to equipment incorporating ongoing training/learning with the changes.
- Provide better access to further computer/IT training for ULTRA and other PathWest applications to medical laboratory staff to ensure skills are not limiting performance and benefits of new systems.
- Review site-based IT staff requirements to ensure laboratories are provided with more timely IT attention.
- Further develop relations with branch laboratories to encourage bilateral communication, involved decision making and a sense of belonging to the organisation.

Training Needs Analysis

In order to ensure a sustainable and productive workforce at the organisational level, PathWest needs to obtain an understanding of what is required in terms of employee training needs. To develop this understanding a PathWest training needs analysis (TNA) survey was distributed to evaluate the PathWest training culture. That is, how people get their training; what types of training are undertaken; perceptions of training relevance; barriers to undertaking training; and types of training required.

Key findings

- Of the staff surveyed the preferred method of delivery for training included formal external training, training off site in other laboratories, internal training but at different PathWest sites and internal laboratory training. There is least interest shown in online training or training by research or computer based learning.
- PathWest has a highly educated group of technical staff with 60% of Technical Assistants/Laboratory Technicians with university qualifications including a biomedical focus.
- Medical Scientists are less satisfied with their career outlook than Laboratory and Technical Assistants.
- Training that helps employees to see a value in what they do for their clients or patients was seen as useful.

Evaluation of survey responses indicate that PathWest training has largely been reactionary and ad hoc, does not clearly integrate with career paths, and does not align with training organisations. Training needs appear to fall short

as professional development, performance management, aspirations of staff, and specific or strategic requirements of laboratories are not always fulfilled.

The challenge for PathWest is to implement a training program that meets both employee and organisational goals, and is tailored to service priorities while also boosting staff moral, retention, motivation, and provokes a learning culture.

Recommendations

- Promote a training and development culture within PathWest.
- Provide the required tools to allow managers to identify training needs within their disciplines and implement training required to meet new roles.
- Tailor specific up-skilling programs to recognise and extend the already highly qualified Laboratory Technician/Technical Assistant workforce.
- Redefine tasks and role delineations of laboratory staff and relate it to their educational background, skills and knowledge.
- Establish a PathWest Training Unit to provide the training/education requirements to meet staff, laboratory, and organisational purpose.

The information presented in this report has highlighted the vulnerabilities associated with workforce issues that PathWest will inevitably face. The objectives of this report are aligned with WA Health's *Healthy Workforce* strategic direction, and aims to generate awareness of the issues, consideration/adoption of the various recommendations proposed, and diligent action to maintain a healthy workforce from both an organisational and employee perspective.

Overview

Pathology testing, also known as Laboratory Medicine is a vital part of the management of patients within the health system. Without its use, the accurate diagnosis and appropriate treatment of most patients would not be possible.

PathWest is the key provider of pathology services for WA Health and is one of the largest employers in the system with around 1,400 FTE. Ensuring sustainable service delivery for PathWest is critical for the efficient and effective running of the health system. It is essential that risks to service delivery as a result of potential workforce shortages are identified and that detailed workforce planning is undertaken. This will enable strategies to be developed and ensure identified risks are effectively managed.

The health industry in Australia, and especially WA, has been confronted with the potential for serious crises as a result of skill shortages. The challenge is complicated in WA by the protracted expansion of the resource sector, the flow on effect this has had for other sectors of the local economy, and its concomitant impact on skill requirements. This activity is expected to continue for at least another five to ten years and will be complemented by the expansion and renewal of public infrastructure, including the proposed capital rollout for WA Health. The re-development of infrastructure for WA Health is a much welcomed initiative, but comes with its own set of operational and strategic workforce challenges.

Continual improvement is the underlying motive driving all of the business and clinical related projects and policy developments within the public sector health system. Moving the various elements of WA Health that contribute to delivery of services from their current practice to new ways of doing business, that are more efficient, resilient, and ultimately sustainable is a major challenge. Failure to achieve this is also a substantial, risk to WA Health due to a future of low growth in skill supply and rapidly rising demand for services across all facets of the business, especially pathology services.

Modelling of the PathWest workforce has identified a substantial risk of finding enough staff with suitable qualifications to provide services at existing levels, let alone accommodating growth. This is especially true for Medical Scientists and Pathologists (medical). Growth in service provision under this scenario must come from productivity. This could be the combined result of improved management, streamlined processes, implementation of new (hard) technologies elimination of redundant technologies, and overuse of existing medical tests. Improving upon existing role delineations for the laboratory workforce is another strategy that can contribute to alleviating skill shortages.

Within PathWest there are initiatives in place to redesign some laboratories and processes using the LEAN methodology. LEAN analysis is an innovative approach that improves productivity by eliminating waste from processes, producing a dramatic impact on quality turn-around-time, employee morale and customer satisfaction. PathWest Core Laboratories at Royal Perth Hospital (RPH) and QEII have recently been through LEAN reviews by specialists from Abbott Laboratories, and similar processes are planned for the

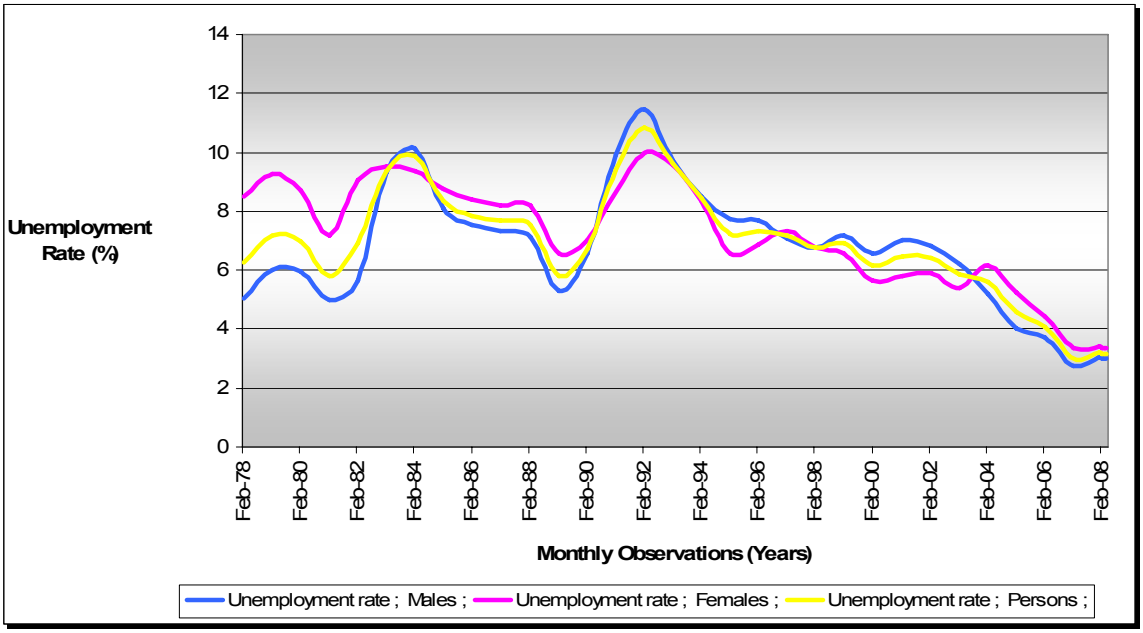
core laboratories at Princess Margaret Hospital (PMH) and King Edward Memorial Hospital (KEMH). These are important initiatives and no doubt will help contribute to the substantial improvements that will be required to meet the demands for pathology services into the future.

The development of the new tertiary facility, Fiona Stanley Hospital, will also provide the opportunity to embed best practice, facilitated by state-of-the-art laboratory design. Other initiatives within PathWest that should, when widely implemented and integrated into every-day practice, improve service delivery include the role-out of the ULTRA information system to replace BLIS in Branch Laboratories and the computerised pathology order entry (CPOE) system. BLIS was a system limited to PathWest Branch Laboratories, whereas there is now a single ULTRA database for all sites with the advantage that tests registered at one site are visible at all sites, making sample referral from site to site much more manageable. CPOE has the potential to make big reductions in patient sampling and specimen labelling errors as well as presenting duplicate test requests and other unnecessary testing.

Economic Outlook and Workforce

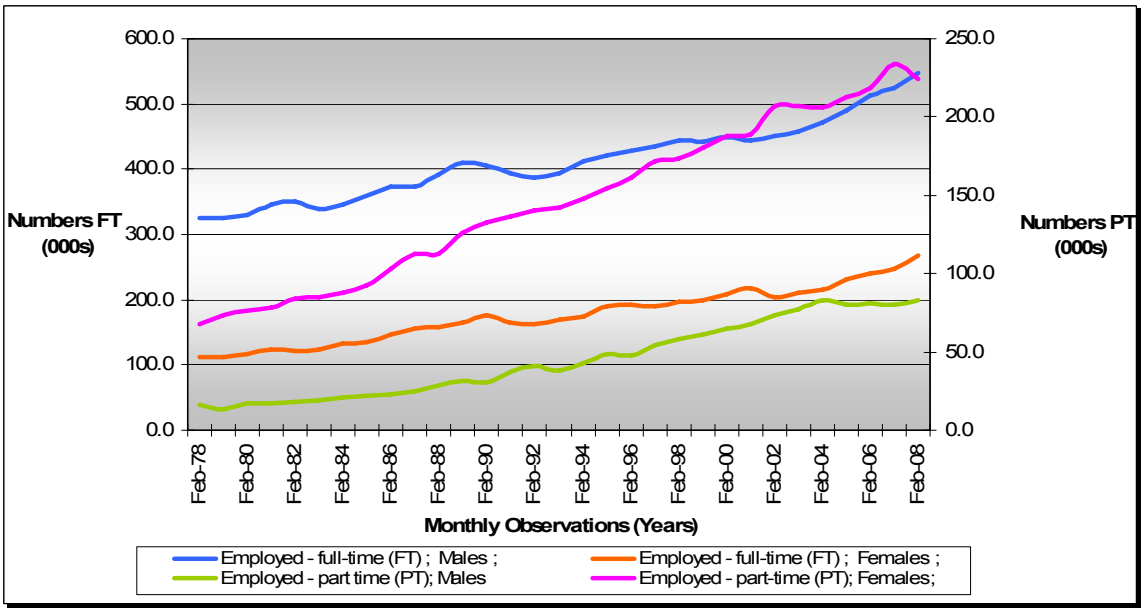
Anyone living and working in Western Australia over the last two to five years will have noticed 'staff wanted' signs literally everywhere. This is from both a direct and indirect effect of the rapid expansion of the resources sector. The impact can be seen in an unemployment rate - at its lowest in 30 years and by a long way (see Figure 4). It can also be seen in the spectacular employment growth in the past few years, especially growth in full-time employment. Part-time employment in the past few years, on the other hand, has slowed dramatically (see Figure 5). Among the reasons behind this is that at least some part-time employment is 'underemployment' (a form of hidden unemployment); the increase in labour demand has seen part-time workers opt into full-time forms of employment (Lewis and Koshy, 1999). A large portion of youth employment is in the retail sector on a part-time basis, the slowing of part-time employment may simply reflect the supply constraint in this section of the labour market (i.e. number of kids is drying up) (Daly et al. 1998). This will also impact on the future graduate market and is one of the main drivers of the shortages that are about to cripple the health workforce.

Figure 1: Unemployment Rate by Gender, 1978 to 2008



Source: ABS 6202.0.55.001 Labour Force, Australia, 1978 to 2008. WA.

Figure 2: Number of Persons Employed by Gender, 1978 to 2008



Source: ABS 6202.0.55.001 Labour Force, Australia, 1978 to 2008. WA.

Note:

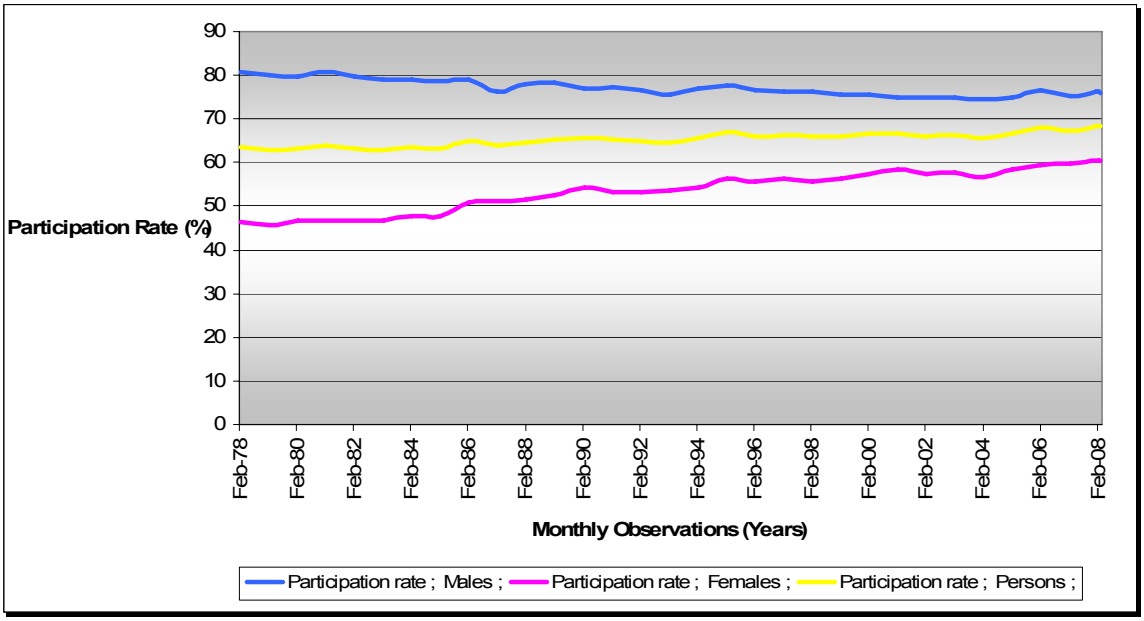
i. Full-time (FT) recorded on left hand scale and part-time (PT) on the right hand scale

ii. Data are for Western Australia

Increases in female participation rates have played a very large part in the increases observed in total labour supply over the past three decades (see

Figure 6)[2]. The low and declining participation rates observed for males are, in part, a reflection of hidden unemployment among older male cohorts (VandenHeuvel, 1999) and the trend toward early retirement. The feature of interest in Figure 3 is the convergence of participation rates for males and females, such that the spectacular growth in labour force participation by females has partly been offset by declining male participation rates. The risk for industry is that increases in female participation rates have probably been exhausted and may not provide the boon to labour supply that they have in the past.

Figure 3: Labour Force Participation Rates by Gender, 1978 to 2008



Source: ABS 6202.0.55.001 Labour Force, Australia, 1978 to 2008. WA.

Skills

There have been a plethora of reports and academic research published over the past five to ten years indicating areas of skill shortage and the impacts of workforce and population ageing. The issue driving the most recent reports is the rapid development of the resources sector as it strives to capitalise on the industrialisation of China and India. Nationally, but especially in Western Australia, the skill shortages are acute and are being felt beyond the resources sector.

More recently there have been some highly publicised reports, such as *Staffing the Super-cycle: Labour Force Outlook in the Minerals Sector, 2005 to 2015* (NILS, 2006).[3] Another study commissioned by the State Training Board, *Beyond the Resources Boom (BRB)* (WASTDB, 2007), focuses on WA's mining boom and how this is placing enormous competitive pressure on

[2] The participation rate is the percentage of the civilian population aged between 15-65 years that are either employed or unemployed.

[3] This report has some interesting and very useful background on investment and issues in the mining sector, however the method for modelling employment growth has very limited capacity to provide any useful insights and the estimates should be treated with extreme caution.

available skills, particularly vocational skills. The influence of these reports on high level decision making is a risk for WA Health, as they diminish the standing of the health sector's claim on training and higher education resources and strategic direction.

The logic underpinning the commissioning of the BRB Report and underscored by some of its recommendations, is to think of the economic and labour market environment in a 'post-boom' environment, what this means for skills and what strategies can be employed to enable a smooth transition. Although the BRB Report does not really achieve this, two important issues arise from it: the impact the resources boom is having on the human services sector[4] and the implicit recommendation of 'more of the same' with explicit endorsement of recent training priorities.

The BRB Report findings also have implications for the higher education sector, as it makes a number of projections for university trained occupations. It is imperative that the human service industries, especially PathWest, ensure that their requirements are given adequate 'voice' and that they do not lose out in the push for greater resource extraction.

Risks

Employment growth could be in the range of 11,000 – 19,000 over the next decade, with annual growth rates of between 1.2 and 2.0% per year (WASTDB, 2007). Between 18 and 21% of this growth will be in the university qualified professions. Undergraduate enrolments are only likely to contribute somewhere around 55 to 90% of this growth,[5] this will lead to keen competition for local graduates and will dictate staffing strategies unless major productivity improvements can be achieved. As shown in Table 1, the growth of the student cohorts will grind to a halt.

Modelling of economy-wide employment growth scenarios have been based on 'requirements' and have not explicitly modelled the underlying demographic structure of occupations. This will be a major issue going forward since it is the age-structure that will drive actual 'replacement demands' over the next decade, at least as much as economic growth.

Table 1: Annual WA Growth Rates for Specific Age Cohorts, 2006 to 2016

Age Cohort	Annual Growth Rate 2006-2016
13-17	0.1%
18-21	0.5%
18-30	1.1%
15-65	1.3%
18-65	1.3%

Source: ABS 3222.0 - Population Projections, Australia, 2004 to 2101

[4] The effect is referred to as 'crowding out' or 'Dutch Disease' after the experiences of the Netherlands during the North Sea Oil boom of the 1960's/70s. The effect was first identified in 1982. In July 2007 it was argued the same is occurring in London as a result of the flood of international capital into the financial services sector (referred to as "Richistan").

[5] The upper end of this (i.e. 90%) is relative to the "low-low" growth scenario modelled by ACIL Tasman. No economic forecaster is tipping this for WA over the decade ahead. The key players driving the mining investment boom which underpins the growth occurring elsewhere in the State are also heavily committed to growth strategies that suggest the upper end of the growth scenario is likely to be realistic. This means home grown students will not even go close to filling the gap at an aggregate level. Some disciplines/occupations of course will follow a different trajectory.

Ageing Workforce – Ageing population

The ageing workforce within WA Health and the broader economy has been written about extensively, the consensus is that it will impact gradually from around 2012 onwards and the worst of it will take around two decades to unfold. This is no coincidence, it is a result of the timing and duration of the post-war bay boom. However, not all occupations are affected to the same extent. A specific analysis of PathWest and what this means for future workforce requirements and risk is one of the key objectives of this report.

The focus on workforce ageing is still primarily thought of in relation to the existing workforce. However, the workforce age structure is not static and fixed; it is the result of a dynamic process that results in flows into and out of the workforce, and varies by gender, occupation and age (among other things). The dynamics that have resulted in an ageing population are an important consideration in this process, since it is the declining fertility rates since the 1970-80s that will have a large bearing on the strategies that WA Health and PathWest pursue to alleviate workforce shortages over the longer term.

WA Health Reform

Service Delineation

The central plank of the health reform involves the expansion of non-tertiary capacity at the periphery of the metropolitan area, namely through the expansion of Joondalup Health Campus, Swan District Hospital, Armadale-Kelmscott District Hospital and Rockingham-Kwinana District Hospital. The way in which PathWest currently supports these facilities and concomitant service profiles will obviously need to change. One of the direct impacts from a staffing point of view will be the changing role of Fremantle hospital and movement of services currently provided at Royal Perth Hospital, into new facilities incorporated into Fiona Stanley Hospital. The impacts will be two-fold: first, staff will need to be re-located. Second, the expansion and re-development of these facilities provides the opportunity to redesign the delivery of service and workflows within laboratories, with obvious opportunities for increased automation.

Single Service

The most obvious health reform for PathWest has been Recommendation 49 of the Health Reform Committees final report (Reid report)(WADH, 2004), which saw the establishment of a single pathology service with the express purpose of expanding specialist services and driving efficiencies. It has managed over the two years since implementation to constrain growth in staffing levels while still meeting the increasing demands for service placed on it. This is quite an achievement but still pales compared to where it will need to be to survive the demographic tsunami it is facing.

Technology and Future

Technology is a key driver of service improvement, operational efficiency and by workforce demand. This is especially the case for pathology services.

Medical Laboratory Science is in a continuous process of technological advance, with new tests being developed, new instrumentation, and new methods of sample and data handling, all aimed at making testing available for more disorders, quicker and more cost effective. Over the last 40 years there has been a constant drive to automate to save labour costs. This has been very effective in the sense of cost per automated test, however the workforce has continued to grow because of the constant development of new tests, a relentless increase in the use of testing and, over the last 20 years in particular a large industry built around quality control and laboratory governance.

Project Overview

Workforce Committee (WFC)

The PathWest Workforce Committee was charged with developing strategies to address the perceived potential workforce crisis. To do this the committee needed to understand the nature and magnitude of the issues within PathWest.

In June of 2007 the PathWest Workforce Committee agreed to support a range of projects that would assist them to provide advice and develop appropriate strategies for workforce issues. The key objective was to provide PathWest with a comprehensive report on their current and projected workforce needs and identify effective workforce strategies to ensure that projected service requirements can be delivered.

The program of work was aimed at providing a background on career pathways, training, operational issues affecting workforce, job redesign, role delineation and projections of future requirements. The WFC provided assistance and guidance throughout the project. Its role in the project included the promotion and distribution of staff surveys and workshops. All processes, consultation, surveys and site selection had the endorsement of the Committee.

Literature Review

The looming laboratory medicine crisis is not limited to WA. The Australian public first became aware of the problem when Queensland Pathology announced that it could no longer train new Pathologists in some areas because of a shortage of Consultant Pathologists. The associated investigation into the Pathologist workforce by the Royal College of Pathologists of Australasia (RCPA) made it clear that unless there was a very significant increase in trainee numbers the shortage of Pathologists nationally would become acute. The problem is an international one as Pathologist workforce studies in the UK, US and Canada have shown that similar acute shortages will occur in those countries (See Appendix B).

Investigations in Australia, and internationally have shown that within the next five to ten years a similar crisis in Laboratory Medical Scientist (LMS) staffing

will occur. In some areas the shortages are already acute, such as California where currently up to 10% of available LMS positions are unfilled. (See Appendix A)

A review of the Pathologist workforce literature was also undertaken, with the focus on shortages, technology and trends. In Australia the RCPA has strongly resisted any shift of traditional Pathologist roles to Medical Scientists. They have also pointed out that the current evidence suggests that the shortage of Medical Scientists will be even more severe than that of Pathologists.

National and international studies (See Appendix A) have suggested various ways of dealing with the crisis. These include international recruitment, more automation, keeping staff in the workforce, better recruitment and training programs and job restructure, with consultant clinical medical scientists taking on some Pathologist roles and senior Technicians taking over some Medical Scientist roles. Issues such as career pathways, registration, role-delineation and training were examined, including international comparisons.

Workforce Modelling

A workforce projection model was developed for three key operational lab-based groupings: Pathologists, Medical Scientists, and Technicians. The latter is an aggregation of a variety of roles from Laboratory Assistants, Attendants and Technicians.

Alternative scenarios were tested by changing retention rates, graduate recruitment, and hours. A gap analysis was undertaken based on two proposed growth trajectories and role delineations.

Review of Laboratory Practices and Issues

There are many useful and important initiatives looking at operational efficiency that had been completed or were in progress within PathWest when this project was initiated. Nonetheless, the need was identified for an examination of a wider range of laboratory settings across the system to determine what areas might provide further scope for service improvement.

This process was initiated by the PathWest Workforce Committee and was a result of the widely held view that the key to finding further scope for improvements within PathWest was to ask the staff and managers to share their knowledge of the ‘everyday’ experiences of doing business. To facilitate the information gathering for this exercise a profile of laboratories was developed that covered a diverse range of types and settings. Workshops were then conducted for each of the selected sites.

Staff were asked to consider issues they could identify about their workplace around the following themes:

- Workspace;
- Technology;
- Organisational processes (including governance and communication); and
- Human capital and training.

Pathologist and Medical Scientist Workforce

Pathologists

There is a world wide shortage of Pathologists. The Australian Medical Workforce Advisory Committee (AMWAC) has also identified a serious shortage of Pathologists in Australia. This shortage will be difficult to resolve by simply trying to attract specialists from overseas.

It was recommended by AMWAC that 100 pathology trainees per annum are required if Australia is going to maintain a balanced pathology service. In 2003, WA had 106 practicing Pathologists, most of whom were practicing in Perth. Now, in 2008 there has been some effort to address the situation with the creation of more training positions across Australia. However a lack of Commonwealth funding for the new positions and mixed support from the states has produced an increase significantly less than required.

The RCPA identified many of the problems associated with the pathology workforce and have proposed solutions and actions that can be carried out by the college. These solutions in the most part address training and recruitment issues and largely dismiss the possibility that there could be significant workload redistribution to other groups, such as Medical Scientists.

A review of the structure of the UK pathology workforce (Carter, 2006) gave a considerably different view of what could be done to deal with the shortage of Pathologists. He promoted a much stronger role for the Consultant Clinical Scientist, and in fact suggested a restructure of roles within the Pathology laboratory from Pathologist through to Laboratory Assistant. The Consultant Clinical Scientist role has been embraced by the UK Royal College of Pathologists, with clear definition of their roles and their additional training needs.

Impact of Medical Advances

New medical technologies in the pipeline have the potential to revolutionise the practice of medicine over the next 10 to 20 years. Many of these are likely to deliver significant benefits. However, when combined with the pressures of an ageing population and increasing community expectations, there will be a significant cost to governments, insurers and the wider community (AAPP, 2005).

The main areas of technological development likely to affect healthcare towards 2015 (See Appendix A) have been categorised as:

- IT and telecommunications, including decision support systems.
- Advances in molecular genetics.
- Biotechnology which will enable advances in genetics to be exploited.
- Bioengineering to produce artificial body parts and organs.
- Minimal access surgery.

- Robotics in surgery.
- Transplantation (National Public Health Service for Wales, 2005).
- Pharmaceuticals.
- Advances in molecular genetics, pharmaceuticals and biotechnology will have the greatest impact on the delivery of pathology services.

Advances in Genetics and Pharmacology

Changes in health care related to the use of new technologies such as genomics mean that screening tests to identify predispositions to certain conditions will allow greater prevention and earlier intervention, serving to reduce treatment costs in the long term both in a monetary sense and quality of life. This will change medical practice by identifying risk factors and shift practice towards prevention instead of reactive practices such as diagnosis and therapy (AAPP, 2005).

Genetic testing, gene therapy and pharmacogenomics are likely to provide a revolutionary set of tools and approaches to tackling disease. Gene therapy is set to revolutionise medicine as it corrects the genetic cause of disease rather than treating the symptoms (AAPP, 2005). Advances in pharmaceuticals alone will replace some procedures and will decrease the need for admission to hospital, and newer vaccines will treat as well as prevent disease (Wilson, 1999).

Medical advances in the areas of genetics, biotechnology and pharmacology for example, will revolutionise how pathology services are delivered and greatly improve health outcomes. However, these benefits will be tempered by health systems' ability to deal with the limitations such as expense, impact on patients and overcoming professional resistance.

Summary

Most of the literature surrounding health reform such as the Reid Report, Clinical Services Framework (CSF) and Productivity Commission Report deal with health at a systems level. However, they are limited in value in regard to workforce issues relating to a particular profession. Although the Reid Report advocates a single pathology service, which will increase WA's specialist pathology capacity through system efficiencies, it does not explicitly mention workforce strategies to address areas of expected shortage. The Productivity Commission's report also concentrates on health at a systems level and provides no direction on strategies to deal with areas of critical shortage.

The AMWAC report and RCPA submission to the Productivity Commission differ from the above in that they provide a detailed analysis of the issues surrounding the specialist pathology workforce. The AMWAC report provides a detailed analysis of the demographics, adequacy, requirements and projected supply of the pathology workforce and makes recommendations for Australia to achieve a balanced pathology workforce.

The RCPA submission focuses explicitly on what they perceive as the critical workforce problems, recommending solutions and actions to be taken by the

college. The RCPA submission limits the solutions and actions to workforce problems to those that can be influenced or actioned by the College. However, some of the actions require a broader scope than what the college is capable of achieving. Raising the profile of pathology courses, creating more training and teaching positions and separating the service and training components requires the cooperation of universities, States and the Commonwealth.

Medical Scientists

In line with other healthcare professions world-wide, it is generally accepted that the pathology workforce is subject to shortages in professional staff. The increasing shortage of medical laboratory professionals in the United States (US) has been noted through evidence of vacancy rates and recruitment difficulties (USDHHS, 2005). The US Department of Labour estimates that 14,000 new medical laboratory professionals will be required annually up to 2012 to sustain the workforce, a major challenge considering less than 5000 students are graduating from laboratory medicine programs (Peterson, 2005). Similar 'crises' have been noted for Canada (Davis, 2002), the UK (BBC, 2002), and New Zealand (NZG, 2004).

Anecdotal evidence, suggests that in Australia, laboratory managers are finding it increasingly difficult to recruit and retain staff. The current Commonwealth Skilled Vacancy level for Medical Scientists is average[6] (DEWR, 2007a). Workforce shortages in laboratory vocations may be related to:

- Ageing population: Resulting in an increased rate of exit due to retirement. The ageing 'baby boomers' will also place demands on the health system (increases in diagnostic testing) through the burden of age related disease (ABS, 2006).
- Predominance of female workers in the workforce: Associated with increasing part-time employment, as women choose to balance work and family responsibilities, and have a greater preference for part-time work (DEWR, 2007b).
- A decline in the number of science graduates: Falling student cohorts may be due to declining levels of fertility (ABS 2006), and the reduced preference for science and maths based courses at secondary and tertiary level (Lemons, 2006).
- Increased opportunities in other healthcare professions: Prospective students may select nursing or medicine because of greater visibility, recognition, support for postgraduate education and patient contact (Lemons, 2006).
- Issues in relation to pay and reward: Other healthcare related careers offer better salaries (DEWR, 2007b).
- Not meeting expectations: Retention problems in the workplace may be related to medical scientists having to work unsociable hours, performing repetitive tasks, and poor career structure (TDHHS, 2002).

[6] The vacancy level for Medical Scientists is based on a decile ranking. Compared across occupations, vacancies for Medical Scientists is ranked 6, representing an "Average" vacancy level. Vacancies arise from three main sources: new jobs, job openings and job changing.

- The work attitudes and values of "Generation Y"[7]: Generation Y employees feel sought-after and arrive at the workplace with higher expectations than any generation before them. They desire immediate responsibility, varied job roles with the opportunity for advancement, ongoing training and multitasking, expect transparent management styles, and prefer small goals with tight deadlines. Generation Y is not afraid of change, is extremely mobile, and appreciate work/life balance. This new generation mind-set may have destabilising effects on the workforce (Anfuso, 2007).

[7] Generation Y refers to a specific cohort of individuals aged between 17 and 28, and account for approximately 25% of Australia's workforce

PathWest Workforce Profile

Introduction

There are three individual characteristics of the workforce that dominate strategic thinking within WA Health - skills, age and gender. This is reflected, for example, in graduate and international recruitment initiatives (skills), retention (workforce ageing) and work-life balance/family friendly initiatives (gender). At a business level, location (or spatial distribution) and pay/pay structure are also of critical importance. Getting enough staff is less of a problem than getting the right skill mix into the right area. Sites that are difficult to staff are not just an issue for WA Health, but a whole of government problem. The influence of this issue affects decision making on state supported housing developments such as those provided by the Government Employee Housing Authority (GEHA). Flexibility in pay structures also attempts to address this issue, but ultimately pales in comparison to the ability of the private sector to address its skill needs in a competitive environment. All of these factors and more are at play for PathWest and will need to be addressed within a complement of strategies aimed at sustainable service delivery.

The following section provides a statistical profile of the PathWest workforce as it was in 2006/07. The key characteristics are described in contrast to the remainder of WA Health's metropolitan workforce. The key parameters governing the supply of the workforce are then used to provide projections for the main occupational groupings of the PathWest workforce out to 2017. The data have been sourced from the Health Corporate Network (HCN) human resource information system (HRIS). The data is based on employed salaried staff that are recorded as having been paid for ordinary time hours at some point in the 2006/07 financial year. The data exclude agency staff.

Trends

Since 2000/01 employment by WA Health in terms of total full-time equivalent staff[8] (Total FTE) has grown by an average annual rate of 3.6 per cent, or 23.4 per cent since 2000/01 to a total of 27,900 FTE. PathWest in its current configuration comprises 1,349 total FTE and for the period covering its most recent consolidation (2005/06 and 2006/07) has grown by 1.8 per cent. For comparison, the predecessor to PathWest employed around 1,130 FTE and its current configuration is 19.6 per cent larger in terms of employment (See Table 2).

[8] Full-time equivalence is based on a standardized week, in most cases 38 hours. There are generally two specific measures of full-time equivalence used, 'productive FTE' and 'total FTE'. Productive FTE is based on service hours (overtime and ordinary hours). Total FTE will include productive FTE and items of leave taken, such as long service leave, sick leave and annual leave.

Table 2: Total FTE for WA Health, 2000/2001 to 2006/2007

	2000 -01	2001 -02	2002 -03	2003 -04	2004 -05	2005 -06	2006 -07	% Change	Average Annual Growth Rate
PathWest	1,128	1,145	1,179	1,236	1,283	1,325	1,349	19.6	3.0
WA Health (metro)	16,194	16,770	17,378	18,242	19,025	20,038	20,872	28.9	4.3
WACHS	5,282	5,245	5,374	5,460	5,496	5,668	5,681	7.5	1.2
WA Health Total	**22,604**	**23,160**	**23,931**	**24,939**	**25,804**	**27,031**	**27,901**	**23.4**	**3.6**

Notes: WA Health metro figures exclude PathWest and WACHS.

Overview

Over the 2006/07 financial year there were 1,157 productive FTE of labour supplied to PathWest (see Table 3), that is, 2.3 million hours of ordinary and overtime hours ('service hours') supplied across all categories of workers. Not including nurses and hotel services, the average hours per person (on an annual basis) varies in predictable ways and is generally consistent with what is observed across WA Health. The most striking difference is between males and females for medical support and administration and clerical.

Table 3: Productive FTE in PathWest

	Average Productive FTE	Productive FTE
Females		
Nursing	0.10	1
Medical	0.53	29
Medical Support	0.55	637
Admin & Clerical	0.55	109
Hotel services	0.32	8
Group Total	0.54	784
Males		
Nursing	0	0
Medical	0.52	50
Medical Support	0.72	237
Admin & Clerical	0.71	74
Hotel services	0.33	11
Group Total	0.66	373
Persons		
Nursing	0.10	1
Medical	0.53	79
Medical Support	0.59	874
Admin & Clerical	0.61	183
Hotel services	0.33	20
Total	0.57	1,157

Demographics

PathWest has a median age of 41 years, however, 25 per cent of the workforce is aged over 50 years and there is substantial variation between gender and occupation (see Table 4). One of the key areas of vulnerability is the medical account group (i.e. Pathologists) where over 63 per cent of the workforce are male, and 25 per cent of these were aged over 55 years as of 2006/07. Also of concern is the age of the medical support account group (made up of Medical Scientists and Technicians). A large share are female and although they generally have younger age profiles, historically they have also tended to retire at a much younger age than males.

Table 4: Age and Gender Profile of PathWest Workforce, 2005/2006

	Head Count	Gender Share	25% of Workforce Are Aged Under:	Median Age:	25% of Workforce Are Aged Over:	Average Age
Females						
Nursing	10	100.0	38	42	50	43.2
Medical	55	36.4	33	39	47	40.9
Medical Support	1,159	77.8	29	38	48	38.7
Admin & Clerical	197	65.2	33	45	52	42.9
Hotel services	25	41.7	41	49	56	46.7
Group Total	1,446	71.8	29	40	48	39.5
Males						
Nursing	0	0	-	-	-	-
Medical	96	63.6	38	48	55	46.5
Medical Support	331	22.2	30	41	52	41.3
Admin & Clerical	105	34.8	40	50	56	47.8
Hotel services	35	58.3	29	49	59	43.5
Group Total	567	28.2	32	44	54	43.5
Persons						
Nursing	10	100.0	38	42	50	43.2
Medical	151	100.0	35	44	53	44.4
Medical Support	1,490	100.0	29	39	48	39.3
Admin & Clerical	302	100.0	36	47	53	44.6
Hotel services	60	100.0	32	49	57	44.9
Group Total	2,013	100.0	30	41	50	40.6

Occupation

PathWest has one of the more homogenous groupings of occupations within WA Health, an obvious result of its service delivery profile. The broad groupings of occupations ('account groups') are shown below. The vast majority of its workforce (74 per cent of headcount) are within the medical support area, with this split between medical scientists and a number of skilled Laboratory Technician roles. The medical support account group are examined in greater detail below (see
Table 5).

Table 5: Occupation Share of Workforce

	Occupation Share	
	Headcount	**FTE**
Females		
Nursing	0.7%	0.1%
Medical	3.8%	3.3%
Medical Support	80.2%	82.3%
Admin & Clerical	13.6%	13.3%
Hotel services	1.7%	1.0%
Group Total	100.0%	100.0%
Males		
Nursing	0	0
Medical	16.9%	12.7%
Medical Support	58.4%	64.5%
Admin & Clerical	18.5%	20.1%
Hotel services	6.2%	2.8%
Group Total	100.0%	100.0%
Persons		
Nursing	0.5%	0.1%
Medical	7.5%	6.5%
Medical Support	74.0%	76.3%
Admin & Clerical	15.0%	15.6%
Hotel services	3.0%	1.6%
Total	100.0%	100.0%

Medical Scientists and Laboratory Technicians

The focus in this section is on the two broad groupings within the medical support account group: Medical Scientists (including Senior Scientists) and the range of technical and assistant roles that support laboratory processes and specimen collection.[9] There are two very distinct supply profiles according to age and occupational grouping, with the share of FTE provided by females among technical staff around 80% across the age profile while there is a clear downward trend in this share for Medical Scientists

[9] Most of these will fall under the '0146' account code under the heading 'Technical'.

Figure 5). This is a reflection of trends in student choices and increased professional pathways for women over the last two decades. There is also a tendency for women to retire earlier (Kelly et al. 2003)[10]. The gender distribution of Medical Scientists is likely to continue to change over time towards females. This has implications for the workplace in terms of total hours supplied, retirement intentions, and work-life balance issues.

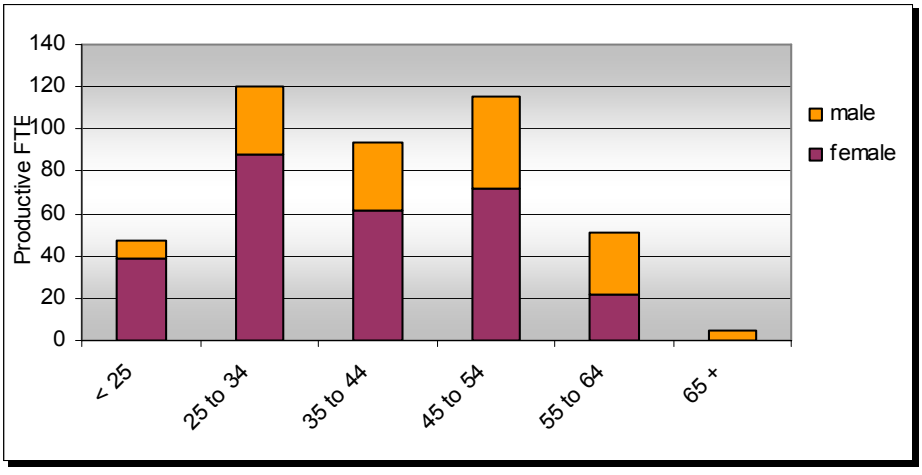
Table 6 shows the key characteristics. Technicians and Assistants comprise 60.8% of the Medical Support account group. In this group, 83.3% of Technicians and Assistants are female.

Table 6: Medical Support Categories by Gender

	Head Count	Average Productive FTE	Productive FTE	Occupation % by Gender	Gender Share of Occupation
Females					
Technicians & Assistants	695	0.50	348.9	60.8	83.3
Medical Scientists (inc. Chief Scientists)	449	0.63	282.2	39.2	70.2
Group Total	1,144	0.55	631.1	100	77.6
Males					
Technicians & Assistants	139	0.63	87.5	42.1	16.7
Medical Scientists (inc. Chief Scientists)	191	0.78	149.2	57.9	29.8
Group Total	330	0.72	236.7	100.0	22.4
Persons					
Technicians & Assistants	834	0.52	436.4	56.6	100
Medical Scientists (inc. Chief Scientists)	640	0.67	431.3	43.4	100
Group Total	1,474	0.59	867.8	100	100

Note: total FTE does not reconcile to other tables due to missing observation on occupation field. The differences are trivial.

Figure 4: Gender Share of Productive FTE, Medical Support, 2006/2007



[10] In the past this has been influenced by pension and superannuation rules for women. This may be less of an influence in the future.

Figure 5: Medical Support Productive FTE by Age Group and Gender, 2006/07

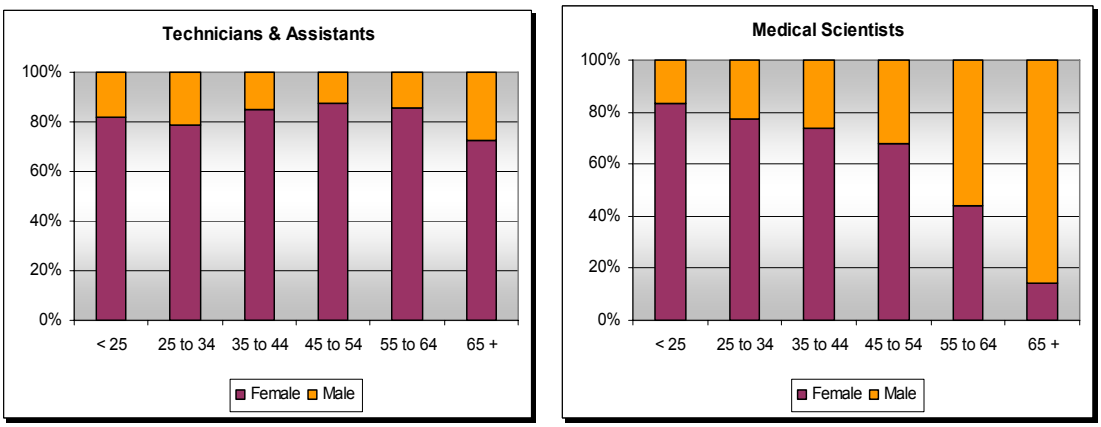


Figure 6: Laboratory Assistants & Technicians FTE by Age Group and Gender, 2006/2007

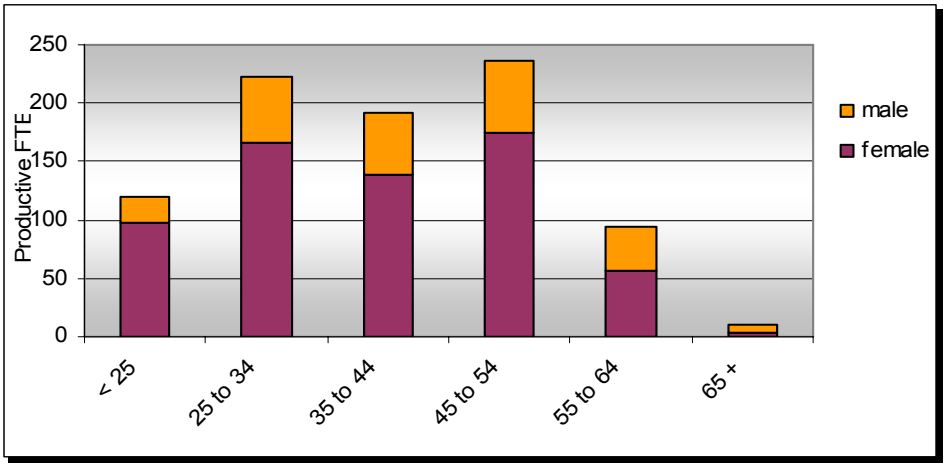


Figure 7: Medical Scientists Productive FTE by Age Group and Gender, 2006/2007

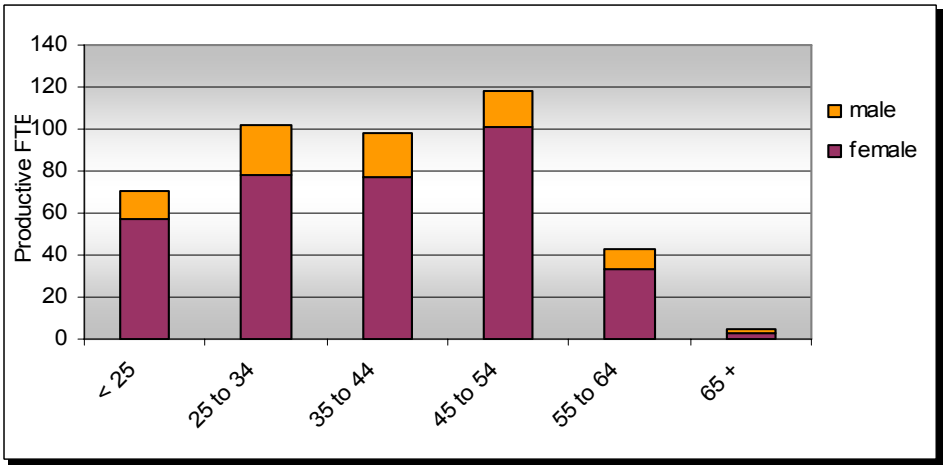
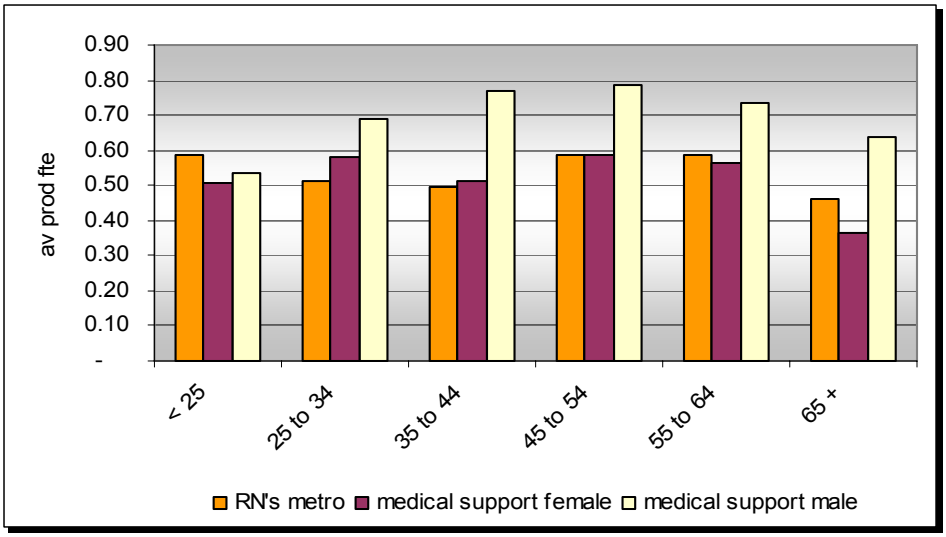


Figure 8: Average FTE Supplied by Age Group



Workforce Flows

Flows in and out of the workforce provide the parameters for developing workforce projections. Combined with average rates of labour supply (i.e. hours) by other demographic features (gender and age) it is possible to provide a guide as to the future labour supply based on the impact of an ageing workforce. The following provides the background information supporting the workforce modelling for PathWest. A number of different scenarios are tested based on the situation remaining unchanged, improved retention, increased recruitment of graduates and changed role delineation/up skilling.[11]

New Entrants

New entrants to the workforce may come from a number of sources, including university, the VET sector, interstate migration, overseas and the private sector. The age and gender structure of new entrants to the workforce will influence the future structure of the workforce and the strategic HR management issues that go with it (work-life balance, generational differences, staff retention, life cycle and hours of work).

Using employee records it is possible to determine whether employees working in the past financial year provided their labour in the previous financial year or some point in the past. There were 295 people who did not record any hours of service during 2005/6. Most of these were in the medical support account group, in particular the Technicians and Assistants (see Table 7).

[11] The motivation for this scenario is based on findings from the training needs analysis that shows a significant degree of role/competency overlap (i.e. many technicians not working to full extent of acquired competencies and medical scientists performing tasks that they could delegate to technicians. It was also found that a significant number of technicians already hold suitable qualifications (science degrees) that with appropriate professional development and mentoring could elevate into roles as medical scientists.

Table 7: New Entrants to PathWest Workforce

	Female			Male			Total		
	Head Count	Gender share %	Prod FTE	Head Count	Gender share %	Prod FTE	Head Count	Gender share %	Prod FTE
Technicians & Assistants	135	82.8%	33.10	28	17.2%	8.82	163	100%	41.93
Medical Scientists	39	78.0%	14.17	11	22.0%	3.86	50	100.0%	18.03
Medical	8	50.0%	1.55	8	50.0%	1.88	16	100.0%	3.44
Hotel Services	7	36.8%	.69	12	63.2%	1.45	19	100.0%	2.14
Table Total	189	76.2%	49.51	59	23.8%	16.01	248	100%	65.54

Staff Retention

Staff retention has become a priority for many organisations, including WA Health. Staff retention is one of the key determinants of labour supply from year to year for an organisation.

Staff turnover ('exits') is a costly and difficult issue for line managers and services. It is further complicated in regional areas by isolation, expectations of new generation workers, and 'thin' labour markets where there are few opportunities for employees', partners, and a non-existent resident pool of labour for employers. For the most part professional staff will need to come from outside the regions. Keeping them engaged in the communities in which they provide their services will remain a challenge for regional areas.

The cost of staff turnover is variable according to job type and can be calculated taking into account the various components: separation costs; replacement costs; lost productivity; and training of new recruits. The Department of Human Services, Victoria has estimated the cost of staff turnover for a Child and Family Welfare Officer at 93.5 per cent of their annual salary. Estimated costs of staff turnover in other Australian and international studies have shown to be in the vicinity of up to three times the annual salary of the vacated job (DSQ, 2007). From both a service and financial perspective it is critical that PathWest target reductions in staff turnover.

Measurement

The usual metric for staff retention is the turnover rate or 'exit' rate. There are a number of ways information on exit rates can be gathered and calculated. A straightforward approach is to measure those who resign or retire from the workforce as a percentage of total staff. For a number of reasons this is problematic given available data. For simplicity and to avoid the issue of churning of contracts that can occur, the exit measure has been derived by matching staff records on hours worked over a financial year.[12]

[12] Using this approach an exit has been defined as someone who records some working time (i.e. productive hours as 'base + overtime') in one financial year, but none in the subsequent financial year. This approach has been used in modelling of the metropolitan workforce and provides a good degree of accuracy. Measures all staff leaving the system as a result of quits, retirement, career break & death. Can only be reliably measured on an annual basis due to nature of casual and fixed term contracts and multiple job holding. Measures those who left WA Health in previous financial year (e.g. 2004/05) and did not return to direct contracted employment in 2005/06. Note that this may understate the extent of turnover from PathWest where staff stay in the system, but not necessarily with PathWest. In these cases the individuals concerned will not be counted as an exit to the system.

Estimated Exit Rates

Exit rates for PathWest compared to the metropolitan area for WA Health average (excluding PathWest) by gender and age group are displayed in Table 8. The average rate over all occupations (excluding admin & clerical) and age groups for PathWest is 14.6%, which is substantially higher than the average for the metropolitan area of around 10.7%. The main areas of difference for both male and female are in the mid-career age groups onwards. The male exit rate for males in the older cohorts is substantially higher for PathWest than for the balance of WA Health.

Table 8: Exit rates by age and gender, 2004/05

Age Group	Female		Male		Total	
	PathWest	WA Health	PathWest	WA Health	PathWest	WA Health
< 25	16.8	15.9	26.1	21.5	18.4	16.9
25 to 34	14.3	16.5	20.7	19.0	15.7	17.1
35 to 44	13.4	9.6	15.1	11.8	13.8	10.2
45 to 54	10.5	6.6	14.0	7.1	11.5	6.7
55 to 64	13.0	7.3	24.4	6.4	18.0	7.0
65 +	14.3	20.2	6.7	19.3	9.1	19.8
Total	**13.3**	**10.4**	**18.1**	**11.6**	**14.6**	**10.7**

Notes:

i. PathWest excludes admin & clerical account group.
ii. WA Health is for metropolitan area only.

Figure 9 shows the turnover rate ('exit' rate) for PathWest for Medical Scientists and Technicians respectively. Figure 10 shows the distribution of exits by age, gender and occupation.

Table 9 shows the turnover rate for PathWest medical support occupations in comparison to the system wide WA Health. The data is separated by gender types.

Table 10 shows turnover by headcount for PathWest and breaks it down into occupational groups and gender types.

Figure 9: Exit Rate by Gender and Age, 2004/2005 to 2005/2006

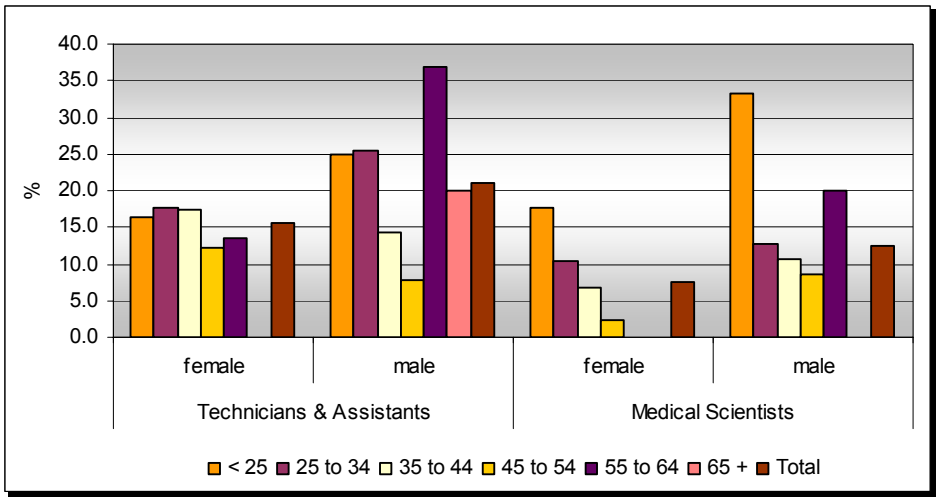


Figure 10: Distribution of Exits by Age, Gender and Occupation Group

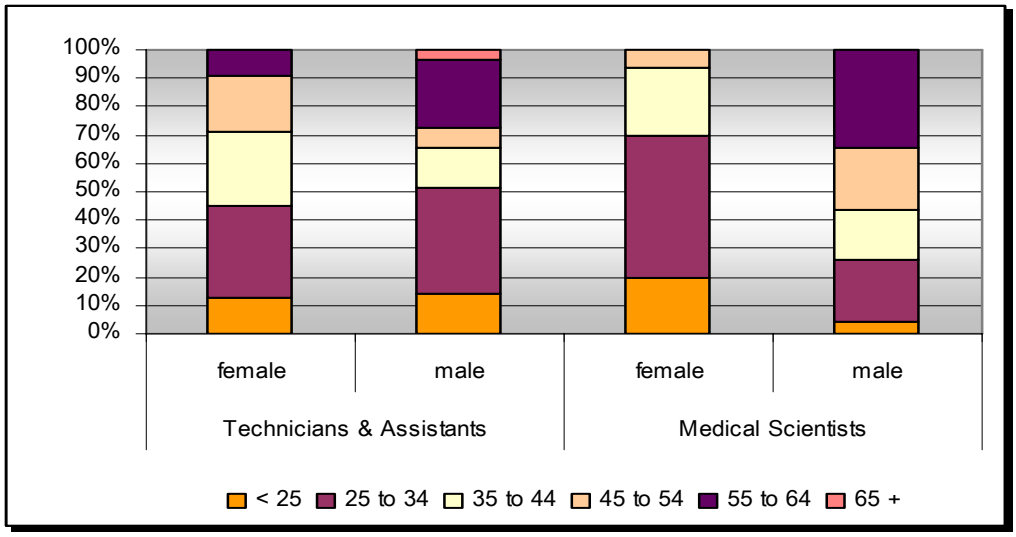


Table 9: Exit rates (%) for Medical Support by Occupation Group, 2004/05[13]

	Female	Male	Total
WA Health	12.1	14.3	12.6
PathWest	12.5	16.3	13.4

Table 10: Exits (headcounts) by Gender, 2004/2005

Occupation group	Female	Male	Total
Technicians & Assistants	100	29	129
Medical Scientists	30	23	53
Total	**130**	**52**	**182**

Projections

Based on observed graduate recruitment, exit rates and existing age and gender structures, a baseline supply projection for PathWest was estimated. To provide some indication of whether this will be enough people to provide services, a growth rate of 1.8 per cent per year of FTE was assumed, this is the rate PathWest grew by between 2005/06 and 2006/07. To put this in perspective, WA Health has been growing at 3.6 per cent per year (in terms of FTE) over the last six years. With the exception of scenario 4, this growth rate is used for all scenarios evaluated. Scenario 4 modifies the required growth rate for Medical Scientists on the basis that improved role delineation can be achieved over a sustained period, thereby moderating the growth required for this occupation grouping.

[13] Medical excluded due to small numbers

For all models and occupation groups it is assumed that the starting workforce positions are in a state of overall balance with respect to supply and demand.[14]

Scenario One: Status Quo

Scenario 1 assumes a required workforce growth rate of 1.8 per cent per annum on the demand side for all occupation groups. On the supply side, it is assumed that:

- Pathologists' exit rates based on WA Health medical workforce exit rates[15]
- Four (4) Registrar Pathologists qualify and enter the workforce each year
- An additional 16 Pathologists enter the workforce from 're-entry', immigration and private sector
- 22 medical science graduates commence employment
- 36 Medical Scientists re-enter the workforce or enter through migration or from private sector
- Total inflows into the Technicians & Assistants group of 160 persons.[16]

The outcome of the Scenario One projections show a shortfall of around 40 Technicians and Assistants by 2012/13, or 4.5% of the expected supply. The situation will continue to deteriorate over time given the labour supply assumptions used (See Table 11).

The situation for Medical Scientists is considerably worse. The workforce will remain essentially unchanged by 2012/13, but if demand grows there will be a serious shortage. In terms of 'productive FTE' (i.e. 'on-floor' FTE) shortages will be in the order of 70 FTE (81 persons), or 16.7% of the available workforce. A substantial improvement in productivity would be required to maintain service delivery growth with workforce growth at these levels. Without improvements in other workforce parameters (e.g. graduate inflows, better retention, and longer working hours) the degree of automation used and optimum process design will be required.

The Pathologist workforce will not be sustainable given the level of recruitment and intake of training positions. A shortage of 16 FTE or 32 persons will emerge between now and 2012/13 without intervention.

[14] At any point in time this most likely will not be the case, as positions can fall vacant or be created and not be filled immediately. Documenting and verifying existing shortages is complex and beyond the scope of this report.

[15] Individual age years used to provide weighted average exit rates for age groupings. Males and female rates averaged.

[16] Note that the supply and demand modelling for all occupation groups is calculated in headcount and then later converted to FTE based on observed average FTE by gender, occupation and age group.

Table 11: Scenario One – Status Quo

	2006/2007		2012/2013		2017/2018	
	Head Count	FTE	Head Count	FTE	Head Count	FTE
Technicians & Assistants						
Supply	834	435	888	464	906	470
Demand	834	435	928	484	1,015	529
Gap	-	-	(40)	(20)	(109)	(59)
% of Supply	0.0%	0.0%	-4.5%	-4.3%	-12.0%	-12.6%
Medical Scientists						
Supply	640	437	631	417	646	422
Demand	640	437	712	487	779	532
Gap	-	-	(81)	(70)	(133)	(110)
% of Supply	0.0%	0.0%	-12.8%	-16.8%	-20.6%	-26.1%
Medical						
Supply	151	64	136	56	132	54
Demand	151	64	168	72	184	78
Gap	-	-	(32)	(16)	(52)	(24)
% of Supply	0.0%	0.0%	-23.5%	-28.6%	-39.4%	-44.4%

Scenario Two: Improved Staff Retention

An alternative scenario was estimated with all parameters set to the same as the base case other than exit rates. These were uniformly reduced by 10% across both genders and all age groups. This equates approximately to a 1.4% drop in turnover, which should be achievable. The outcome for this scenario is shown in (Table 12).

A decline in the weighted average rate of exit from PathWest from 13.7% to 12.3% will make a substantial difference to workforce sustainability. The Technicians and Assistants workforce should be close to balance between supply and demand for the next decade. The shortage of Medical Scientists falls from 16.7% of the workforce to 11.3%. The Pathologist workforce shortage falls from 32 to 24 people.

Table 12: Scenario Two – Improved Staff Retention

	2006/2007		2012/2013		2017/2018	
	Head Count	FTE	Head Count	FTE	Head Count	FTE
Technicians & Assistants						
Supply	834	435	950	500	991	516
Demand	834	435	928	484	1,015	529
Gap	-	-	22	16	(24)	(13)
% of Supply	0.0%	0.0%	2.3%	3.2%	-2.4%	-2.5%
Medical Scientists						
Supply	640	437	658	437	684	449
Demand	640	437	712	487	779	532
Gap	-	-	(54)	(50)	(95)	(83)
% of Supply	0.0%	0.0%	-8.2%	-11.4%	-13.9%	-18.5%
Medical						
Supply	151	64	144	59	143	58
Demand	151	64	168	72	184	78
Gap	-	-	(24)	(13)	(41)	(20)
% of Supply	0.0%	0.0%	-16.7%	-22.0%	-28.7%	-34.5%

Scenario Three: Increased Graduate Recruitment

Under Scenario Three graduate recruitment is increased to a level where supply equals demand, in the respective occupational groupings by 2012/13 and maintains this through to 2017/18 (See Table 13). All other assumptions are the same as for Scenario One.[17]

Under this scenario the number of Technician graduates entering PathWest will need to increase by 10 graduates in 2010 and gradually increase to 30 graduates per year by 2017/18. The Medical Scientist graduate intake will need to increase by over 106% per year on current levels until 2012/13 and then for the period 2012/13 to 2017/18 an increase of 142% over current levels will be needed on an annual basis. That is, the graduate intake will need to go from 22 per year to 45 per year to maintain the required workforce by 2012/13 if nothing is done to improve turnover and retirement. The intake beyond that period will need to be around 53 per year. These sorts of levels relative to the total workforce would be undesirable in terms of the supervision requirements, and unattainable given the numbers and competition from other sectors. The intake of Pathologists would need to increase to 16 per year initially and then increase to 33 per year beyond 2012/13.

[17] It is normally assumed in modelling of this type that there is a lag between increasing student places, generally by the length of the degree awarded, and observing increased recruitment into the sector. Under these projections no lag is assumed, by extension this assumes that there is an available supply, but that PathWest has not chosen to utilise it.

Table 13: Scenario Three - Increased Graduate Intake

	2006/2007		2012/2013		2017/2018	
	Head Count	FTE	Head Count	FTE	Head Count	FTE
Technicians & Assistants						
Supply	834	435	927	490	1,007	529
Demand	834	435	928	484	1,015	529
Gap	-	-	(1)	6	(8)	0
% of Supply	0.0%	0.0%	-0.1%	1.2%	-0.8%	0.0%
Medical Scientists						
Supply	640	437	719	488	800	532
Demand	640	437	712	487	779	532
Gap	-	-	7	1	21	-
%of Supply	0.0%	0.0%	1.0%	0.2%	2.6%	0.0%
Medical						
Supply	151	64	169	72	207	78
Demand	151	64	168	72	184	78
Gap	-	-	1	0	23	-
%of Supply	0.0%	0.0%	0.6%	0.0%	11.4%	0.0%

Scenario Four: Changed Role Delineation

Scenario Four includes:

- 10% per year rate of up-skilling among the higher employment levels of the technical positions[18], this equates to 10 people per year.
- 0.5% per year reduction in the demand for Medical Scientists as a result of improved role delineation, automation and other service improvements.
- An extra 6 graduates per year over the current intake of 22.
- Turnover is reduced by 1.4% throughout the projection period.
- It is assumed that the Technician workforce can be adequately covered by increased VET graduate recruitment and internal development of the existing workforce. In addition to this, ongoing automation and process improvement will also reduce the rate of growth in technician requirements.
- The Pathologist workforce has not been modelled for this scenario.

By 2012/13 the workforce will be approximately in balance and will only have a small shortfall (3 FTE) by 2017/18 (See Table 14). The initiatives required to address the shortages must be underpinned by service improvement and strategic prioritisation of equipment that minimises labour inputs. Even without lowering the demand for Medical Scientists the workforce will be in balance by 2012/13 and only 25 FTE short by 2017/18 if other initiatives are implemented and targets achieved.

[18] Assumed to be 150 employees in this category, with 100 of these holding relevant degrees or diplomas.

Table 14: Scenario Four - Changed Role Delineation

	2006/07		2012/13		2017/18	
Medical Scientists	**Head Count**	**FTE**	**Head Count**	**FTE**	**Head Count**	**FTE**
Supply	640	437	729	486	771	507
Demand	640	437	692	473	738	504
Gap	-	-	37	13	33	3
% of supply	0.0%	0.0%	5.1%	2.7%	4.3%	0.6%

Workshops

Overview

Although there are many useful and important initiatives that are currently in progress or have been completed in PathWest, there has been an identified need to examine a wider range of laboratory settings across the system to determine what areas might provide further scope for service improvement. This process was initiated by the PathWest Workforce Committee and is a result of the widely held view that the key to finding further scope for improvements in our system is to ask the staff and managers to share their knowledge of the 'everyday' experiences of doing business in PathWest. A letter was circulated to Principal Scientists and managers at the various laboratories asking staff:

> *"…to look at the things we do in the workplace that staff think are holding us back and could be done differently and done better. …examples of unnecessary processes that are a bug bear, of doubtful value and if eliminated could free up valuable time to do what we do best. But more importantly, we want to learn from the everyday experiences of staff on how we can do it differently; how we can do it better. This ground up approach has the potential to give us the best information, best solutions and greatest chance of improvement and success."*[19]

To facilitate the information gathering for this exercise a profile of laboratories was developed to cover a diverse range of types and disciplines. The main principle was to achieve acceptable representation across the Area Health Services where PathWest provides services *in situ*, as well as QEII. Managers were contacted and agreement sought before arranging workshops. The workshops ran for one day and involved nominated staff participating in one hour to one and half hour long sessions. These sessions described the purpose, process and type of information required. More specifically, staff was asked to consider issues they could identify about their work place around the following themes:

- Spatial interaction
    - For example, are workplaces cluttered and difficult to move around? Is there adequate storage? Is workflow affected by the lay out of equipment, office space or lab design?

- Technology
    - Are the tests and speed with which they are undertaken affected by the available equipment?
    - Does the equipment used affect the skills required to operate it? Could this be improved upon?
    - Is it the best equipment for the procedures being used?

[19] Letter from the Executive Director of PathWest, Dr Daryl Nicol, circulated to Managers.

- Organisational processes
    - Is there too much paperwork? In what areas?
    - How effective are the information collection processes?
    - Are they really necessary?

- Governance processes (clinical)
    - What is really required?

- Communication
    - How is information – formal & informal - managed and shared? Is there too much paperwork? In what areas?
    - How effective are the information collection processes? Are they adhered to? Does 'verification' slow you down?

- Scientific processes
    - Is it really best practice, or are you limited by available technology? Can it be done differently?

- Human capital and training
    - Are the skill levels and competencies appropriate for the required tasks?
    - Can I do other tasks? Move into a new position with extra training?)

In total there were 23 workshops conducted with staff from each participating site discussing issues from their perspective along the lines of the themes described above.

The basic thrust of the workshops was to ensure that staff understood that it was their perspective of the operations within each of their respective areas that was of interest for the review of workplaces, practices and skills.
The participating staff were very engaging and there were many useful insights gained from the various workshops. What was clear from discussions with staff is that many of the issues were localised and did not require business-wide strategies or policies to remedy. The solutions were simple, understood by staff, and could easily be put in place as site-based initiatives.

Some issues, however, would clearly benefit from a coordinated and system-wide approach. Most of what was identified could best be described as management issues that could be remedied through more effective communication between managers and staff. The same basic issues that confront workplaces in pathology and elsewhere continue to slow work practices: people learn to 'get around the rocks' rather than re-thinking the way they do things.

In summary, the issues can be grouped into:
1. The problem is site specific and requires local solutions.
2. The problem is across many sites, but solution needs tailoring to site needs.
3. The problem is across many sites, system intervention required.

Follow-up/Validation Surveys

Staff attending the workshops identified a number of issues affecting performance at PathWest sites. A survey instrument was developed and circulated to a range of PathWest sites to get further insights into how widespread and how important staff considered these issues to be. The anticipated reach of the survey was around 400 staff with a response rate of just over 23 per cent.

The following provides an overview of the key issues identified in the workshops and proposed solutions under the groups and themes discussed above where applicable. The chapter concludes with headline results of the validation survey and key findings from these.

1. The problem is Site Specific and Requires Local Solutions

Lack of Space

There were a number of sites that were less efficient because of the nature of the facility in which they were operating. This was generally due to it being an older facility that was never designed to have an integrated pathology service managing the numbers and types of samples and tests that currently go through the laboratories.

The sample reception, sorting and laboratory areas were generally small with insufficient space in which to receive, sort, process and analyse the samples between arrival, dispatch throughout the laboratories, and on to resulting and validation. Simple and routine procedures were often hampered by their location relative to work areas and equipment. This impacted on reception, staff obtaining samples for pre-analysis and analysis tasks, and also staff in unrelated areas that were inconvenienced by traffic movements through shared spaces.

Other ways that workspace impeded staff workflows included the addition of equipment over the years that has been layered over existing areas. It was generally a case of "…this is the only space we have available". This has resulted in things being in the 'wrong place' and impedes people movement. There is also a clutter of processed and stored samples in many laboratories under and on benches, as well as on shelves and 'free spaces', which add to the difficulties of working in and around the laboratories.

Proposed solutions:

Re-organise the way samples are processed-

In some instances, the use of spaces within laboratories can be remedied with a re-organisation of the way in which samples are processed within the laboratory. In others, the only solution is to live with the bottleneck, or redesign the lab from the ground up.

Upgrade equipment-
Changing specific tests and instruments used to undertake these tests would also fix the bottlenecks. Essentially, replacement of old and/or large instruments and integration of new technology will free up some of the space by making some tasks and/or equipment redundant.

Off-site storage-
Off-site storage, consideration of what actually needs to be stored in the laboratory, and what can be stored elsewhere could reduce the amount of stored samples, records and stock and create more space.

Recommendations:

1. Provide support to laboratories to design and implement more efficient sample workflow systems.
2. Identify equipment that can be replaced by more efficient, reliable technology that can handle pre-analysis and analysis steps faster. Greater consideration needs to be given to overall workplace efficiency when reviewing equipment needs.
3. Examine scope for material, equipment and extraneous items to be stored offsite and determine *net* benefits. Identify offsite storage needs and scope/benefits of coordinated action.

Poor Communication and Coordination

As the numbers and types of samples have increased, the capacity of instruments and the speed of processing have also increased. As a result, most laboratories are encountering issues related to the movement of samples and/or batches of samples through laboratories and between laboratories within sites. Also, handling of samples is often duplicated unnecessarily and results in the creation and re-creation of batches of samples.

These issues arise for a number of reasons, such as individual preferences in organising workflow; instrument capacity; errors associated with information accompanying the samples; slow technology; opening times of clinics and wards; arrival and dispatch of large batches of samples; timing and frequency of couriers; difficulties resulting in the inconsistent adoption of the creation of a ‘paperless’ trail; the amount of paperwork and quality control procedures required; breakdowns of equipment and software; and the numbers, types and complexities of samples arriving into the laboratories. They result in holdups, for example, where staff in the laboratories are waiting for samples when sample reception is busy, causing occasional misunderstandings between staff excessive downtime.

Proposed solutions:

Increased automation of sample identification, tracking and administrative processing -

Automatic requesting, sample reception, registration and processing using barcodes would speed up the sample reception and many analysis tasks. Automatic tracking of samples into the required laboratories would reduce backlogs of sample batches, particularly in sample reception areas of larger laboratories.

Improve role delineation in sample reception, pre-analysis and relevant instrumentation tasks-

Role delineations in sample reception, pre-analysis tasks and instrumentation tasks that relate to the technology and capacity of specific instrumentation used, may assist in keeping samples feeding into and around the laboratories better. Better understanding of issues between staff in sample reception and laboratories could identify local solutions.

Improve frequency and timing of courier dispatch-

Changes to the frequency and timing of couriers could also reduce the sizes of batches going to, into and from sites as well as the rush to prepare batches of samples to meet courier deadlines. Since courier deadlines also often corresponded to other busy periods in laboratories, such as late afternoon reporting and validation, it has added to the workload of staff rostered at those times. No doubt satisfaction with work is affected, which feeds into staff turnover. Addressing workplace stress through better management of workflow will be greatly appreciated by staff.

Recommendations:

1. The National Health Service (NHS) in the UK has implemented a Pathology Improvement Service to assist pathology laboratories to undertake LEAN/6Sigma reviews of sites. This has had a dramatic impact at some sites, with massive improvements experienced in sample reception. This could be adopted in Western Australia, or perhaps in collaboration with other States to reduce the cost and concentrate expertise. Alternatively, commercial providers could be used to a greater extent, providing that the issues relating to cost and contract management are not prohibitive.
2. Facilitate LEAN/6Sigma solutions at all sites so that individual sites can resolve issues relating to communications and processing more effectively at a local level.
3. By limiting the sizes of batches within laboratories that people manage, the flow of samples around laboratories improves. It has also been clearly demonstrated from UK studies that smaller batches can improve turnaround times.

Equipment and laboratory processes

In some laboratories automated, newer or molecular technology can replace hands-on procedures, while in others the procedures performed can be performed with analysers or equipment located in other laboratories.

Proposed solutions:

New equipment, new procedures and increased 'in-sourcing'-

Identify the type of procedures and equipment this relates to and depending on the type of tests and numbers of samples, new equipment could be purchased or these tests could be moved to another laboratory. These also impact on Occupational, Health and Safety outcomes as newer equipment contain hazards more effectively while also increasing the accuracy and speed by which samples are processed.

Recommendations:

1. Survey all equipment used and identify the needs in all laboratories to initiate an overhaul of equipment. Identify shared and similar equipment needs within and between sites, such as analysers, molecular extraction technologies, microscopes and others to create locations within laboratories based on generic processes rather than current delineations built around 'disciplines'.

Human capital and training

As new staff enter laboratories they are involved with staff induction initially and then mentored by other staff in their duties. Medical scientists generally have access to some form of training within their laboratory that aims at extending their knowledge in their preferred area. But this does not occur at all sites and generally tends to overlook the needs of other laboratory staff. While all staff are often encouraged to attend training, the timing and content does not always match with their workload and aspirations.

Proposed solutions:

Further work on PathWest training needs has been undertaken which examines a range of interrelated issues. The outcomes and recommendations arising from these are shown in greater detail in the "**Training Needs Analysis**" section.

Recommendations:

1. Establish a culture that supports change by making lifelong learning part of organisational culture.
2. Identify, reward and offer the opportunity for formal qualifications to staff involved with training and development of other staff.
3. Establish performance management and career pathways for all staff that take account of their skills, activities, aspirations and preferences.
4. A concerted effort is required to ensure time for training and professional development is available for staff and that there is sufficient take up of opportunities.

2. The problem Exists Across Many Sites, but the Solution Needs Tailoring to Site Needs

Suitable Workspace

There are many issues with old laboratories, such as layouts with unsuitable or damaged benches, chairs or workspaces. These can be classified as ergonomic or occupational health and safety issues. In addition, it was identified that more appropriate spaces are required for new technology.

Proposed solutions:

Identify, replace, remove or repair unsuitable chairs, benches and equipment. This could occur subsequent to a LEAN process within each laboratory. Review must consider Occupational Health and Safety standards as one driver for these changes.

Recommendations:

1. General use equipment, such as chairs and benches identified as not fit for purpose, especially where occupational health and safety is compromised, need to be replaced.
2. Any review of new equipment to be installed should consider the impact on workflow. LEAN reviews of larger sites may assist this process. Establishing demonstration sites for both large and small laboratories within each specialisation may also provide a useful mechanism to achieve this.

IT Equipment

Small laboratories often do not have sufficient or suitable technology for the number of tests or samples they process. This particularly relates to the ULTRA platform and the technology and software that supports or is interfaced

with it. Turnaround times for reporting, insufficient instrument capacity; difficulties with handling batches or repeat runs; printing of reports; interfacing between printers; interfacing between other management software platforms (such as TOPAS, BLIS, PMI and specialized software with facilities for narrative reporting (as required by some areas) creates ongoing issues.

While many of the other administrative equipment (such as printers, photocopiers, scanners, fax machines) are in working order, some are not suitably located, are old and unreliable, poorly integrated with other equipment, or are large and take up space.

Occasionally, when new technology is added, they are not correctly interfaced or only replace part of a procedure, resulting in old and new equipment existing side by side.

Proposed solutions:

Appropriate office IT equipment-

Some sites would benefit from fewer photocopiers, while others could operate sufficiently with smaller machines ('all-in-one' solutions). Installing good scanning technology would also help.

Equipment for smaller batch sizes-

Upgrading equipment where necessary with equipment that handles smaller batches (for smaller areas) and are also physically smaller will free up valuable working space.

IT support and instrumentation training and support-

New technology needs to replace current tasks as well as extend the capacity and types of tests if possible. Better IT support needs to be provided for specific sites. Instrumentation support should also be improved. Processing samples through a laboratory would also benefit from work lists created electronically where they are needed.

Recommendations:

1. Changes in technology need to fit anticipated needs and be suitable for the tasks they are meant for. Improve the selection and purchasing of equipment and involve staff actually using it in making selections. Collaborate with training providers to find solutions to IT and instrumentation service issues. Use the 'latest and best' where possible. A system or process of continual updating and replacement needs to become an entrenched and routine management priority.
2. Old equipment can be used by training providers (at their locations or at PathWest) to maintain an inflow of suitably trained staff in IT and instrumentation.

Organisational Processes/Governance Processes (Clinical) and Communication

An issue of concern across a number of sites was the lack of appreciation by many staff of the needs and requirements of other sections. For example, the issues associated with collection of baby/child/adult samples compared to other adult samples. This is reinforced by the creation of specific advisory groups that, while increasing networking within specific disciplines, also serves to maintain the separation of the disciplines from each other and reduces networking across disciplines.

Another issue is related to the long time it takes for the supply of new stock and how it made it necessary for laboratories to carry sufficient stock to manage this. The additional stock was often stored in hallways, under benches, desks, above working areas on shelves and so on, adding to workspace issues discussed previously.

There was also a difficulty within and between sites in creating a paperless information trail for recording the movement of batch samples. This seems to be associated with individual approaches at laboratories, as well as unreliable, insufficient, inappropriate or poorly integrated technology. The way in which new technology was integrated into laboratories was also discussed with staff. New technology added to an already busy workload for senior staff, and this flowed onto the whole area, resulting in many staff working longer hours and the implementation taking much longer than should be the case.

Proposed solutions:

Increased collaboration across disciplines-

To increase collaboration across disciplines, PathWest needs to organise information and collaboration sessions to understand each other's needs within laboratories, sites, geographical areas and regions.

Change stock ordering processes-

Reduce the length of time it takes for stock to be replaced. Use and share good examples of the management of stock and ordering already operating within laboratories or sites of PathWest. Set up ongoing orders and devolve most stock control of routine stock to laboratory staff. It might be worth using a logistics consultant to work out how to manage this most efficiently.

Change implementation strategies for new equipment/processes-

Manage the integration of new technology, by supporting the core laboratory processes with additional casual/contract staff (that can rotate between laboratories) when new technology is integrated, to avoid at least some of the added workload. Additionally, create training and development processes by which staff in the laboratories are able to progress through and gain confidence in and ability to use the new technology more frequently. This applies in particular to the management of IT resources where there is no planned management of the replacement of PCs or co-ordinated management of the use or purchase of software systems.

Recommendations:

1. Specific advisory groups should have cross-representation between disciplines. Alternatively, decisions made by an advisory group should be reviewed by all advisory groups before implementation to ensure externalities are minimised or eliminated.
2. Establish an action and focus group to resolve communication issues with batch processes. This can best be achieved through standardise coding throughout PathWest. Make sure new technology integrates effectively with future plans for managing communications and coding throughout PathWest.
3. Ensure staff at appropriate levels of responsibility are given sufficient training to record and manage stock levels.

Human capital and training

The amount of work increases for other staff when new staff enter a laboratory or when new technology needs to be integrated into the laboratory.

While rotation between areas within the laboratories occurred more in smaller laboratories, the range and types of tests conducted was also less, which resulted in a lack of variety in terms of tests. In larger laboratories, where there were a larger number of different tests, rotation did not usually occur and the work tended to become repetitive. This work was generally resulting in individual staff members focussing on one process using one instrument only. This reinforces and creates 'silos' at all levels. Repetition for most people tends not be rewarding and may be driving high turnover of staff.

Proposed solutions:

Re-organise laboratory workflow and match site training-

Some issues associated with skills and training could be solved through a simple re-organisation of laboratories with workflow, technology and processes in mind. When laboratories are less cluttered and flow better it is easier to work in them. Training new staff to know where things are kept, how things are done and so on takes less time and can be done better when laboratories are better ordered. Support for these processes through the availability of specifically trained mentors and/or site based trainers with specific skills would also help.

Opportunities for staff rotations-

Rotational pathways within PathWest may provide increased interest in work, help address site-specific shortages and provide another avenue for career development. Reduce the importance of an instrument determining what a person does, but focus instead on processes or skills that are transferrable.

Recommendations:

1. Ensure site staff have had professional development in training and induction for laboratory practice.
2. Create job descriptions, professional development opportunities, performance appraisals and career pathways that are seamless, transparent and focussed on retention, retraining and change management. Using capacity building models to integrate these increases the value of these interrelated activities.
3. Create rotational pathways within PathWest and make them widely available to staff. Support these processes through the availability of mentors and/or site trainers with specific skills during the time new staff enter into the laboratories to minimize the impact.

3. The Problem Exists Across Many Sites, and System Intervention is Required

Suitable Workspace

Many laboratories are not suitable for the existing workload given current ways of performing tasks and the equipment that is used. Workspaces were often cluttered, equipment and consumables not placed near workspaces, and in many locations storage occurred in corridors, less frequently used rooms and wherever it could fit. While this is an obvious and convenient way of coping with the problem, over time it builds and compounds problems. There were sites where this issue had consciously been addressed and the impact was dramatic, contributed to better performance and had a positive impact on staff morale.

Proposed solutions:

Continue to pursue best practice in workflow, instrumentation and occupational health and safety. Use of LEAN processes is an appropriate mechanism to bring this about, while also empowering staff to become more responsive to change.

Recommendation:

1. Extend the review of laboratories and provide mechanisms to disseminate experience and expertise developed at one site to the remainder of PathWest.

Technology

The biggest issue with technology is related to recent IT changes, servicing issues and upgrades across PathWest. Upgrades occur before outstanding issues have been resolved. For example, the difficulties and time taken for interfacing between other platforms; lack of suitable and available IT staff to fix problems and the lack of suitability of ULTRA for narrative reporting or the specialist reporting needs of some sections. In the absence of suitable and sufficient computers in many laboratories, these issues compound.

Where external doctors and clinics do not have access to ULTRA, staff spend time answering phone calls for results before the samples have been analysed. The addition of further tests that result in staff looking for and finding samples, then adding these onto ULTRA and so on adds to the workload.

The main issues staff identified with ULTRA is that it is slow and cumbersome, particularly when interfacing between other software and equipment. There is not sufficient and suitable support to resolve issues related to ULTRA throughout PathWest or at specific sites. When changes to software and ULTRA are made, people did not feel that follow up support was sufficient.

Most sites have old computers with old software. The lack of suitable computers and software makes participation in the organisation (via Intranet, emails) and their own learning (research, training) much more difficult.

Most laboratories also have old, outdated equipment that is not 'best practice' (scientifically, workflow, work efficiency, accuracy, quality control management, performance, occupational health and safety) and breaks down frequently. These are retained or stored in the laboratories, which takes up valuable space and affects workflow.

Proposed solutions:

Review backlog of IT issues-

Prior to upgrades being conducted, a review of site based implementation issues of original products should take place. Where the upgrade does not specifically address these, steps should be taken to 'clear the log' before further upgrades take place.

Streamline external communication of ordering and test results-

Once Computerised Pathology Order Entry is up and running, additional tests will need to be added electronically if the system is to deliver on its promise to streamline ordering processes. To ensure this happens, the implementation and training phase should explicitly address this issue. By providing external doctors with limited/appropriate access to ULTRA, or improving the faxing or emailing of reports and results directly from ULTRA to external doctors, downtime could be reduced.

Ensure PC operating systems are fit for purpose-

Upgrade or replace operating systems of PCs to run on later and consistent versions of Windows so that software runs faster and fails less often. Update PCs as required to accommodate the latest software.

Improve capacity to address minor breakdowns-
Training in day-to-day calibration and repair of instruments within PathWest laboratories and ensuring that all laboratories have at least one staff member that is able to address day-to-day instrumentation issues would also assist in the speed by which minor repairs are done. This task can be devolved to suitably trained technical staff who can rotate between pre-analysis tasks and instrumentation maintenance on a needs basis.

Recommendations:

1. A review of site support for IT should take place to ensure timely pathology services are not being compromised.
2. Where relatively high volumes of external ordering and reporting is required (i.e. by external doctors) systems should be put in place to streamline the process and minimise the extra handling, data entry and communication required by laboratory staff. Ideally a standardised approach across PathWest should be adopted. This will streamline training for staff and minimise their downtime.
3. An inventory of outdated computers and software needs to be taken. Good computing equipment is a cheap investment in keeping staff happy with their workplace. Poor equipment that is slow to operate and unreliable will increase overtime and job dissatisfaction.

Research, Projects and Change

Staff felt there are too many projects and although staff are willing and keen to participate, it can be difficult for managers at times to manage their time and extra workloads as a result. These also add to responsibilities with day-to-day core business as well as site or laboratory specific research, development and/or financial business.

Proposed solutions:

Existing workloads acknowledged-
Existing workloads need to be considered before new projects are undertaken or change implemented. System changes will continue to be rolled out throughout PathWest from time to time. As staffing difficulties intensify with workforce ageing, change will need to be managed better than ever before. Priority needs to be given to the types of technology and processes that can improve workload.

Appropriate resourcing of workloads to accommodate new research work-
Research is fundamental to the business of WA Health and public pathology. However, accommodating new research projects needs to prioritised and managed in a way that is cognisant of existing workloads and ongoing staffing difficulties.

Recommendation:

1. Review existing research projects within PathWest and ensure managers are involved in decision making for prioritising workload for new projects.

Communication

The main issues with communications that impact on staff across all of PathWest seems to be the information associated with the management of samples firstly from and to non-PathWest sites and clients, and secondly between and within PathWest sites. These are generally a result of inconsistencies as well as the lack of standardisation in forms and labelling. More specifically, there are errors and omissions in forms; lack of standardisation of codes and test abbreviations; difficulties interpreting handwriting; abbreviations and even differences between labelling and labels within and between sites. These all create misunderstandings and additional work as people need to sort these issues out before the sample can be sent on to be processed. In some laboratories these issues flow from sample reception into the laboratories before being sorted out as well. These issues can affect turnaround time, staff morale and ultimately quality and reliability of results.

These issues also affect the management of batch samples (discussed in previous sections) between laboratories and between sites, from specimen reception into laboratories and between laboratories within sites.

Issues related to HCN, HR, IR and roles and responsibilities were frequently mentioned. HCN was considered to be ‘too big with ‘too many new staff who could not answer questions’; too high a turnover of staff; too much ‘red tape’ ‘takes too long’; difficulties in establishing a ‘relationship’ with one individual’ as well as the difficulties in accessing HCN during work time (by either phone or email) was mentioned.

Retaining, retraining and recognition of staff were also important throughout PathWest, in particular in larger or regional laboratories. The former was thought to be due to the repetitive nature of work in several larger laboratories. In smaller laboratories the opportunities for multitasking and rotation through tasks was bigger, which reduces the repetitive nature of the work. However, finding and retaining staff in regional areas remains difficult.

Smaller and/or regional sites or laboratories had difficulties accessing equipment; being part of organisational decision-making; making their own decisions (in particular related to staffing and equipment); engaging with continuous improvement and feeling they were ‘part of the organisation’. Related to these issues were also a ‘culture of blame’; loss of initiative to try any more as ‘we have tried but we could not do it’; it did not work; or it did not happen’ and the ‘them and us’ attitude with other sites/disciplines.

Proposed solutions:

Standardise labelling-

The processing of batches at large sites is heavily influenced by how samples are sent to them in batches from other sites and the sample handling processes of those sites. Standardisation of labelling and coding, better communications and sufficient staff at either end to make sure samples are packed and unpacked would improve outcomes.

Facilitate knowledge sharing-

At several sites, people take the initiative to manage errors in different ways with different success rates, and there is an increasing initiative to share successful strategies and resources to deal with this between some sites.

Recommendation:

1. Solutions identified at the coalface may have application across other sites. Although staff are sharing to some extent issues and solutions, providing a forum for staff to do so would be useful. One approach would be to establish a "PathWest Improvement Network" and reward staff for ideas and solutions, especially where improvement can be shown.

Survey Results

On the basis of issues identified in the workshops, a questionnaire was sent out to a selection of sites to determine whether the issues were widespread. The following summarises the findings.

The first issue addressed was the factors affecting processing time. Items for this question were scored on a 5 point Likert scale as follows: 1 - Always; 2 – Frequently; 3 – Often; 4 – Seldom; 5 – Never. The mean scores for each of these items are shown in
Table 15. The capacity of instruments and transfers between sites appear to be the main driver.

Table 15: Factors Affecting Processing Times

Item	% Answered Often, Frequently or Always
Capacity of instrument	42.6
Labelling errors	25.5
Transfers between sites	41.5
Transfers within sites	21.3
Poor communication with sites/clients	20.1
Lack of standardised coding across PathWest	26.6

The second issue addressed were factors that affect laboratory operations more generally. The same rating scale was used. The results are shown in Table 16. All of these issues appear to be widespread and confirm the issues identified in workshops, although suitability of equipment is more site specific.

Table 16: Factors Affecting Laboratory Operations

Item	% Answered Often (Freq or Always)
Equipment breaking down or needing re-calibration	52.1
Delays in getting equipment serviced	33.0
Poor integration of IT and equipment	51.1
Lack of staff access to computers	43.7
Old (slow) & poorly equipped computers	57.4
Lack of suitable equipment for testing procedures required	23.4

One of the more recent and critical PathWest initiatives has been the implementation of ULTRA. This issue was frequently mentioned in workshops, at times with some derision. Table 17 shows the aspects of Ultra that affect laboratory operations. IT support staff stands out as a key issue to be addressed.

Table 17: Issues Relating to ULTRA that Affect Laboratory Operations

Item	% Answered Often (Freq or Always)
Ultra poorly interfaced with other systems	25.5
Lack of IT staff to service faults & other issues	32.5
Lack of IT staff with an understanding of Laboratory needs	40.4
Time taken to switch between Ultra & Topaz to complete registrations	18.1
Ultra's capacity to handle batch or repeat samples from a single patient	11.8
Entering narratives on results and reports into Ultra	30.8
Availability of Ultra	26.5
Lack of external access to Ultra	29.7

Table 18 confirms that many tasks can and should be devolved to Technicians to free up time for Medical Scientists.

Table 18: Tasks Undertaken by Medical Scientists

Item	% Answered Often (Freq or Always)
Pre-analysis	77.6
Start up, shut down, check, run controls on equipment	87.7
Reporting on start up/shutdown run control outcomes	85.4
Validation of start up/shutdown run control outcomes	83.3
Collecting samples from patients	19.5
Collect samples within sample reception of lab to register	46.3
Register samples	51.8
Distribute samples for testing	62.2
Prepare equipment for samples & testing	86.9
Use standard procedures to process samples for testing and interpretation	90.4
Perform analysis tasks	96.2
Examine, review and interpret samples and sample results	96.3
Post-analysis tasks	97.5
Validation of results	92.7
Reporting of results	93.8
Data entry of results	90.2
Cleaning	67.1
Stock-take	71.6
Ordering	68.3
Quality control	88.1
Calibration of equipment	86.4
Perform non-routine tests	66.7
HR & Admin	66.3

Workspace and workflow are consistent themes identified in LEAN reviews of NHS laboratories in the UK by the Pathology Improvement Service. The issue was raised in workshops and included in the survey questions. The results are shown in Table 19. All of these issues are having an impact, with storage space a big concern.

Table 19: Workspace Issues Affecting Laboratory Operations

Item	% Answered Often (Freq or Always)
Location of equipment for specific steps in other areas	45.5
Constantly walking around objects	53.3
Lab too small for type/volume of tests	51.1
Lack of storage space	70.3
Inappropriate location of storage of samples	40.7
Lack of suitable workspace in which to perform required tasks	54.9

One of the recurring themes in workshops was the issue of sample labelling and the curse of following up details of errant samples or, worse, having to repeat sample. The results are shown in Table 20.

Table 20: Communication Issues Affecting Laboratory Operations

Item	% Answered Often (Freq or Always)
Incomplete or poor labelling of samples	57.1
Tests incorrectly specified	56.7
Insufficient background information provided for the test	68.1
Procedures not followed	36.3
Incorrect sampling	30.8
Lack of information from external clients or other PathWest labs	56.7
Poor feedback from other service providers	34.8

The key themes discussed above were also rated on a 6 point scale as follows: 1 - Most important; 2 - Next most important; 3 - Third most important; 4 - Fourth most important; 5 - Fifth most important; 6 - Least important. The mean ranks are shown in Table 21. Communication and equipment clearly stand out as issues requiring immediate attention.

Table 21: Ranking of Issues

Issues	Mean Rank
Equipment	2.70
Communication	2.91
Tasks Carried Out By Medical Scientists	3.56
Workspace	3.70
Ultra	3.90
Batch Processing	4.23

Factors Affecting Processing Times

Communications with sites and clients, transfers within sites, and the lack of standardised coding are the key factors affecting processing times. These factors seem to be occurring together, so that staff, who indicated that transfers within sites are a big issue, are also likely to have indicated the other two factors were important as well.

But the importance of these three factors varies to some extent according to the role of the staff member, the laboratory discipline and the location of the laboratory. For example, tertiary facilities rate the transfers between sites as a difficult issue (with 50% of respondents indicating it occurs *often, frequently* or *always*) compared to smaller/other metropolitan (31%) and regional sites (30%). Problems associated with transfers within sites, is also a bigger issue for larger tertiary facilities (35% of respondents indicating it occurs *often,*

frequently or *always*), in particular at QEII, than for other metropolitan (6%) or regional (9%) sites. Transfers within sites also seem to be an issue for laboratory assistants (36 % respondents indicating it occurs *often, frequently* or *always*), laboratory supervisors (33%) and laboratory managers (27%) and to an extent also for Medical Scientists (19%), rather than Technical Assistants and Technical Officers.

When looking at differences between laboratory disciplines, it seems that issues relating to transfers between sites, poor communication with sites and clients and the lack of standardised coding are important. And these factors impact mostly on CRA/specimen reception (72%, 72%, and 85%) and biochemistry (67%, 67%, and 67%) compared to other areas, particularly histology and related laboratories (13%, 0%, and 19%).

Equipment Issues Affecting Laboratory Operations

Old or slow computers (33% respondents answering always and frequently), lack of suitable equipment for testing (27%), the lack of staff access to computers (27%) and the poor integration of equipment and IT (26%) are the major factors affecting many laboratory operations. To some extent equipment breakdowns (18%) and delays in servicing of equipment (17%) are also issues. The lack of suitable equipment for testing, poor integration of equipment and IT, and delays in servicing of equipment are also related to each other and respondents that indicate that one of these is important to them tend to indicate that the other issues are also important.

Equipment issues are particularly important in CRA/specimen reception areas (80% or more identifying issues as occurring *always* or *frequently*). Old computers are an issue in histology in particular, but also to an extent in all other areas. QEII (67%) and KEMH (50%) seem to be more affected by equipment issues (in particular equipment breaking down and old/slow computers) than other sites. In regional sites, equipment issues are more frequently related to old/slow computers and the delays in servicing and upgrading of equipment.

Use of Ultra

The major issue that respondents identified with ULTRA was the lack of IT staff to service faults (50% respondents indicating this occurs *often* or *frequently*), and the lack of IT staff that understand the laboratory needs for the software sufficiently to provide the specific service the laboratories need (50%). These are particular issues for tertiary sites (40%, 57%) and metropolitan sites (50%, 50%), rather then regional sites (0%, 0%). Regional sites reported that these issues occurred *seldom* or *never* and some of those who reported they *never occurred* did not have ULTRA.

When looking at the responses from the different disciplines at PathWest, the biggest issues with the use of ULTRA occur in CRA/specimen reception (83% respondents indicated it occurred *always, often* or *frequently*). And those who felt there were issues with ULTRA tended to also have issues with associated with interfacing, entering narrative results, lack of external access to ULTRA by clients and the capacity of ULTRA to handle batches easily. The time it takes to switch from ULTRA to TOPAZ to complete registrations was also an issue in

some areas, particularly in CRA/specimen reception areas. This issue also seems to be associated with the lack of IT staff to service faults. The lack of IT staff to service faults with ULTRA is a big issue for tertiary sites, then regional and last other metropolitan sites.

There appears to be consensus from all staff and sites with regard to the issues associated with ULTRA throughout PathWest.

Frequency of Tasks Performed by Medical Scientists

There are many variations in job roles throughout PathWest. When differences in locations are considered, Medical Scientists in regional areas in particular, are much more involved in all components of laboratory work than Medical Scientists in tertiary laboratories. There is also a lack of agreement on the duties performed by other staff (Laboratory Assistants, Technical Assistants, Technical Officers, Laboratory Supervisors and Laboratory Managers) in the laboratory. The same issue occurs when examining the differences between sites and laboratory disciplines.

Workspace Affecting Laboratory Operations

The biggest issue with workspaces are the interrelated factors of a lack of storage space (70% of respondents noted that this occurred *often, frequently* or *always*), walking around objects (53%) and too small laboratories (51%). This is particularly the case in tertiary sites (36%, 56%, 43%), and to an extent also in other metropolitan (14%, 9%, 8%), and some regional sites (11%, 8%, 7%). Additionally, respondents who identified the above as important also tended to identify that the lack of appropriate storage space as also important. Small workspaces in which to perform tasks seem to be a bigger issue for regional and other laboratories (14%), and in haematology and related areas (10%) microbiology and related areas (8%), and forensics and molecular areas (6%), compared with other disciplines. Respondents who identified small workspaces as a problem also tended to identify small laboratories, the lack of storage space, constantly walking around objects also as problems.

There were no differences in responses when considering the roles of staff to the above issues, which suggests that there is common agreement within staff sites, disciplines and locations on these workplace issues.

Communication

Communication issues such as insufficient information, client background and other information on samples were also sited as a problem (68% respondents indicating these occur often, frequently or always). In particular these communication issues particularly affect tertiary sites (46%) and regional sites (14%), and to a certain extent other metropolitan sites (8%). When considering how communication issues affect specific disciplines, incorrectly specified tests appeared to be the biggest issue. Respondents at regional (17%), haematology and related areas (12%), and CRA/specimen reception (7%) are most affected by this with those in forensics or molecular areas (2%) least affected. Respondents who indicated that incorrectly specified tests is often an issue, also indicated that the incorrect processes were used in collection of the specimen, and poor feedback from service providers also tended to occur. Poor feedback from service providers is identified by Laboratory Managers,

Medical Scientists, Laboratory Assistants and Technical Officers in particular to also be an issue.

When considering how communication factors vary between sites, incomplete or poor labelling, insufficient background provided with the samples or the lack of information from external clients are the most important factors. QEII and southern regional sites face these issues predominantly.

Several of the factors are also associated with each other, and respondents who consider that sampling procedures not having been followed is an important issue, also tend to indicate that tests were incorrectly specified and insufficient background was provided.

Most Important Factors

To examine the overall value that respondents had placed on the previous six factors (workflow, equipment, ULTRA, the tasks done by Medical Scientists, workspaces and communication), respondents were asked to rank these factors according to their importance.

Equipment was identified as the most important issue, in particular at tertiary sites (23% respondents rated it 1 or 2), but it was also an issue to some extent at regional sites (19% of respondents rated it 1 or 2) and less of an issue at other metropolitan sites (12% respondents rated it 1 or 2). On a site level, the main tertiary site that ranked it highest was QEII, and it was less of an issue at Fremantle Hospital and KEMH.

Workspace was the second most important factor for all respondents, and tertiary sites (19%) found it more of an issue than other metropolitan or regional sites (both 6%).

The strongest agreement of issues according to locations and sites was with regard to batch processing and the influence of ULTRA on work processes. Regional sites were only slightly more affected by these than tertiary or other metropolitan sites. There was also an association between equipment, laboratory discipline and ULTRA suggesting that respondents who rate any one of these higher are also likely to have rated the others high too.

When considering the responses regarding the roles of staff, the most important issue was the tasks done by Medical Scientists. This was particularly so for Laboratory Supervisors, especially those at RPH and KEMH (rating it higher than others), although those at PMH (*n=1 only*) and QEII rated it less of an issue. This issue was rated lowest by Laboratory Assistants overall. There is strong agreement that roles in the workplace are an issue, and respondents at KEMH and Fremantle rated it a particularly significant issue, compared with regional centres that considered this less important than other issues.

The impact of factors also varies between disciplines. For Biochemistry, equipment, ULTRA and tasks done by Medical Scientists were rated most important. For other disciplines – regional, Histology and related disciplines, CRA/specimen reception disciplines and Haematology and associated disciplines these factors have varied impacts.

CRA/specimen reception areas have been identified as being affected by a variety of issues. In CRA/specimen reception areas the most important factor was workspace (86% rated it 1, 2 or 3), batch processing (57%), issues with ULTRA (57%), and communication (35%). Equipment (14%) and tasks done by Medical Scientists (6%) were rated least important.

The role of Laboratory support staff may relate to processes, equipment, or be of a general supporting role (Smith, 2004) that may vary within laboratories, sites and disciplines. In essence however, the duties of the basic supporting role, is to maintain the laboratory fit for purpose as well as to register and manage the receival and distribution of samples throughout the laboratory. Further roles relate to assisting with equipment and instrumentation, pre-processing and support roles in routine analysis of samples. Further roles relate to analysis of routine samples as well as assisting with more complex tests and analyses. All of these roles are supervised by appropriately trained staff. Under this format Medical Scientists are involved with more complex analyses and tests, validating results, supervision of routine testing and analyses as well as involved with the research associated with equipment and method development. The classification of staff can therefore, be addressed by consideration of the specific tasks associated with specimen processing and hence linked to competencies, training opportunities and experiences within and outside the organisation.

Training Needs Analysis

Overview

The challenge for PathWest is to implement a training program that meets both the individual and organisational goals of PathWest and its staff. Moreover, PathWest needs to tailor training to their service priorities while also boosting staff morale, retention, motivation and enhancing learning and other collaborative cultures within the organisation.

The work that underpins the analysis in this section is based on information and insights gleaned from the workshops held with PathWest laboratory staff, site visits and consultation by a laboratory training specialist. By design the nature of the analyses are primarily focussed on the roles and interface between Technicians and Medical Scientists. The equivalent issues that arise between Pathologists and Medical Scientists are equally important and critical. Although the nature of the research and consultation that needs to be undertaken for that exercise is much more involved, it will still need to be addressed and should be given high priority by PathWest.

Objective

The primary objective is to determine what needs to be done as an organisation in terms of its training program to ensure a sustainable and productive workforce. To develop a high level analysis of PathWest's training needs, a number of approaches have been adopted. The primary tool has been the development of a survey instrument that explores a number of themes around individual needs, training relevance and mode of delivery. More specifically, the purpose of the PathWest Training Needs Analysis (TNA) survey was to develop an understanding of:

- PathWest Training Culture
- How people get their training
- What types of training are undertaken
- Perceptions of training relevance
- Barriers to undertaking training
- Types of training required

By design, the survey provided an assessment based on individual perception. For a complete assessment of training needs, further understanding is required of the service priorities, known risks to service provision and how training can augment and alleviate these respectively. These have been addressed in part through workforce modelling and consultation with a sample of PathWest laboratory staff.

The obvious and well documented risk to health service delivery both in Australia and worldwide is the shortage of trained professionals and the impact of the population and workforce ageing. Modelling of the PathWest workforce has identified a specific risk among Medical Scientists and Pathologists. Part of the issue is the extent of staff turnover. Organisational engagement of staff through well tailored training programs can help reduce turnover. This point's to a virtuous circle encompassing the direct effects of training in response to

skill requirements from workforce shortages, improved productivity, and the indirect effect of reducing turnover. The information that has been gleaned from the TNA survey has also informed an alternative scenario of workforce projections. The outcome is an important one for PathWest, as it helps align a training strategy that can address shortages, improve staff engagement and improve productivity.

Prior to the development and selection of questions for the TNA, research was focussed on examining workflows, occupational standards, competencies, procedures, skills, knowledge and activities that influence service priorities within PathWest and other similar organisations. This information, together with further information about learning and training theories, was used to develop initial drafts of competencies for laboratory staff within PathWest and explore potential career pathways for these staff.

Issues

Training at PathWest does not appear to involve training beyond that which is necessary for the induction or movement of staff in laboratories. The evaluation of PathWest suggests that the training or learning culture within PathWest as a whole is quite weak. The training has largely been reactionary and ad hoc and does not clearly integrate with career paths, training organisations, professional development, performance management, aspirations of staff, or specific or strategic requirements of laboratories. When this occurs, the organisation is unable to engage, retain or retrain staff.

Survey

Questions in the TNA survey were developed to match PathWest's organisational goals, learning and individual aspirations. There were 23 questions in the TNA with the main focus on the following three sections:

- Section 1 - Current role, skills and qualifications.
- Section 2 - Career at PathWest.
- Section 3 - Training and development.

A total of 80 surveys were distributed within PathWest in January of 2008. The response rate overall was high, with 82% of metropolitan surveys returned and 33% of surveys from the regions returned. The sample, however, is not sufficient to make distinctions between metropolitan and regional responses.

Results

Section One: Current Role, Skills and Qualifications

Most staff (70%) with a classification at Level 1 and 2 had Vocational Education and Training qualifications, and most at a Level 3 had university education (60%), mainly from Murdoch and Edith Cowan Universities. All Medical Scientists surveyed (not shown in Table 22 above) have university qualifications, predominantly from Curtin University (71% Bachelor Degree, 7% Postgraduate Diploma and 21% a Higher Degree). This would suggest that there is a highly educated group of technical staff within PathWest that could be up-skilled into Medical Scientist's positions.

Results from both the Workforce and TNA survey indicate that staff at all levels perform their generic tasks as expected (from information in job description forms), but that there are a number of tasks performed by both technical staff (Laboratory Assistants, Technical Assistants, Laboratory Technicians/Technical Officers) and Medical Scientists that overlap. It is also clear that many Medical Scientists in one discipline (e.g. Haematology) perform tasks that would be delegated to technical staff in other settings. Part of the explanation for the overlap is no doubt a result of the different needs of specific laboratories, availability of staff and the need for specially trained staff to operate some equipment. However, a major cause of the overlap is poor role delineation and a reflection of entrenched practices from the amalgamation of PathWest laboratories in 2005. WA has a long history of using a higher ratio of Scientists to Technical staff, a point noted by many staff arriving from interstate or overseas.

Table 22: Estimated (from TNA data) Qualifications of Technical Staff in PathWest

HSU Level and Title in PathWest	Numbers (Nov 2007)	Estimated Qualifications
L1/2 - Laboratory Assistant	646	39% University 32% VET and 29% High School
L2 – Technical Assistant	23	45% University 44% VET and 11% High School
L2/3 – Technical Assistant/ Laboratory Technician	19	60% University and 40% VET
L3 – Laboratory Technician/ Technical Officer	130	47% University and 53% VET

Note: Staff classified as Medical Scientists or above not included.

Key points:

- Many Laboratory Assistants (19%), Technical Assistants (45%) as well as most Technical Officers (60%) have University qualifications in biomedical themes (degrees, partial degrees or undergraduate diplomas from Murdoch, Edith Cowan, and Curtin Universities in particular).
- All but one Medical Science staff member surveyed has a degree from Curtin University. Only four out of the 24 Laboratory and Technical Assistants sampled had only High School Certificates, most of the balance held Vocational qualifications (Certificate IV or Diploma, 70%) with some with Certificate II or III (19%).

Recommendations:

1. Redefine tasks and role delineations of laboratory staff to make optimal use of their educational background, skills and knowledge.
2. Identify specific needs for laboratory settings with respect to tasks and roles.
3. Redistribute tasks according to qualifications and competencies to maximise the capacity of existing staff to meet service needs
4. Bring phlebotomy and the clerical component of sample reception/registration/reporting into a qualification for laboratory and technical assistants. Use existing VET pathways for this.
5. Redefine the tasks and roles of Medical Scientists – remove them from routine testing into complex/specific testing, method and equipment development, supervision and validation.
6. Laboratory Attendant and Technician roles to be trained and recruited from high school and VET programs. Explore partnerships with training providers to do so.
7. Collaborate with Universities to clarify roles and address the undergraduate training needs of Medical Scientists – grow the capacity to provide ongoing training within PathWest to meet changing service industry needs. Develop specific bridging courses in conjunction with Curtin University to up-skill in medical science technical staff with biological science degrees.

Section Two: Career at PathWest

A number of questions were asked in this section to determine the extent to which staff engage with managers to develop their training needs to support their career aspirations and whether their current role will fulfil these. These questions included:

- Have you discussed or arranged a career or professional development pathway for the next five (5) years at PathWest?
- How often do you meet with your manager or supervisor to discuss your career, training or development needs?
- If you are intending on staying with PathWest for at least the next five (5) years, how well do you feel that your current position will be able to meet your career goal(s)?

Key points:

- Only 13% of respondents indicated that they have discussed a career path with their manager, with Laboratory and Technical Assistants less likely to have done so.
- 40% meet their managers annually or at other times for performance reviews, with 54% only when ‘needed, rarely or never'.
- 33% have some form of a career plan, and only a few have discussed this with their manager. 41% would like a career plan and have not discussed this with their managers, but would like to do so.

- In general, Medical Scientists are less satisfied with career outlook than Laboratory and Technical Assistants.

Recommendations:

1. Increase the skills of, and resources available to, managers for staff development and training processes within the laboratory.
2. Create career pathways for all staff that are based on capacity building.
3. Increase the opportunity for staff movement within and between sections of PathWest.

Section Three: Training and Development

This section provides some of the key insights into the specific training usage and needs. A number of questions were asked to get an indication of where staff get their training, what the barriers are, what type of training they get and whether they felt it was relevant. In particular, the following themes were addressed:

- Strengths and abilities staff believe contribute most to their existing roles and performance.
- Participation in, and type of, training activities at PathWest.
- Usefulness of training attended at PathWest.
- Reasons for attending PathWest training.
- Types of training activities that would help performance.
- Factors that make training and development activities more attractive.
- Preferred methods of learning.

Key points:

- The training staff undertake is focussed primarily on career development and understanding how the different sections operate. The higher the level of staff, the less they value these elements of training.
- The role of managers in staff training participation is pivotal.
- Staff surveyed rate skills and knowledge as the least useful aspect of the training they have received.
- Skills, knowledge and instrumentation are rated highest by Medical Scientists for further training. Laboratory Attendants and Technicians rated computer training highest for further training.
- Method of delivery, location and length of training influenced motivation to undertake training. Staff prefer laboratory based training and prefer on-line training least.

Most people rated their personal characteristics such as work ethic, the ability to work under pressure, communication and team work, creativity and their flexibility to new ideas as their greatest strengths and abilities they bring to their role to work more effectively. Communications and teamwork are characteristics that can be improved through targeted training. Work related

strengths and abilities such as work experience, technical skills, knowledge and the ability to problem solve, were also rated highly.

All staff surveyed had participated in some training on the use of instrumentation and/or computers, with those in higher roles also training in scientific skills, quality control, leadership/management as well as career planning. The results suggest that higher-level staff are more likely to participate in training.

Most training is concerned with computers and scientific skills. Very few staff indicated that they have attended training related to personal development, career planning, organisational development and communications.

The main driver for training is for career development and understanding the purpose of their section (these two are inter-related). The higher the level of staff, the less value in terms of skills/knowledge and understanding the purpose of their section that people derive from their training at PathWest. This suggests that the training at PathWest is targeted at those early on in their career and, while desirable, may benefit from strategies that accommodate those staff in their mid and late career more appropriately.

Supervisors have a large influence on whether lower level staff attend training, as might be expected. In general, people attend training because it is new and interesting. The least useful aspect appears to be for the development of skills and knowledge. This is a critical failing from an organisational perspective, as productivity is dependent on extending the skills and knowledge base of staff as it enhances an organisation's capacity to absorb changes. Further consideration should be given to how this can be improved upon.

There is expressed interest in attending further training at PathWest. Scientific skills, knowledge and instrumentation for their own section were high on the list for Medical Scientists and Technical Officers. Laboratory and Technical Assistants are more interested in computer training. A few staff also expressed a desire for training in management skills (training, development, project management, etc.), while some indicated an interest in organisational development.

The most important factors influencing whether people attend training are the method of delivery, length of time and the location of the training. The cost[20] or whether PathWest delivers it is less important. The preferred methods of delivery include external training, visits to other laboratories with training included, internal training in other laboratories and when needed in their own laboratory. Staff are less interested in online training or training by research or using computers.

[20] Responses may have been in the context of PathWest picking up the cost of training, rather than individuals.

Recommendations:

1. Establish a training and development section that addresses training needs on an ongoing basis and links these activities not only with organisational objectives and service requirements but also with career and professional development aspirations.
2. Training audits should be routinely undertaken with a 'training inventory' developed and promoted with managers. Staff assessment for targeted training with increased emphasis on up skilling programs to alleviate shortages should be the PathWest's main workforce priority.
3. Performance review could be assisted through a training unit to promote consistency in its application across PathWest and alleviate the impost and personal stress on managers
4. Establish a capacity building framework for PathWest staff linked to training activities, competencies, tasks, aspirations, needs, career and education. Staff training should also provide for mid and later career needs.

Staff Engagement

Staff are very keen to attend training, not only to understand their laboratory and organisation better, but also for personal aspirations as well as collaboration, understanding and communication within PathWest. Staff at all levels also indicated that training that helps them see a value in what they do for their clients or patients would also be useful. This element suggests that there is a culture of wanting to engage within the organisation, the community and the clients it serves.

PathWest does not have a strong learning culture, though some laboratories embraced staff development much more than others. As training was seen as less valuable at higher levels, there is an indication that training does not meet individual aspirations. It is difficult to say whether it adequately meets existing organisational goals. However, it is not well positioned to meet the challenges that it is confronted with and would benefit from an overhaul and greater coordination.

The Way Forward

Table 23 presents some initial options on how to address training needs with the emphasis on changing role delineations around competencies and tasks.

Table 23: Summary of Proposed Training

Level and Title	Numbers (Nov 2007)	Qualifications – Estimated from Survey	Proposed Training and Development
L1/2 - Laboratory Assistant	646	39% University 32% VET and 26% High School	Focus on VET training and/or skills recognition. Entry of staff from schools and TAFE colleges close to sites. Course content to be driven by PathWest. Extend on present and establish capability to deliver and manage training internally 'at the job'.
L2 – Technical Assistant	23	45% University 44% VET and 11% High School	Internal training programs related to laboratory and organisational purpose.
L2/3 – Technical Assistant/ Laboratory technician	19	60% University and 40% VET	Internal training related to laboratory and organisational purpose. These staff members can move into gaps predicted by the anticipated loss of Medical Scientists. By developing and setting up internally driven training the gap is moved down and can be better/more easily managed by collaboration with or existence of RTO.
L3 – Laboratory Technician/Technical Officer	130	47% University and 53% VET	

In order to meet their needs PathWest must first identify industry relevant competencies as they apply in their workplace. Many industries are today defining their own, which they then link to training opportunities so that they are more capable of tailoring training to meet their own needs effectively.

Working with competencies, rather than titles, knowledge or specific qualifications, allows an industry to target training and development in tasks, processes and roles that directly affects efficiency and effectiveness.
The 7 Meyer Key competencies developed during the 1990s and which are used in current VET Training Packages are due to be upgraded into competencies that incorporate a focus on employability skills. They include: communication, teamwork, problem solving, initiative and enterprise, planning and organising, self-management, learning and technology. These themes were used while examining procedures and processes within PathWest laboratories to identify industry relevant competencies for PathWest.

Projections of the PathWest workforce show that it is unlikely that the current ratio of medical scientists to technicians can be sustained into the future. This will result in a move from the current 1:54 proportion of technical staff to Medical Scientists to one of 2:28 (see Table 24).

Table 24: Projected Technician to Medical Scientist Ratios

Category	Current	2011/2012	2016/2017
Laboratory Assistants and Technical Assistants	834	984	1067
Medical Scientists	540	524	468
Differences	294	460	599
Ratio of Technicians to Medical Scientists	**1:54**	**1:88**	**2:28**

The modelled changes reflect more accurately the 2-3:1 ratio currently found (and considered suitable) in most laboratories worldwide. This change can be serviced by addressing the up-skilling of the large portion of staff with university qualifications working in Assistant or Laboratory Technician roles within PathWest (See

Table 25). These staff could be moved into analytical roles where they manage routine equipment, testing and resulting. They would work under the supervision of suitably trained Medical Scientists. The latter could therefore perform fewer routine tasks associated with equipment, tests and analyses and more with the complex or specialised tests, research, development and building capacity in the laboratory and organisation to meet projected needs, while also supervising routine testing.

Table 25: Changing Roles - Transition to Sustainability Through Up-Skilling

Who to Train	Current Roles	Future Roles – Training Gap	How to Reach and Train Them
Existing Laboratory Assistants	Mainly laboratory roles and sample collection and reception	Sample collection and reception, instrumentation, interpersonal/ intrapersonal skills, adaptability to change, generic technical skills	Ongoing 6 monthly Performance Management and career planning, TNAs and relevant, available and easier access to training (manager, staff). Reward, incentives. Develop relevant training models.
Existing Technical Assistants	Laboratory preparation and pre-analysis roles	Sample collection and reception, instrumentation, interpersonal/ intrapersonal skills, adaptability to change, generic technical and specific scientific pre-analysis and routine analytical skills	
Existing Technical Officers	Varies – laboratory roles from sample reception to analysis and reporting tasks	Instrumentation, interpersonal/intrapersonal skills, adaptability to change, generic and specific technical and scientific pre-analysis and routine analytical skills. More QC, laboratory management roles. Validation of instrumentation.	Most already have degrees and many are already performing in roles similar to Medical Scientists. 6 monthly performance development, training via training and development visits to other laboratories or in situ via PathWest specific training scheme in collaboration with site specific

Who to Train	Current Roles	Future Roles – Training Gap	How to Reach and Train Them
			Pathologists and Medical Scientists.
Existing Medical Scientists	Varies – laboratory roles from sample reception to analysis and reporting tasks	Initially skills and instrumentation related training as well as specific scientific pre-analysis, routine and non-routine analytical skills. Validation of reports. More QC, laboratory management, method development, research roles.	6 monthly performance management, training via training and development visits to other laboratories or in situ via PathWest specific training scheme in collaboration with site specific pathologists and Medical Scientists. Gradual devolution of pre-analysis and instrumentation tasks to appropriately skilled Technical Officers.
New employees	Various – schools, community, TAFE and University.	VET (Cert I, II) – TAFE (Cert III) and PathWest (internal training models) pathways leading to above skills	Schools, community, TAFE, University. 'Competing' industries.

Training needs in the laboratories include a range of skills recognition, up-skilling to meet existing and predicted gaps, matching skills with tasks, roles and preferences. There are key areas where there are gaps or where changes can be made, these have been identified in the workshops, site visits, survey and the TNA survey. These include:

- Instrumentation (in particular calibration, maintenance and interfacing); and
- Sample reception, collection, registration and management.

These can be met via existing training packages in collaboration with TAFEWA. Further VET training in routine sample processing and analysis, as well as laboratory management can also be provided at higher levels by TAFEWA (See Table 26).

Table 26: Identified Training Needs, Packages and Coordination

Training Need	Current	PathWest and TAFEWA Partnership
Instrumentation	Certificate III/IV and Diploma in Laboratory Skills/Techniques/Technology in PML04 tailored to PathWest needs	The PML04 course needs to import some units from engineering, IT or other area and focus on instrumentation.
Sample collection	Certificate III/IV in Pathology Sample Collection (phlebotomy) in HLT02	The HLT02 course needs to collaborate with RPH phlebotomy training and import some units from PML04, particularly related to sample management in

Training Need	Current	PathWest and TAFEWA Partnership
		laboratories
Sample reception and registration	Certificate III/IV in Business Administration (Medical Administration) in BSB01. Certificate III/IV in Laboratory Skills/Techniques in PML04 tailored to PathWest needs	The BSB01 course needs to collaborate with PathWest and import some units from PML04 and or HLT02. The option of a focus on the PML04 should also exist.
IT and instrumentation		Collaborate with TAFEWA and IT service providers to provide industry relevant training within PathWest
Training and development	Certificate IV in Training and Assessment in TAA40104	Units of this course are currently offered at NMHS and are also available online from several RTOs. Selection of units could also involve some units from PML04, HLT02 and/or BSB01.
Up skilling of University educated staff	Perform a variety of roles from sample collection, reception and registration through to analysis and validation or routine tests	These staff need training within PathWest to move into testing and analysis of routine samples as well as assisting with method development and research within the laboratories. This also creates a career pathway for them to move into roles of medical scientists.

Recommendations

1. Meet with TAFEWA representatives to establish the training model(s) that will meet PathWest needs.
2. Assist TAFEWA to promote these throughout WA.
3. Continue to collaborate with TAFEWA to meet these needs as well as begin collaboration with other VET providers (schools and other industry) to market PathWest as a preferred employer of a variety of staff.
4. Use this work to continue to collaborate within PathWest to set in place performance management, JDFs, career pathways and evaluative/monitoring processes that fit a skills capacity building framework.
5. Continue collaboration within PathWest to assist the job reclassifications as a result of changed role delineations.

Job Redesign and Role Delineation

By following the progression of a sample through a laboratory, from the point where it is collected from the patient through to where the result of tests are sent to a clinician, it is possible to divide the activities into sequenced steps (for example Burnett, 2002). These steps can then be grouped in to fit into roles, tasks and competencies within general pathology laboratories. The pre-analysis, analysis and post analysis tasks are carried out from sample collection through to reporting.

In Table 27, the sections highlighted are the tasks identified in the TNA survey to occur frequently and hence are 'rate limiting steps'. Those that are in bold are the tasks that are performed routinely by staff at various levels. In most instances these could be devolved from Medical Scientists to Laboratory Assistants and Technical staff.

Table 27: Proposed Role Delineations (Levels 1, 2, 3, 4/6 and 4/6+)

Tasks in the Sample Processing Steps	Comments	Who does what?
Pre-Analysis Tasks		
Collect samples from patients		2 with assistance from 1
Collect/receive samples from other sites		1-2
Sort samples		1-2
Register samples	**Make registration/clerical duties part of a set of tasks within the pathology laboratory**	1-2
Problem solve issues relating to samples	Supervisors within areas need to manage issues relating to samples	2-3
Distribute samples to laboratories for testing	**Includes packaging, mailing and organising transport/couriers**	1-2
Administrative tasks (telephone, filing, mailing, scanning)	**Make clerical duties part of a set of tasks within the pathology laboratory**	1-2
Prepare routine equipment for sample testing	**Routine preparation, testing, analysis and resulting to be done by Level 2 – 4 Technical staff. Medical Scientists supervise and validate the results.**	2-3
Start-up, shut down, run controls, calibration of routine equipment		2-3
Interpret results from above		2-4/6
Record results from above		2-3
Report on results from above		3
Validate above		4/6+
	Analysis Tasks	
Use standard operating procedures to perform routine tests on samples	**Routine preparation, testing, analysis and resulting to be done by Level 2 – 4 Technical staff. Medical Scientists supervise and validate the results.**	2-3
Examine, review and interpret samples and sample results		2-3
Record results from above		2-3
Validate above		4/6+
Enter routine results into database	**Routine results, once validated, can be entered into databases by clerical staff in the laboratory**	1-2
Report routine results to clients	Depending on the type of results, the reporting could be done via fax, online or email by a number	2-4/6+

Tasks in the Sample Processing Steps	Comments	Who does what?
	of different staff	
Start-up, shut down, run controls, calibration of specialised or non-routine equipment	Depending on the level of complexity of the test or instrument laboratories need to be able to devolve some of these to technical staff. Ongoing training and sharing of knowledge.	3-4/6+
Interpret results from above		3-4/6+
Record results from above		3-4/6+
Validate above		3-4/6+
Use standard operating procedures to perform specialised or non-routine tests on samples	Depending on the level of complexity of the test or instrument laboratories need to be able to devolve some of these to technical staff. Ongoing training and sharing of knowledge.	3-4/6+
Record results from above		3-4/6+
Validate above		4/6+
Enter specialised or non-routine results into database	Depending on the level of complexity of the test or instrument laboratories need to be able to devolve some of these to technical staff. Ongoing training and sharing of knowledge.	2-4/6+
Report specialised or non-routine results to clients		3-4/6+
Problem solving routine equipment and laboratory issues		3 (-4/6) all
Problem solving specialised or non-routine equipment and laboratory issues		3-4/6+
	Post Analysis Tasks	
Quality control – AIMS		4/6+
Quality control – other	Generic quality control (equipment, processes and so on) can be managed by technical staff. Medical Scientists supervise and validate.	2-3
Stocking shelves for tests		1-2
Stock take – routine equipment		2-3
Ordering routine equipment		2-3
Stock take – specialised or non-routine equipment		3-4/6+
Ordering specialised or non-routine equipment		3-4/6+
HR – rosters	Laboratory Supervisors of technical staff with an interest and aptitude in this	2-4/6+
HR – other		4/6+
Cleaning		1-2
Other tasks	These could include training, managing changes and so on. It will vary from laboratory to laboratory and site to site.	varies

Career Pathway

The majority of staff entering PathWest laboratories come from scientific (VET and university) backgrounds. In the VET sector, the PML04 training package (Processing and Manufacturing Laboratories 2004) is used by Registered Training Organisations (RTOs) to deliver training in laboratory operations for Samplers/Testers, Laboratory Assistants, Laboratory Technicians/Technical Officers and Laboratory Technologists/ Technical Officers. TAFEWA is also increasing their capacity to deliver Advanced Diplomas (Laboratory Supervisors/Managers/Senior Technical Officer) and elements of Baccalaureate qualifications as well.

It should be noted that there is communication between all education and training sectors, subject to performance and other relevant entry criterion.

Training Packages

Another important consideration to selecting the appropriate qualification is the delivery of the VET PML04 training package in WA. While many TAFE Colleges in WA deliver the PML04 training package under the classification of ANZSIC 781 Scientific Research, there are other possible classifications. These are ASCED4 0199 Other Natural and Physical Sciences and ANZSCO 311000 Agricultural, Medical and Science Technicians. No WA TAFE College delivers the latter classification, yet the selection of units to achieve this classification is the same as the other classifications. There is therefore the potential to support TAFEWA in the delivery of this better titled classification for biomedical laboratories, while also linking it with Australian Institute of Medical Scientists (AIMS) via a suitable training pathway. AIMS is not involved with TAFE Colleges in recognition of suitable training pathways but will accept a Diploma in Medical Science or Diploma in Laboratory Technology (Pathology Testing or Medical Science) for intermediate membership.

Training Needs: Summary of Recommendations

The following recommendations will help PathWest to establish a more coherent, focussed and integrated training agenda. It is intended that these will address the key strategic priority of sustainability of the PathWest workforce, enabled by a learning culture within PathWest. Some of these are direct outcomes of research into job redesign as it relates to role delineations, JDFs, career pathways and the role of training and education providers. Others are indirect changes needed to be able to affect these outcomes. These include the establishment of a training and development section within PathWest, followed by the provision of resources and facilities for training and development to occur ‘on the job’ in the first instance. Some of the changes are also linked to issues identified in the workforce survey and workshops.

The establishment of a training framework tailored to PathWest can address training and development needs as they arise following changes to roles, tasks, processes, communications, human resources and equipment. This can also be used to deliver training and development activities that relate to organisational and desired cultural changes.

Establish a Training and Development Section within PathWest

The best way for PathWest to have direct control over the changes it will need to make to transition from the relative ease which it can currently source its staff and fill positions, to the anticipated shortages arising from workforce ageing and expected dwindling graduate supply.

Through consultation, the TNA survey, site visits and the workshops that were conducted, it is clear that there are opportunities to exploit improved role delineations within laboratory settings. However, to implement these while dealing with the day-to-day demands dealt with in laboratories would be burdensome on the already challenging time management required of managers.

With this in mind, the primary objective and deliverables for such a unit would be to:

- Establish a training inventory.
- Tailor specific up-skilling programs to recognise and extend the already highly qualified laboratory technician workforce.
- Assist managers to identify training needs with their settings and implement training required to meet new role.
- Ensure site specific training and enabling programs are put in place to assist laboratories to move towards staffing profiles where qualifications and experience have been recognised and can be more appropriately utilised.
- Provide change management and implementation assistance for managers implementing new role delineations in their worksites.
- Provide performance and evaluation advice to managers and assist in performance and professional development needs for all categories of laboratory staff.
- Maintain a training and development database and develop training performance criteria in consultation with PathWest stakeholders.
- Promote a training and development culture within PathWest.
- Provide a central communication point for liaison and collaboration with universities, TAFE, undergraduates and graduates.
- Coordinate training rotations and clinical placements for undergraduates.
- Pursue and manage funding from Commonwealth and State Governments for training assistance.
- Ensure training programs, competencies and qualifications meet relevant Australian industry standards.
- Develop recognition framework for PathWest relevant competencies and promote these within PathWest.
- Collaborate with relevant stakeholders to ensure training standards and developed roles and competencies are consistent with an appropriate governance framework for PathWest that minimise risk.
- Provide a training forum and resource for PathWest managers and staff through workshops, conferences, networks, on-line collaboration and reports.

Actions to Be Taken

- Clarify and agree on core, generic and specific task, role delineations and competencies of all staff and processes at all levels.
- Redefine tasks and role delineations of laboratory staff and relate it to their educational background, skills and knowledge.
- Redefine the tasks and roles of Medical Scientists – remove them from routine testing into complex/specific testing, method and equipment development, supervision and validation.
- Bring phlebotomy and the clerical component of sample reception/registration/reporting into a qualification for laboratory and technical assistants. Use existing VET pathways for this.
- Recruit and train staff at lower levels from high school and VET programs. Explore partnerships with training providers to do so.
- Create career pathways for all staff that are based on capacity building models.
- Use the results of this trial Training Needs Analysis to develop routine and online Training Needs Analyses to identify specific needs of groups and individuals on an ongoing basis. Relate this to a dynamic system for ongoing human resource training and development with 360 degree reviews as well as systems to monitor and evaluate and respond appropriately to changes as they arise.
- Review computer/IT training requirements for ULTRA and other PathWest applications to ensure existing skills are not limiting the performance and benefits of new systems.
- Replace, upgrade and begin a process of continuous improvement with respect to equipment incorporating ongoing training/learning with the changes.
- Promote and facilitate extensive training in LEAN management principles. A management forum to be facilitated through a dedicated training unit to foster a networked approach to disseminating information on improvements and methods.
- Identify existing and potential leaders within PathWest for LEAN training and provide a gateway for training. Assist in implementation of laboratory review and changes.
- Internal training packages to be tailored and developed to accommodate workplace changes emanating from process redesign (i.e. LEAN designed workplaces).

Conclusion

In commissioning this report, the PathWest Workforce Committee has initiated the process of developing strategies to address the looming workforce crisis. A study of the PathWest workforce through engagement with laboratory staff and analysis of available workforce data has raised a number of issues. Solutions have been identified to address expected shortages before they compromise service delivery. The issues identified in this report will help inform future workforce planning and a strategic direction for PathWest.

Shortages and staffing difficulties for Pathologists and Medical Scientists are already widespread and the outlook appears to be even more challenging. Modelling of the PathWest workforce has shown that it is extremely vulnerable given current recruitment and turnover to shortages of Pathologists and Medical Scientists.

The looming supply gap as well as current pressures can be alleviated through a multi-faceted approach. They include a 1.4% reduction in turnover, 6% increase in graduate intake, up-skilling of Technicians into Medical Scientist positions, and demand management strategies through service improvement. Using a single approach is not an appropriate solution to addressing the workforce crisis.

International evidence has demonstrated that role delineation and job redesign are achievable strategies and that implementation provides a partial solution to the workforce crisis. Job redesign has shown to improve workflow within laboratories and has contributed to sustainability by reducing the requirement to expand the workforce. Other service improvements specific to PathWest could also be implemented, of which many have been identified through consultation with staff at all levels within PathWest, with some already being acted upon.

Within PathWest evidence shows that there are a substantial number of Technicians with relevant qualifications for Medical Scientist positions, and that with appropriate mentoring and up-skilling could effectively fill these roles where essential. In order to deliver on up-skilling, role delineation and service improvement, the focus and quality of internal training specific to Medical Scientists and Technicians needs to improve.

To ensure a sustainable workforce for PathWest, the establishment of a suitable training resource to coordinate, assist and implement training initiatives across PathWest is essential. Addressing the issues identified in this report will go a long way to improving the attractiveness for PathWest as a place to work and develop a career, and also improve the culture and reduce turnover.

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Appendix A

Summary of AMWAC Report on Pathologist Workforce in Australia and RCPA Response

Current Situation

The Australian Health Ministers Advisory Committee (AHMAC) directed AMWAC to prepare a report on the specialist pathology workforce. The AMWAC review of the pathology workforce revealed that the pathology workforce is already in crisis and that there is a serious shortage of Pathologists in Australia. It also recognised that this was an international problem, not one that could be remedied by importing specialist pathologists from overseas. The serious shortage of Pathologists not only influences the future of the speciality, but will also affect the work of other medical specialities. If this trend continues, pathology services may become the capacity-limiting process for many clinical activities (RCPA, 2007). For WA Health this is a major risk to planned reforms and future service profiles, as a substantial part of acute services are critically dependent on diagnostic services.

In 2006, there were 1281 Pathologists in active practice across Australia. With the population in Australia reaching 20 million this gives a population ratio of one pathologist to 15,500 people. Of major concern is that 20% of Australia's active Pathologists are currently over the age of 60, with 10% over the age of 65. The 2003 AMWAC report recommended that an additional 100 registrar positions (11 for WA) needed to be created per year on an ongoing basis in order to address the current shortfall of Pathologists (RCPA, 2007). WA has fallen a long way short of this, although there have been recent moves to increase the number in training.

Shortages and Training Positions

A snapshot survey of vacancies in pathology in mid-2006 revealed 70 FTE of vacancies across Australia, which were actual funded positions that could had not been filled. The RCPA in liaison with public and private sector laboratories also identified 130 potential new positions for training in laboratories throughout Australia provided there was funding available. This included 16 private sector positions, as the private sector in the last five years have committed to training pathology Registrars (RCPA, 2007).

In 2006, the Commonwealth provided money for 10 new positions (1 for WA) over 5 years to produce Pathologists for the private sector. The RCPA has had meetings with state Ministers for Health and received a commitment from WA of 11 positions (10 WA government, 1 private sector) (RCPA, 2007).

The lobbying by the RCPA has resulted in an additional 53 new positions since the AMWAC report in 2003, which is a long way short of the 400 positions that should have been in place by the beginning of 2007 (RCPA, 2007).

Currently the Commonwealth spends $1.6 billion dollars a year directly on the provision of pathology services and until very recently provided no direct support for the training of pathologists to provide the service. Responsibility for

funding training positions mainly rests with State and Territory Governments (RCPA, 2007).

The situation in other countries where the RCPA provides training is even worse. In New Zealand the ratio of Pathologists to population is 1:20,250, in Hong Kong it is 1:26,500, in Singapore it is 1:48,900 and in Malaysia it is 1:75,000 (Graves, 2007). As the situation worsens in other countries it is conceivable that they will begin to recruit Australian trainees, further exacerbating local shortages (Pathology Associations Committee, 2005).

Sub-Disciplines of Pathology and Impact of Shortages

At the present time, pathology has seven major areas of activity. These relate either to the methods used or the types of disease which they investigate. The disciplines are:

- Anatomical pathology
- Chemical pathology
- General pathology
- Genetics
- Haematology
- Immunology
- Microbiology (RCPA, 2007)

The RCPA has identified four areas of major concern in relation to training in forensic pathology, academic pathology, paediatric pathology and rural/regional pathology. Current statistical data collections do not adequately capture the sub-disciplines enough to do longer term projections, however, the RCPA has undertaken surveys of the membership in these areas, which reveal significant shortfalls in the workforce (AMWAC, 2003).

There are currently only 24 forensic pathologists currently performing 11,000 autopsies. An international benchmark states that there should be one Forensic Pathologist per 250 autopsies. It should be noted that this level is not achieved in any country at present, as there is an international shortage of Forensic Pathologists. Regardless of this fact, there is a significant shortfall of forensic pathologists required in Australia. According to the RCPA, the concern in relation to forensic pathology is where the structural arrangements financing forensic positions are cross-departmental with responsibility shared between that of Attorney-General Departments (and in some cases Police), and Health Departments. The issue is further exacerbated by a perceived lack of positions available within forensic institutes or hospitals to ensure Anatomical Pathologists have access to training in the performance of autopsy examinations (AMWAC, 2003).

Table 28, shows potential effects of Pathologist shortages by discipline.

Table 28: Shortage of Pathologists and Impact by Sub-Discipline

Sub-Discipline	Impact of Shortage
Anatomical Pathologists	Adverse impact on the timeliness, quality and accuracy of diagnosis for a range of diseases, including all cancers.
Haematologists	Adverse impact on safe processing of blood transfusions, potentially impacting ability to conduct surgery.
Chemical Pathologists	Adverse impact on ability to diagnose heart attacks. Adverse impact on ability to monitor diabetes, possibly resulting in early deaths, or serious complications.
Microbiologists	Adverse impact on ability to diagnose or prescribe treatment for infectious diseases such a meningococcal disease.
Immuno-Pathologists	Adverse impact on testing and monitoring of HIV Aids patients Inability to titrate the drugs required for treatment.
Geneticists	Adverse impact on ability to conduct prenatal screening for serious congenital and hereditary diseases, leading to an increase in numbers of children being born with major diseases.
Forensic Pathologists	Postponed autopsies, delayed burials. Adverse impact on the ability to conduct criminal investigations.
General and specialised pathologists	Adverse impact on availability to provide clinical advice and support to medical specialists.

Source: (RCPA, 2007).

A breakdown of pathology services would eventually lead to the paralysis of the entire health system, relegating hospitals to little more than emergency first aid centres, with no ability to undertake critical diagnostic functions (RCPA, 2007).

Review of UK Pathology Workforce

The review of the pathology services in England found that the complexity of the workforce probably reflects the ad hoc and silo-based evolution of the different professional and employment groups rather than active, managed change driven by the requirements of local pathology services, based on function and the opportunity for effective multidisciplinary approaches to working (Carter, 2006).

There are a number of different professional and/or employment groups that make up the pathology workforce, including:

- Specialist Pathologists are medically qualified and provide direction, interpretation of results, and direct patient care, having membership of the RCPA
- Clinical Scientists provide direction, interpretation, and advanced scientific expertise
- Biomedical Scientists do the core of the lab work associated with pathology
- Medical Technical Officers provide higher level technical support
- Medical Laboratory Assistants provide technical assistance, some of which may be shared across disciplines
- Cervical Cytology screeners provide technical support to cancer screening programs and to cervical cytology in general

- Phlebotomists undertake venepuncture and (in some areas) other haematology investigations or point-of-care testing
- Administrative and clerical staff undertake a wide range of support roles (Carter, 2006).

Technological advances (such as laboratory automation and point-of-care testing) and other clinical and scientific advances in laboratory medicine are changing the skill set required to deliver pathology services, which is not yet reflected in the composition of the current workforce. This indicates a need to review the roles and structures of the workforce (Carter, 2006).

The NHS review found there has been an increased emphasis on integrated service improvement as a means to achieving associated gains in productivity. It also recognises the need for pathology to streamline its processes and service functions, which includes understanding the impact of new technology, and to develop its skill requirements to improve efficiency and effectiveness. This would imply an integrated pathology service model where inputs such as demand, the type and range of general and specialist provision; hours of operation, and automation, could be matched to skill and knowledge requirements. Therefore producing a workforce profile, which optimises the desired service outputs, different to the workforce which has evolved (Carter, 2006).

With the advances in science and technology there appears to be a blurring of boundaries between some specialties, which would lend itself to the introduction of greater service and workforce flexibility, which is generally not being exploited. This suggests that the pathology workforce needs to be considered as a whole, by emphasising the complementary nature of skills within a common service and competence framework (Carter, 2006).
Any pathology workforce planning model must reflect the changing requirements of the pathology workforce and be based on skills and competencies. It must not preserve the current professional silos. If the pathology professions are to take on new roles then workforce planning needs to be set in the context of the whole career pathway and the whole workforce, with provision for roles to be extended as appropriate (Carter, 2006).

The expected pathology workforce shortage also provides scope for introducing new staff with new skill sets aligned with the changing pathology service. Career pathways in pathology need to be clearly defined, based on the skills and competencies required for modernised services and transferable roles and remove barriers to attraction and retention (Carter, 2006).

AMWAC Report into the Specialist Pathology Workforce

The Australian Medical Workforce Advisory Committee (AMWAC) was asked by the Australian Health Ministers Advisory Committee (AHMAC) to prepare a report on the specialist pathology workforce. For Australia to achieve a balanced pathology workforce AMWAC recommended that:

- From 2008 there needs to be 132 pathology entrants entering the workforce (see Table 29).

- Based on the average number of new trainees (52) between 1998 and 2002 and an average attrition rate of 20% this will require an additional 100 trainees per annum from 2004.
- The assumptions used by AMWAC to model the pathology workforce were as follows:
- An estimated 50 new pathologists admitted per year and a loss rate of approximately 40 Fellows per year
- An average retirement age of 65 years
- 1,056 Fellows working solely in pathology based on 2000 Australian Institute of Health and Welfare (AIHW) data
- 1,290 fellows based on RCPA database for 2002
- 1.3% (0.9% per annum from projected population increase plus technological change over the next 10 years, plus 0.4% per annum increase in demand from the ageing population)
- 1,290 (includes all RCPA fellows) and 1,056 (excluding those with dual fellows) were considered as baseline supply levels for projection scenarios.

The WA population grew by 2% (41,200 people) in the year to September 2006, (ABS, 2007). Therefore given that a national population growth figure of 1.3% was used by AMWAC to model the workforce requirements, the figures for WA are likely to be an underestimation of what is actually needed.

Table 29: Projected Pathology Workforce (AMWAC, 2003)

	2003 Entrants	Entrants Based on Population Growth 2008 Onwards	Entrants Required Based on 3.5% per Annum Growth 2008 Onwards
	Baseline supply of 1,056		
WA	6	9	15
Australia	52	61	132
	Baseline supply of 1,290		
WA	6	12	19
Australia	52	85	171

There are a number of indicators to assess the adequacy of a medical workforce and no single measure can provide a definitive assessment. The indicators chosen by the Working Party to assess the adequacy of the pathology workforce, were:
- Unfilled positions
- Excessive hours of work
- Practitioner to population ratios
- GP assessment of the need for Pathologists
- Consultation with jurisdictions, organisations and professional colleges.

Overall, the AMWAC Working Party concluded that although the distribution of Pathologists by geographic region matches the distribution of all specialists fairly closely, there was a misdistribution in rural and remote areas. A snapshot of vacancy rates across the States and Territories suggests vacancies of approximately 72 FTEs. The AMWAC surveys of 1996 through to 2001 reflected public hospital vacancies across the sub-specialties of Anatomical Pathology, Chemical Pathology, Microbiology and Haematology, and an

anecdotal shortage of Registrars training in these sub-specialty areas (AMWAC, 2003).

WA Pathology Workforce Characteristics

In 2003 there were 106 specialist Pathologists practicing across WA; 97.9% were located in Perth. WA's specialists to population ratio was 1:12,695 overall, substantially lower than the national average and a substantial improvement over the 2000 figure of 1:18,067 (See Table 30).

Table 30: Demographics for the WA Specialist Pathology Workforce (AMWAC, 2003)

Category	Measure	WA	Australia
No per population in 2000	Number	106	1,017
	% total	10.4	100
	% Australian Population	9.9	100
	Specialist to Population Ratio	1:18,067	1:18,971
	Pathologists per 100,000	5.5	5.3
No per population in 2001	No.	148	1,214
	% total	12.2	100
	% Australian Population	9.8	100
	Specialists to Pop^{n} Ratio	1:12,695	1:15,780
	Pathologists per 100,000	7.9	6.3
Geographic Area in 2000	Capital city	97.9	83
	Other metro	-	6.7
	Larger Rural	1.0	6.9
	Other Rural / Remote	1.0	3.4
	Total	100	100
Age Profile % in 2002	<35	1.5	2.7
	35-44 yrs	29.5	29.7
	45-54	34.1	31.4
	55-64	19.7	26.4
	65+	15.2	9.7
	%55+	34.9	36.1
	Average Age	51.1	50.5
Gender % in 2002	Male	75.7	72.8
	Female	24.3	27.2
Numbers	1995	120	1,095
	2000	148	1,214
	%change	4.3	2.1
	% population change	1.6	1.2
Labs	No of accredited Labs 2003	7	72
Disciplines		microbiology anatomical pathology chemical pathology, haematology, immunology, genetics	microbiology anatomical pathology, chemical pathology, haematology, immunology, genetics
Trainees 2002	Number Trainees	15	192
	% Trainees	7.8	100
	% of population	9.9	100
Weekly Hours	Average Hours Worked per Week	46.4	46.2

Women represent 24.3% of the RCPA fellows and are much younger than male Pathologists, with the majority being under the age of 45 years (46.4%) compared to 27.1% of male Pathologists (Table 31).

Table 31: Australian Pathologists Age by Gender, 2002

Gender	Under 35 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65+ yrs	Total
Percentage Gender by Age Group						
Male	2	25.1	31.5	29.7	11.7	100
Female	4.9	41.5	31.5	17.5	4.6	100
Persons	2.8	29.7	31.5	26.3	9.7	100
Percentage Age Group by Gender						
Male	51.4	61	72.1	81.5	86.9	72.8
Female	48.6	39	27.9	18.5	13.1	27.2
Persons	100	100	100	100	100	100

Source: (AMWAC, 2003)

Pathologists in WA work on average 46.2 hours which is lower than the average of 51.2 hours for all specialists (See Table 32), with women working on average 5.9 fewer hours per week than their male counterparts (AMWAC, 2003).

Table 32: Australian Pathologists, Average Weekly Hours, 2000

Gender	<35 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65-74 yrs	75+ yrs	Total
Males	42.8	50.2	50.6	46.9	34.8	38.5	47.4
Females	46.6	39.6	45.9	46.3	28.3	—	42.5
Persons	44.4	46.8	49.4	46.8	34.0	38.5	46.2

Source: (AMWAC, 2003)

Table 33 shows the distribution of pathology trainees by sub-discipline for WA, the majority of which were training in Anatomical Pathology. The AMWAC working party acknowledged this issue as having a significant effect on future supply, in particular the capacity to supply appropriately trained people to rural and remote areas where multi-skilling across a range of sub-disciplines is required. Although only 2% of Pathologists are found outside of the metropolitan area in WA, the population distribution is substantially different to the eastern states and the business models supporting pathology services reflects this.

Table 33: Training Program of Current RCPA Trainees by Sub-Specialty 1995 to 2002

	1995	1996	1997	1998	1999	2000	2001	2002	Total
Anatomical Pathology - WA				1	3	4	1	1	10
Anatomical Pathology - Aust	1	6 3	13	1	13	24	26	27	113
Chemical Pathology - WA							1		1
Chemical Pathology - Aust	0	0	1	0	1	1	2	0	5
Genetics - WA							1		1
Genetics - Aust	0	0	1	1	2	11	23	13	51

	1995	1996	1997	1998	1999	2000	2001	2002	Total
Haematology - WA							2		2
Haematology - Aust	1	6	7	14	22	42	57	43	192
Immunology - WA									0
Immunology - Aust	0	0	1	0	1	0	0	2	4
Microbiology - WA					1		1		2
Microbiology - Aust	0	0	1	0	5	6	5	1	18
No admitted to the RCPA - WA	5	7	3	7	2	2	7	3	
No admitted to the RCPA - Aust	41	56	56	34	38	29	33	36	40

Source: (AMWAC, 2003)

Table 34: Average Number of Trainees Admitted to the RCPA

No. Admitted to RCPA	Average
Average Annual Admitted to RCPA - WA	5
Average Annual Admitted to RCPA– Aust	40

Source: (AMWAC, 2003)

The lack of training opportunities in pathology is evident. In 2005, out of a total of 6059 vocational training places, only 282 trainees (4.7%) were in pathology. Of the total number of vocational trainees 45.5% (2758), 55.3% were female (Medical Training Review Panel, 2005).
Table 34 and Table 35 show the number of trainees admitted to the RCPA and pathology trainees broken down into age groups and gender.

Table 35: Australian Pathology Trainees, 2001

Gender	Under 30 yrs	30-34 yrs	35-39 yrs	40-44 yrs	45+ yrs	Total
Male	17	56	27	13	6	119
Female	33	50	15	10	4	112
Total	**50**	**106**	**42**	**23**	**10**	**231**

Source: (AMWAC, 2003)

RCPA's Submission to the Productivity Commission

In 2005 the Productivity Commission conducted a research report into Australia's Health Workforce. As part of its submission the RCPA has identified many of the problems that have lead to pathology workforce shortages and have proposed solutions. Most of the pathology workforce problems can be related to recruitment, training, retraining and retention. These findings are detailed in the following tables (See Table 36-39)(RCPA, 2005).

Pathology Workforce Problems, Solutions and Actions (RCPA, 2005)

Table 36: Recruitment Problems, Solutions and Actions

Recruitment Problems	Recruitment Solutions	Action by RCPA
Lack of training positions Lack of opportunities in some disciplines unless dual trained RACP	1.1 More positions need to be made available via direct government funding.	RCPA has been lobbying the State and Commonwealth governments for more positions.
Recruits receive insufficient exposure to pathologists (in undergraduate course, in teaching, in hospitals, in one on one encouragement) Lack of knowledge about a career in pathology (i.e. course and outcomes)	1.2 Raise the profile of pathology in Medical Schools and Hospitals via education (including hospital management), and greater exposure to pathologist.	College has a program to promote pathology and pathologists to general and medical communities: Pathway magazine sent to GPs, specialists, medical students etc career posters and attendance at career days Pathology week developing displays for hospital foyers, collection centres etc
Pathology does not have a high profile in medical courses	1.3 Strengthen the pathology content in medical courses.	College has developed a core curriculum in pathology working in universities and the Australian Medical Council.
Difficult to attract recruits in some areas Quality of recruits not optimal	1.4 Special attention to promote at the intern / resident level.	College encouraging fellows to take an active interest in talking to interns and hospital medical officers about careers in pathology. Formalised programs were planned for 2006.
Workforce requirement figures are essential	1.5 Separate the service and training components of the funding for training jobs.	
		Discussions with State Health Ministers. College proposes a centralised training agency as part of Commonwealth MOU negotiations.

Table 37: Training Problems, Solutions and Actions

Training Problems	Training Solutions	Action by RCPA
Insufficient training positions and adequate funding for them (in public and private), centralised funding is needed with funds allocated specifically for pathology	2.1 Create additional positions (public and private), Governments to provide direct funding.	See 1.1 recruitment problems.
Allocation of jobs to trainees is not efficiently handled	2.10 Consider UK system of House Officer for pathology posts.	The College is aware that with the increase in the number of medical student places that there will need to be more intern places available. The College has written to the Post Graduate Medical Education Council offering pathology rotations as a term for interns. The College considers such a rotation would be very useful for all doctors not just those interested in pathology as a career. The College is still to be advised if this will be supported.
	2.15 Encourage private sector to offer more training.	The private sector has embraced the Commonwealth Private Sector Training Program. The scheme provides $75,000 of funding per trainee. The private laboratories are having to contribute top up salary for the trainee, equipment and pathologist's time for training and are doing so willingly.
Insufficient consultants who are too overworked to train registrars, who are themselves overworked and too busy to train properly	2.6 Ensure sufficient pathologists available to supervise registrars.	This is an ongoing issue. Of note, by using the private sector for training there has been an increase in the number of pathologists available for supervision.
	2.13 Advise public and private areas of acceptable levels of cut up for registrars, try to utilise scientists, medical assistants for cut up and transfers.	The College during training accreditation visits actively encourages the use of scientist and medical assistants for cut-up (macroscopic cut-up, dealing with frozen sections and reporting microscopic pathology) in accordance with National Pathology Accreditation Advisory Council (NPAAC) guidelines. There are more and more laboratories doing this.
Flexibility required in training positions High failure rate lengthens training to 6 years, some drop out	2.3 Ensure trainees finish in 5 years by reviewing training, examinations & requirements.	There have been several actions of note in relation to this; Firstly, the College introduced repeat examinations in November (the normal exams are in August) for Part II candidates and also Overseas Trained Specialists (OTS) in order to offer further opportunities for the completion of Fellowship. This has been very successful with many trainees who had failed in August, passing

Training Problems	Training Solutions	Action by RCPA
		the second attempt in November. Secondly, there had been considerable concern over the Part I anatomical pathology (AP) slide failure rate. A workshop was held with AP supervisors on this issue in February 2004. There were a number of issues identified: Supervisors not understanding that the exam tested what is normal practice and not esoteric cases as had been the case when many of them sat exams. As a consequence a session at the College update was provided to Trainees and Supervisors on the type of cases to expect and the approach to take. The Trainees felt that there was not enough time to complete the exam. As a consequence the exam time was extended from 3 hours to 4 hours for the 2004 exam. The Part I pass rate in 2004 increased to 75%. Of note, this change was a control based change as the same exam was used 10 years ago when the pass rate was 60%, i.e. the exam was still the same level of difficulty.
	2.16 Change training programs in AP from 1/1 requiring 500 hrs/year to more emphasis on teaching aides like digital photos, computer programs, and formal assessment as in pattern recognition with computers.	The College has developed a learning tool called 'In view' (an electronic module for AP) which is to be launched in March 2005, which will assist in this process. This is a start, but more work will be needed.

Training Problems	Training Solutions	Action by RCPA
	2.5 Clarify reasons for drop outs, introduce better selection process.	Interviews have been conducted with a number of the Trainees who have dropped out of training. One of the major reason that has been put forward is that trainees had considered Pathology would have been an easier option than some specialties than they anticipated, when they realised this was not the case they chose to change courses. Further, there have also been concerns over the lack of supervision in some areas due to insufficient Pathologists to train them. The College is actively encouraging a more centralised recruitment process so selection of trainees can be more standardised. The College has developed a guideline for centralised recruitment that includes selection criteria for training, (Attachment 2).
Some laboratories not suitable for training	2.4 Separate service and training components of the funding for training jobs.	See recruitment section actions.
Single discipline training Trainees unaware of training requirements and expectations Problem based learning for undergraduate and post graduate appears to produce a lower standard of candidate for pathology training Mismatch between job requirements and training positions	2.8 College to redesign training program for general pathology and to provide better program to produce clinical pathologists.	Proposal to develop a Clinical Pathology Fellowship and a post Fellowship Diploma in Clinical Pathology. Curriculum are being developed for presentation at the July 2005 Council meeting.
	2.9 Offer rotation through several disciplines to increase general knowledge.	Trainees are able to do rotations as part of Fellowship (currently for 12 months). The problem is finding funded positions. This has been raised at Commonwealth and State Government level during lobbying for extra training positions.
There is a need for training in Forensics and general pathology	2.7 Establish pathway for training Forensic Pathologists (possibly with overseas experience).	A Forensic Review Working Party was established and the Review was reported to Council. One of the recommendations was for a slanted Anatomical Pathology exam to be developed at the Part 1 level for Forensics. Previously Trainees had to do AP Part I first before being able to commit to Forensics. Council approved the change in principle. The Forensic Advisory Committee is developing a curriculum by July 2005.
Increasing age of recruits (due mainly to prior degrees, deferments etc), means it is harder for them to take on specialty training, harder to learn and thus less likely to achieve original contributions	2.12 Consider medical student projects and holiday studentships.	The College offers medical students Scholarships to each of the medical schools in Australia and New Zealand.

Training Problems	Training Solutions	Action by RCPA
and discoveries. Often complete specialty in mid 30's and many opt to work part time (especially women).		
Lack of controls of the training system All aspects of academic training need to be upgraded	2.17 Consider OTS training and integration into workforce as additional.	The OTS interview process is to be centralised so as to improve consistency of the process. The OTS exam exemption tables and training time credits are now published on the College website to increase transparency.
	2.2 Improve quality of training.	The College has developed a Supervisors Module to train Supervisors as to the requirements of training. In edition the Chief Examiners in each discipline currently offer sessions to Trainees and Supervisors on the specific requirements of their discipline. Requirements for training are in a check list format and have been published in the College Trainee handbooks for several years. Further, over the last 18 months the College has been working with the University of Sydney's Medical Education Unit to develop detailed curricula for each discipline. These are projected to be completed mid 2005. Once completed the College is to hold seminars for Supervisors and Trainees to educate them on the new more detailed Curriculum.
	2.14 College to promote, encourage and seek funding for general training.	This is an ongoing part of lobbying for funding.

Table 38: Retraining Problems and Solutions

Retraining Problem	Retraining Solution	Action
Pathologists wishing to retrain in another area	3.1 Review existing College guidelines and make specific recommendations.	The College now offers retraining programs to Fellows as required. A number of Fellows in recent years have retrained in different disciplines.
Problems of re-examination and recertification Eligibility to retrain No adequate system at present Take up new graduate posts	3.2 Introduce supernumerary posts for retraining.	With the increased number of training positions in general, the retraining post requirements should be able to be addressed within these positions as there is not a huge demand.
People contemplating retraining are much older, likely to learn more slowly Less willing/able to make major lifestyle changes (have more family commitments at this stage) and have less working life left	3.3 Encourage part time work.	This is encouraged by the College and seems to be adopted widely in some organisations.
Continuing education	3.4 Retraining via continuing education and quality control programs (e.g. virtual microscope when operational).	This forms part of any retraining program.

Table 39: Retention Problems and Solutions

Retention Problem	Retention Solution	Action
Conditions sometimes not conducive to remaining (public and private), as roles appear to be undervalued by many organisations Too many jurisdictions involved Insufficient continuing education on offer Management requirements giving added work and stresses Lifestyle choices, now more acceptable to work part time and pursue other interests More women involved (but not necessarily as full time for a full working life)	4.1 Survey current conditions for research, study, conferences, remuneration, workload, guidelines, employment (including flexible working arrangements), and develop basic 'minimum' recommendations for all these areas.	To be undertaken in 2005.
Some go overseas and then do not return	4.2 Provide exchange posts opportunities overseas (USA/UK).	To be investigated in 2005.
Disincentives provided by costs of medical insurance, inadequate CMB remuneration (surgical pathology/cytology/microbiology)	4.3 College to work at alleviating medical indemnity and CMB remuneration problems.	The College is actively working on issues of Medical Benefits Scheme remuneration problems and is currently undertaking a relative value study.
Inadequate funding reflected in insufficient manpower therefore being overworked, thus more likely to retire early Inflexible working arrangements in some areas Ageing workforce	4.4 Employ retired people as a temporary solution to ease strain.	The College actively encourages this and provides facilities for Fellows to advertise their availability for locums.

Appendix B

The PathWest Career

The following section provides an overview of the competencies required for the various non-pathologist laboratory based disciplines with PathWest. It includes a comparative analysis with other jurisdictions. Also examined are role delineations, job redesign and career pathways. It concludes with a discussion on the interdependency between job redesign, role delineation and career pathways, and a discussion of the implications for universities and TAFE. The primary objective is to develop an understanding of the complexities and constraints on altering the way tasks are undertaken within PathWest, in response to the identified need arising from skill shortages and projected shortages of Pathologists and Medical Scientists.

Medical Scientists' Entry Level Competency Frameworks

In 1990 the National Training Reform Agenda (NTRA) was implemented to raise the international competitiveness and productivity of Australian industry. Primary reform initiatives involved the development of national standards and skill competencies by industry/occupation; the establishment of a National Training Board (NTB); and the establishment a National Office of Overseas Skills Recognition (AEI-NOOSR) to provide a clear assessment of international qualifications for skilled migrants (Curtain, 1994). As a result, during the 1990's, many health and allied professional associations developed competency-based standards for practice in their relevant professions (VDHS, 2005).

Competency Standards in Australia

The development of *Competency-based Standards for Medical Scientists* (the 'Standards') was initiated in 1991, through the collaborated efforts of the Australasian Association of Clinical Biochemists (AACB), Australian Institute of Medical Scientists (AIMS), and the Australian Society for Microbiology (ASM) (CoA, 1993). The Standards were based on AEI-NOOSR (1990) guidelines (Gonczi et al. 1990), compiled with the prime objectives to:

- Represent an act of self-definition by Medical Scientists, through collective action of professional groups.
- Better define the skills, tasks, and level of performance expected of Medical Scientists, at the entry level.
- Guide curriculum development of undergraduate or post graduate courses in clinical laboratory sciences.
- Provide an employment framework for the training, development, and performance management of staff.
- Provide a benchmark for assessment of overseas qualifications and articulation between Vocational Education and Training (VET) and Higher Education (HE) (CoA, 1993).

The Standards reflect the expected contribution from an entry level Medical Scientist with a "…degree in a relevant area of science or applied science

from an Australian or equivalent university, together with two years relevant professional experience in an accredited laboratory". (CoA, 1993; p.1).

Professional Associations Representing Australian Medical Scientists

There are a number of professional associations and societies representing Medical Scientists practising in a single discipline or across all disciplines (RCPA, 2007):

- Australian Institute of Medical Scientists
- Australian Society for Microbiology
- Human Genetics Society of Australia
- Australian Society for Cytology
- Australasian Association of Clinical Biochemists
- Haematology Society of Australia and New Zealand
- Australian and New Zealand Society of Blood Transfusion.

The Australian Federal Government has assigned AIMS as the assessment authority, to assess skilled migrants for the qualifications of Medical Scientist (ASCO 2115-11) and Medical Laboratory Technical Officer (ASCO 3111-11) (AIMS, 2007a). In addition, AIMS accredits medical laboratory science programs provided by Australian tertiary institutions (AIMS, 2006).

AIMS Accredited Degrees

AIMS accredited bachelor degrees are vocationally-directed with the prime function of preparing graduates as Medical Scientists (AIMS 2006). This has been achieved by incorporating courses in the disciplines of medical science which not only cover the techniques used but also the pathological basis of disease processes. The disciplines include, but are not limited to: Histopathology/Anatomical Pathology and Cytology; Haematology and Transfusion Science; Microbiology; Clinical Biochemistry; Immunology and Molecular Pathology (AIMS 2006). An additional and essential requirement is that programs provide students with the practical skills and competencies which adequately match entry-level requirements of the medical science profession. These skills can be obtained through laboratory classes, workshops and professional placement in clinical laboratories (AIMS 2006). Table 40 lists AIMS accredited Medical Laboratory Science degree programs in Australia and New Zealand.

Table 40: AIMS Accredited Medical Laboratory Science Degree Programs[21]

Jurisdiction	University	Degree
New South Wales	Charles Sturt University	Bachelor of Medical Science (Pathology)
	The University of Technology Sydney	Bachelor of Science (Biomedical Science). This is an acceptable qualification provided the medical laboratory science option is followed
Western Australia	Curtin University of Technology	Bachelor of Science (Medical Science)
Queensland	James Cook University	Bachelor of Medical Laboratory Science
	Queensland University of Technology	Bachelor of Applied Science (Medical Science)
Victoria	RMIT University	Bachelor of Applied Science (Laboratory Medicine)
South Australia	University of South Australia	Bachelor of Laboratory Medicine
Tasmania	University of Tasmania	Bachelor of Biomedical Science
New Zealand	Auckland University of Technology	Bachelor of Medical Laboratory Science
	University of Otago	Bachelor of Medical Laboratory Science
	Massey University	Bachelor of Medical Laboratory Science (AIMS 2007b).

Tertiary Institutions offering degrees that meet the *AIMS Minimum Requirements Standards for Accreditation and Re-Accreditation of Bachelor Degree Programs* are eligible for accreditation via assessment of the following criteria:

- The recommended title descriptors for program nomenclature should include “Laboratory Medicine” or “Medical Laboratory Science”.
- Program structure and content must include the study of two or more disciplines following the undertaking of foundation units in basic physical and biomedical sciences. Programs seeking accreditation must contain the following professional medical science units: Patho-physiology; Immunology; Clinical Chemistry/Clinical Biochemistry; Clinical Microbiology; Haematology; Transfusion Science; Histopathology/Anatomical Pathology/Cytology. The program must provide allocated time for professional placement.
- Provide evidence of appropriate resources and program management including: staffing; funding; physical resources; library facilities; and external evaluation (AIMS, 2006).

[21] AIMS directed degree programs

Program accreditation is valid for four years with disbursement to AIMS for this service (AIMS, 2006). As for all other Science or Applied Science degrees offered within Australia, AIMS classifies these as non-directed degrees. Individuals holding non-directed degrees are assessed on an individual basis. Non-directed degrees refer to degrees attained in science or applied science relevant to pathology, other than in medical laboratory science or alternative qualifications acceptable to the AIMS National Council (AIMS, 2007b).

AIMS Membership

Medical Scientists working in hospital and private medical laboratories in Australia, who have graduated with an AIMS accredited qualification, are initially admitted as Graduate members (AIMS, 2007b). After two years of professional medical laboratory experience, Graduate members are eligible to become a Member of the Institute. Individuals who hold a science/applied science degree other than an AIMS accredited degree (non-directed degree) are eligible to be Associate members (AIMS, 2007b).

Registration

Registration or membership with AIMS is not a prerequisite for recognition or employment as a Medical Scientist within Australia (Department of Immigration and Citizenship, 2007). Registration has been problematic for Australian Medical Scientists, as multiple jurisdictions present discrete legislation, requiring ratification in each state (Badrick, 2007).

Canada (CSMLS, 2007a), New Zealand (NZ) (NZMLSB, 2007) and the UK (IBS, 2005a) all have a registration process for medical laboratory workers. As a condition of registration, competency is assessed and maintained by compulsory Continuous Professional Development (CPD) programs. In Australia, a CPD has been adopted by AIMS, AACB and the ASM but is not compulsory (AIMS, 2007c).

International Comparisons: Qualifications and Training

International comparisons of the medical laboratory worker demonstrate the different titles used to describe what is known as a Medical Scientist in Australia (see Table 1). The qualifications range from a Baccalaureate Degree to a Bachelor Degree with honours, the term of study increasing with advancement in qualification. There are additional requirements for employment in Canada and the UK, being competency based examinations (CSMLS, 2007b) and submission of Registration Portfolios (IBS, 2005b) respectively. International qualifications place a strong emphasis on practical training with the inclusion of a clinical placement year.

To gain employment in Australia as a Medical Scientist, the minimum requirement is completion of a medical science degree (generally 3 years) which incorporates a clinical placement scheduled during vacation periods, some degrees include a fourth year with clinical placement (AIMS, 2007b). The clinical placement of the program fulfils part of the ‘acquisition of practical skills’ requirement as defined by AIMS accreditation. However universities are finding it increasingly difficult to find clinical placements for students

(AIMS, 2005). Whether this is due to lack of funding or a shortage of supervisory capacity is unclear. Given moves in other disciplines, such as nursing, by the Commonwealth to provide financial support for clinical training (NNNET, 2006) it would be appropriate for support to be extended to pathology services. In the Australian state of Victoria, medical laboratory science students enrolled in the Bachelor of Applied Science (Laboratory Medicine) program at RMIT University (AIMS, 2005) undertake a 40 week Professional Practice placement of which 13 weeks may be spent in an approved overseas laboratory. Students receive a tax free bursary funded by the Victorian Health Department or by private pathology laboratory's that make donations to a scholarship fund. The benefit of this is evident through the clinical placement opportunities provided to students. In Western Australia, PathWest funds a four week placement of eight medical science students from Curtain University, under the *Student Vacation Employment* scheme. Students are paid during this period.

International Comparisons: Registration Requirements

There is no registration process for Medical Scientists in Australia, and in effect are not subject to self regulatory schemes (AIMS, 2005). In order to commence employment in Canada, NZ and UK registration by a regulatory body is compulsory (CSMLS, 2007a; NZMLSB, 2007; IBS, 2005a). Each has a State and/or National regulatory body which assess the competency and ongoing competency of its applicants/registrants.

Registration for a professional body can be a costly and bureaucratic process and involves meeting the criteria of the Australian Health Ministers Advisory Council (AHMAC) and the National Competition Policy guidelines (AASW, 2004). Registration is a difficult and time consuming process and would be further complicated given there is not a single professional association representing Medical Scientists. Nonetheless the benefits of registration are two-fold:-

1. It would unify the profession by directing their political and educational focus, and developing Codes of Professional Conduct which define "who Medical Scientists are" and "what they do".
2. It would provide general benefits such as protection of the public, protection of professional identity, setting of professional standards, assessment and maintenance of competence, and employment statistics of registered practitioners (Badrick, 2007).

Workforce data for Medical Scientists is lacking in Australia (AIMS, 2005), the registration for this subset of health professionals would provide a means through which industry statistics (numbers, age, career intentions, public/private sector employment, rural/metro distribution, discipline, education) could be obtained, and would assist in workforce planning and better establishing workforce education and training needs.

International Comparisons: General Competencies

It has been fourteen years since the *Competency-based Standards for Medical Scientists* (1993) have been published (CoA, 1993). Canada, NZ, and the UK have more recently reviewed and updated their expected profession entry level competencies (CSMLS, 2007c; NZMLSB, 2006; Health Professions Council, 2003). Since then technological, government and regulatory, workplace and workforce changes have taken place and therefore current roles and responsibilities of Australian Medical Scientists may not be adequately reflected in these standards. Since tertiary institutions use these standards to guide curriculum development, the lack of ongoing evaluation may undermine the professional and industry relevance of these degrees, as well as standards more generally.

Comparison of entry level scientists (Canada, NZ, UK, Australia) through assessment of the general competencies expected and base level job description forms (JDFs), indicate some differences (Table 41) In general, Medical Scientists in Australia do not perform phlebotomy on patients. Traditionally this was a task performed by scientists, but is now widely performed by phlebotomists. In Canada, NZ, and UK, scientists appear to perform this duty as part of their demonstrated competence in specimen procurement. It is open to question as to whether the Australian approach is a more appropriate and efficient role delineation.

In terms of what is expected of an entry level scientist, from a technical and scientific point of view, the four compared nations appear to be very similar (Table 41). Although difficult to make direct comparisons between generalised competencies, all place emphasis on the understanding and ability to perform laboratory procedures, and the use of scientific knowledge to interpret and report laboratory results. Appropriate tertiary training and clinical placement experience are the pathways to these highly developed skills.

In Canada, the profile of *Competencies Expected of an Entry-Level Medical Laboratory Technologist*, have been recently modified to include additional competencies which reflect the advanced abilities of entry level Medical Technologists required to succeed in the current health care system (CSMLS, 2007c). The additional competencies include: critical thinking, applied investigation, resource management, and communication and interaction. Applied investigation infers research and development activities, and the terminology used to describe this competency includes “demonstrate”, “apply”, “conduct”, and “participate”. Entry-level professionals in the UK are required to “direct” research and development activities, giving these laboratory workers greater responsibility in this area. The fact that these scientists graduate with honours may account for the difference.

Resource management, and communication and interaction are competencies which are apparent in all comparisons (Canada, NZ, UK and Australia), although are more clearly defined for the Canadian and British laboratory worker. For Canada and the UK, highly developed and well defined expectations are required of the entry-level professional in comparison to Australia and NZ. These higher order competencies differentiate the roles of

scientists and technicians where scientists are involved in research and development or management activities and operate at the clinical interface.

International Comparisons: Advanced Competencies

To enable flexibility in career structure and extension of professional roles, the definition and maintenance of comprehensive competency profiles are required (Hallworth et al. 2002). Competency templates for each clinical scientist modality (Haematology, Biochemistry, Immunology) set by the Association of Clinical Scientists in the UK, demonstrate requirements to fulfil the role of a Clinical Scientist and the areas of training required (Association of Clinical Scientists, 2006). Competency templates outline generic competencies which are divided into scientific, clinical, technical, research and development, communication, problem solving and management. Specific competencies are aligned to the generic competencies and the competency profiles also detail how individual competencies are acquired and how they are assessed. Clear role definitions promote improved career structures which enable attraction, retention and extension of skilled scientists.

Summary

- Competency standards for Medical Scientists in Australia require update and review.
- AIMS is the national assessing authority for skilled migrants seeking employment as Medical Scientists in Australia.
- AIMS is the accrediting body for medical science programs from tertiary institutions.
- Medical Scientists do not require registration to be employed in Australia.
- International qualifications have a strong commitment to clinical placement.
- Clinical placement opportunities are problematic in Australia.
- Australian general competencies (at entry level) appear to be appropriately matched to international general competencies. Areas which could be better matched involve the categories of applied investigation, resource management, and communication and interaction.
- International competencies provide clear role delineations for higher qualified health professionals, which provide improved career structures.

Table 41: Comparisons for Profession Entry-Level Scientists

	Canada	NZ	UK	Australia
Qualification	Baccalaureate Degree (Science or Medical Laboratory Science	Bachelor Degree (Medical laboratory Science)	Bachelor Degree + Honours (Biomedical Science or Equiv)	Bachelor Degree (Science/Applied Science (MLS) or recognised Equivalent
Term of Study	3 Years (including supervised training)	4 Years (including clinical placement year)	4 Years (including placement year)	3 or 4 Years (4th year is clinical placement year)
Job Title	Medical Laboratory Technologist	Medical Laboratory Scientist	Biomedical Scientist	Medical Scientist
Registration	Canadian Society for Medical Laboratory Science Registration and/or Licensure with Provincial Regulatory Body.	New Zealand Medical Laboratory Science Board Registration.	Health Professions Council State Registration.	N/A
Additional Requirements for Profession Entry	Canadian Society for Medical Laboratory Science, competency-based examinations.	N/A	Institute of Biomedical Science Certificate of Competence following submission of Registration Portfolio.	N/A
Competency Category: Safe Work Practices	Conducts professional practice according to established protocols, safety guidelines, and existing legislation.	Practice safely in accordance with health and safety legislation and workplace safety policy and procedures.	Practice safely in accordance with Trust Health and Safety policies.	Maintain and promote safe working practices.
Data Collection and Specimen Procurement/Receipt	Verifies relevant data and ensures that appropriate specimens are procured according to established protocols. Including phlebotomy.	Apply the protocols of informed consent to include collection of specimens.	Apply skills in phlebotomy and specimen reception.	Prepare and analyse biological material.

	Canada	NZ	UK	Australia
Analysis of Specimens and Validation of Results	Analyses specimens and validates results using established protocols.	Analyse specimens using prescribed protocols of the workplace. Authorisation of results.	Participate in all aspects of analytical work.	Correlate, validate and interpret results of investigations using clinical information.
Analytical Techniques	Understands principles and performs analytical techniques on specimens that originate from a variety of sources.	Demonstrate practical competence and an understanding of current knowledge.	Knowledge of and ability to perform procedures related to the discipline.	Knowledge of and ability to perform laboratory procedures relevant to the discipline.
Interpretation and Reporting of Results	Using scientific knowledge as the basis, interprets, communicates, and documents confidential data.	Report and interpret laboratory results.	Provide scientific, diagnostic and interpretative advice.	Report, interpret, and issue laboratory results.
Quality Management	Practices and promotes the principles of quality management and the efficient utilisation of resources.	Apply the principles of Quality Control, Quality Assurance and Improvement	Develop and maintain quality standards.	Liaise with health workers and others to continuously improve the service.
Critical Thinking	Applies critical thinking skills to constructively solve problems.	Demonstrate problem solving skills.	Demonstrate extended skills in trouble shooting.	Demonstrates use of analytical and problem solving skills.
Applied Investigation	Demonstrates research skills to investigate, evaluate or problem-solve.	Apply appropriate research methods.	Conduct and direct research and development.	Participate in research and development activities.
Resource Management	Addresses workplace challenges by applying skills involving human resources, skills in change management, materials management, financial management and information management.	Manage workload and resources. Take responsibility for the training, direction and/or supervision of others.	Develop, evaluate and provide new services. Teach laboratory professionals and other health workers	Participate in education and training of health workers and others. Maintain documentation, equipment and stock.
Communication and Interaction	Interacts with clients/patients/colleague in a professional and competent manner, using effective listening, verbal and written communication.	Communicate effectively with patients/clients, colleagues, other health professionals and the public. Work	Communicate complex technical information. Practice at the clinical interface.	Communicate with other health care professionals and related industries.

	Canada	NZ	UK	Australia
		collaboratively.		
Professionalism	Meets the legal and ethical requirements of practice and protects the patient's rights to a reasonable standard of care. Professional responsibility encompasses scope of practice, accountability, and professional development.	Act in accordance with ethical, legal, professional and regulatory requirements. Demonstrate culturally competent practice.	Participate in continual Professional Development. Adhere to Standards of Proficiency for Biomedical Scientists.	Demonstrate professional accountability for Medical Scientists practice. Demonstrate continuing professional development.

Role Delineation Between Key Professions

There are a number of role's which are attained by laboratory personnel at PathWest Laboratory Medicine WA, these include:

- Laboratory Attendant
- Phlebotomist
- Laboratory Assistant
- Technical Assistant
- Laboratory Technician
- CytoScientist
- Mortuary Technician
- Medical Scientist
- Senior Medical Scientist
- Medical Scientist in Charge
- Principal Scientist
- Pathology Registrar
- Consultant Pathologist

A generalised description of the tasks carried out by key medical laboratory personnel within the PathWest organisation are described in Table 42. This provides a basic demarcation of the roles assigned to each of these key professions.

Table 42: Key Roles Within the Medical Laboratory Profession in PathWest

Occupation	Role
Phlebotomist	Collects blood samples and biological specimens from both hospital inpatients and clinic outpatients.
Laboratory Assistant	Responsible for sample sorting, labelling, request entry, sample distribution, and telephone inquiries.
Technical Assistant / Laboratory Technician	Performs and results laboratory tests on blood, other body fluids and tissues, which assist clinicians/pathologists in the diagnosis, treatment and prevention of disease.
CytoScientist	Prepares and analyses cell samples taken from various sites of the body.
Mortuary Technician	Assists Medical Practitioners and Forensic Scientists to conduct post-mortem examinations, to determine the cause of death.
Medical Scientist	Performs and interprets laboratory tests on blood, other body fluids and tissues that range from simple to complex, which assist clinicians and pathologists in the diagnosis, treatment and prevention of disease.
Pathologist	Examines biological material, interprets laboratory results, provides clinical consultation for selection of diagnostic testing, treatment options and monitoring of therapy. Pathologists provide overall management of the Department of Pathology.

Within PathWest Phlebotomist and Laboratory Assistant roles are found to be interchangeable, where the collection of blood samples and biological specimens may be the primary task of the Phlebotomist but sample sorting, labelling, request entry and related tasks may also be included as additional duties.

PathWest employs a number of Technical Assistants with limited numbers of Laboratory Technicians within the organisation. Both perform duties within the laboratory in a testing capacity, reporting to the supervising Medical

Scientist. Laboratory Technicians may work more autonomously than Technical Assistants often having additional higher order duties.

Medical Scientists are represented at various levels ("Senior", "In charge", and "Principal") within the PathWest organisation, the degree of seniority is based on the level of professional, technical and administrative control maintained.

The process of requesting pathology tests can be generically mapped to identify key areas where the role of laboratory personnel become active. For example, observing the specimen pathway (Table 43), where the starting point is demonstrated by the initiation of a pathology request, individual or collective contribution by personnel can be observed right through to the finishing point where the requesting doctor receives the patient result.

Through the mapping of the journey of a pathology request it can be noted that there are various entry points into the specimen pathway which determine which laboratory personnel become involved in the process. Obviously the representation in Table 43 is a very basic map of the "request to test" process and the process will vary to some extent between both sites and disciplines. Nonetheless, each step of the specimen pathway encompasses a broad framework of specific tasks where a potential blurring of the roles may transpire.

Task substitution is not a new concept to the healthcare industry. For example, Nurse Practitioners have evolved to fill a role that extends the scope of a traditional Nurse into the domain of decision making once reserved solely for Medical Practitioners. They perform higher order duties including exercising prescribing rights and diagnostic testing rights (Bryant-Lukosius et al. 2004). Using the role of a Medical Scientist as a reference point, potential task substitution and role expansion between the key laboratory professions can be explored.

Task Expansion and Role Substitution

Contemporary healthcare workforce structures favour specialisation, requiring staff with specialised skills to perform specialised tasks. Inefficiencies continue to surface from this structure, it has been argued that a flexible approach is required, with emphasis on organisation and deployment (Murphy, 2007). In relation to workforce flexibility, attention is being directed towards strategies involving task expansion and role substitution, enabling existing health professionals to acquire additional skills to enable them to perform additional or higher order duties (Duckett, 2005). Examples of potential or current task substitutions in various areas of the health profession are demonstrated in Table 44 (Duckett, 2005).

Table 43: The Specimen Pathway

PATHWAY								
Function	**Pathology Test Requested**	**Specimen Collection**	**Sorting, Labelling, Request Panel Entry, Request form scan**	**Pre-Analysis & Analysis**	**Interpretation**	**Validation**		**Result Issued**
						Normal Results	**Positive Results**	
Performed by	Medical Practitioner	Phlebotomist	Laboratory Assistant	Technical Assistant	Medical Scientist	Medical Scientist	Pathologist	Electronic Release
	Nurse Practitioner	Nurse	Technical Assistant	Laboratory Technician	Pathologist			Automatic Fax Send
		Medical Practitioner	Laboratory Technician	Medical Scientist				Internal/External Mail Hardcopy

Table 44: Potential or Current Task Substitutions for Healthcare Professions

Task	Traditional Professional	Substitute Professional/Assistant
Anaesthesia	Anaesthetist	Nurse Anaesthetist
Clerking of new hospital patients	Hospital medical officer	Nurse
Closure of Wounds	Surgeon	Nurse
Foot care	Podiatrist	Foot Care Assistant
Foot surgery	Orthopaedic surgeon	Podiatric Surgeon
Laryngoscopy/Naso-endoscopy	ENT surgeon	Speech Pathologist/Nurse
Maternity care	Obstetrician	Midwife or GP
Mobilisation assistance	Physiotherapist	Physiotherapist Assistant
Patient management	Medical practitioner	Nurse Practitioner
Plain X-ray	Medical imaging technologist	X-Ray Assistant
Refraction	Optometrist	Orthoptist
Reporting pathology	Pathologist	Scientist
Reporting X-ray	Radiologist	Medical Imaging Technologist

Source: Duckett 2005

In the United Kingdom, policies have already been put in place through career frameworks, to allow Biomedical Scientists with additional training to take on higher order duties (UKDH, 2005). The new associate practitioner grade in biomedical science, describes an individual who “performs a wider range of clinical, scientific or technical procedures (that may have previously been performed by regulated practitioners) but usually under the direction of an appropriately regulated practitioner” (UKDH, 2005).

To address the national retention and recruitment problems of Consultant Histopathologists, a number of case studies within the NHS are available, which demonstrate pathology service improvements (UKDH, 2005b). Implemented improvements include the use of Biomedical Scientists to carry out specimen dissection and reporting of histological tissue. The measurable outcomes of these improvements include, relieving some of the work burden from Consultants and therefore freeing up time to focus on more complex work; and offering Biomedical Scientists career progression within the specialty (UKDH, 2005b).

Another position unique to the UK pathology workforce is the Clinical Scientist, who’s advanced education and training enables the individual to provide direction, interpretation, and advanced scientific expertise. Clinical Scientists usually have membership to the Royal College of Pathologists (In Australian only medical practitioners (pathologists) are granted this membership) and are a registered profession (UKDH, 2006).

In recognition of the projected shortages, task expansion and role substitution may present as a sustainable solution to the pathology workforce. Re-profiling of the current pathology workforce will require a review of workforce requirements, and where skill mix and new ways of working can be introduced (UKDH, 2004).

Skill-Mix in PathWest

In addressing the possibility of role redesign, the 'Specimen Pathway' (Table 43), demonstrates many points along the pathway where traditional lines do blur. The most evident is the role of Phlebotomist and Laboratory Assistant, as previously mentioned. PathWest appears to employ more Technical Assistants over Laboratory Technicians. This may be an appropriate delineation of roles and matched by the observed employment levels. It may also be a reflection of inappropriate or inconsistent labelling of job titles, or substitution of Technical Assistants for substitute Laboratory Technicians. Until there is a thorough validation of tasks, roles job titles and pay levels, this will remain unclear.

Up-skilling of Laboratory Assistants to cover more of the tasks currently undertaken by Laboratory Technicians could provide an expanded pool of staff to take on more complex roles. For example the graduate certificate in Surgical Pathology Preparation, is a professional development program offered by the University of South Australia, and is designed for Technicians and Scientists working in Histopathology laboratories. This course provides advanced training in the dissection, sampling and preparation of tissues for histopathological examination and diagnosis (University of South Australia, 2007). With this advanced training Technicians could assist in specimen dissection and reporting of histological tissue, there are already examples where staff members at PathWest have done so.

Medical Scientist – Pathologist Interface

Like the Biomedical Scientists and Clinical Scientists in the UK, Medical Scientists within PathWest, through extended training, could practise higher order duties in terms of validation and interpretation of results. Having these skilled individuals in the organisation would provide an initial solution to the projected consultant pathologists shortage.

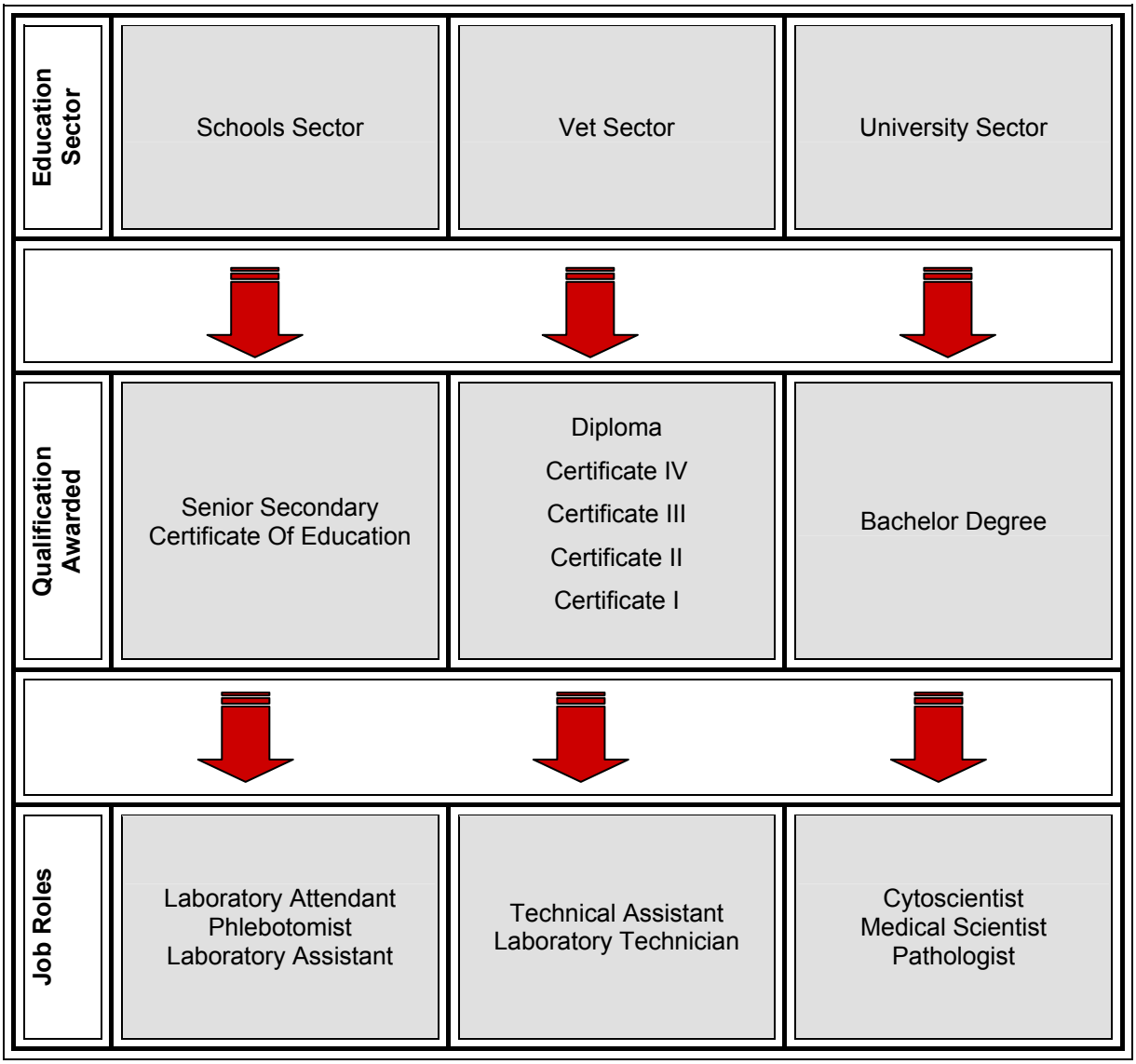
Overview of Existing Career Pathways for PathWest

Education Qualifications of Current Laboratory Personnel

There are a number of educational pathways that gain entry into PathWest Laboratory Medicine, and lead to the attainment of key laboratory positions. Following the Australian Qualifications Framework and the corresponding qualifications that each educational sector is legislated to award, Figure 11 demonstrates the relating positions held within PathWest[22] (AQFAB, 2007).

[22] There are many instances where movement from one education sector to another enables the award of higher qualifications and the attainment of higher job roles in PathWest. Figure 11 represents the highest qualification generally required to be employed in these PathWest positions.

Figure 11: Educational Qualifications of Key Personnel



In general, the minimum educational requirements of Laboratory Attendants, Phlebotomists and Laboratory Assistants include the attainment of a Certificate of Secondary Education with additional training in phlebotomy procedures (in the case of Phlebotomists) where tuition may be internal or external. There is some variation with regard to minimum education qualification requirements for Technical Assistants within PathWest with higher level Certificates (IV and III) or VET Diploma being accepted. Laboratory Technicians are generally required to hold a VET Diploma qualification. CytoScientists, Medical Scientists, and Pathologists are required to hold Bachelor degrees and higher qualifications.

Entry Points and Learning Options for PathWest Medical Scientists

There are various entry routes into the Medical Scientist profession (See Figure 12). In Australia, on completion of the Senior Secondary Certificate of Education, a prospective Medical Scientist may obtain a Diploma qualification

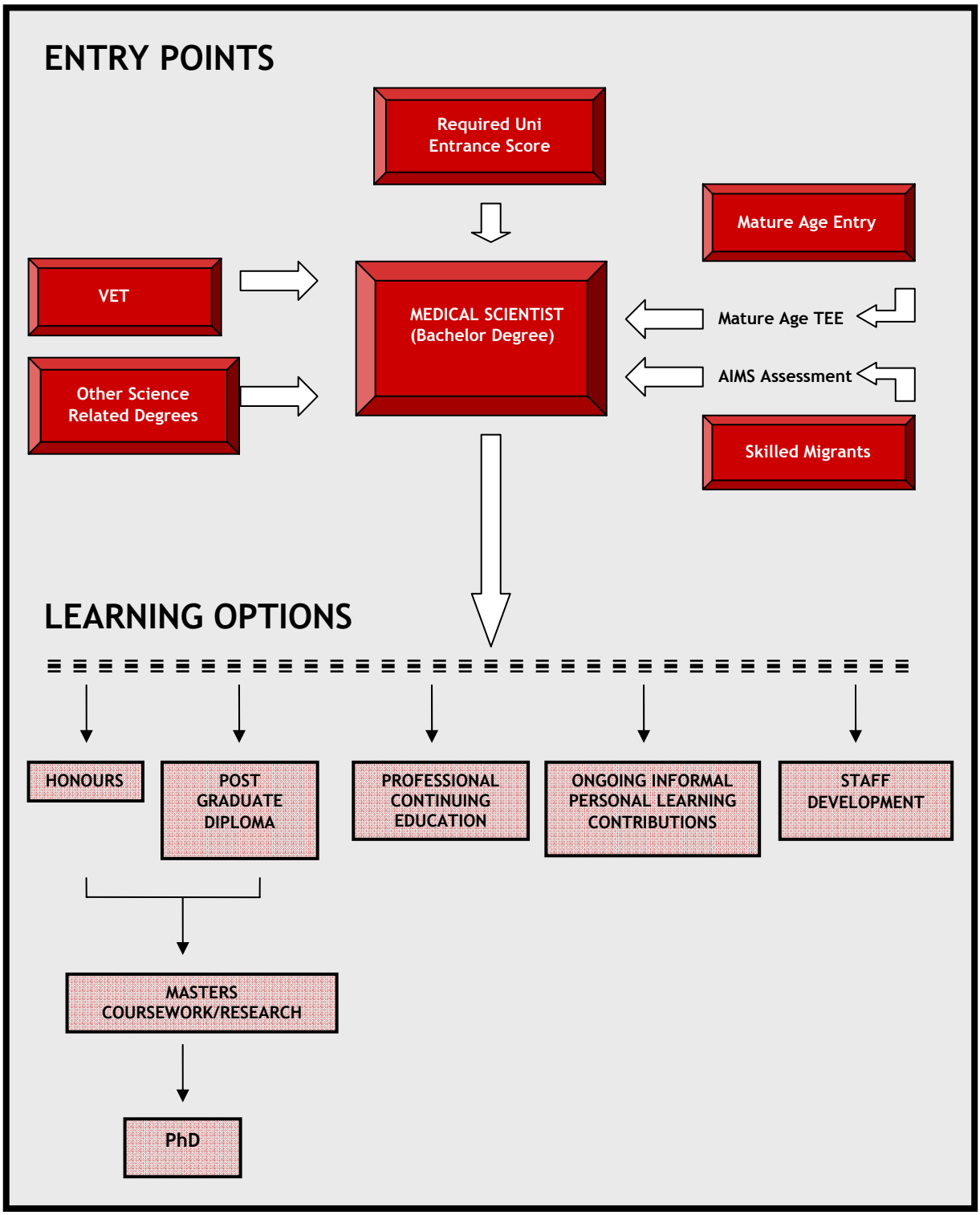
at TAFE, with progression into university to complete a Bachelor degree qualification. With the appropriate university entrance score a secondary school student wanting to become a Medical Scientist is eligible to gain entrance into a Bachelor of Science (BSc) in Medical Science (and the various equivalent degrees) through the satisfactory completion of the Tertiary Entrance Examination (TEE) (Curtin University of Technology, 2007). Alternative science degrees to the BSc in Medical Science provided by Curtin University have also provided an entry point for medical science. Given projected shortages and existing staffing difficulties, students with non-Curtin University degrees are an important source for the PathWest medical science workforce.

For mature-age university entry, an applicant must undertake the *Mature-Age TEE*, involving the undertaking of two TEE subjects in addition to sitting the Special Tertiary Admission Test (STAT) (TISC, 2007). Skilled migrant's that want to pursue employment as a Medical Scientist, are required to pass an AIMS assessment. An applicant's English competency is assessed, and if an acceptable science degree is held with two years post graduate experience, are eligible to sit the AIMS Professional Examination. On successful completion of this written examination, applicants are classified as Medical Scientists and eligible to work in Australia (AIMS, 2007a).
The post-graduate learning options for Medical Scientists include formal and informal learning activities (Figure 12) and include:

- *Higher Education Qualifications:* obtained at the university level and may include: Honours; Post-Graduate Diploma; Masters; and PhD (AQFAB, 2007).
- *Professional Continuing Education (PCE):* generally includes the learning activities provided by the medical science related professional bodies (AIMS, AACB, AMS etc) such as fellowships, conferences, dry and wet workshops, seminars, presentations, publications (AIMS, 2007a).
- *Ongoing Informal Learning:* personal learning and knowledge acquisition through literature research of journals and science publications, attendance to on-site educational sessions and presentations.
- *Staff Development:* varied ongoing education programs provided on-site by each Area Health Service, providing the opportunity for staff to acquire the knowledge and skills to effectively perform their role.
- Programs may vary from computer applications to management to dealing with aggressive behaviour (WA Health, 2007k).

To encourage employees to continue learning, PathWest has recently initiated a Staff Development Fund, whereby eligible staff may be given financial support for professional development activities (WADH 2007l).

Figure 12: Entry Points and Learning Options for Medical Scientists



Career Progression for Medical Scientists

Under the Health Professions Work Value Review and revised classification structure, Medical Scientists, once qualified commence their career path at the 4/6 level whereby the minimum essential academic requirement is a tertiary degree. There are approximately 7 levels (Level 4/6, 7, 8, 9, 10, 11, 12) with various increments demonstrating increasing responsibility, based on decision making, communication, knowledge and skill proficiency, leadership and professional role (WADH, 2006c).

Commencing at the base level, Level 4/6 is the entry level following tertiary graduation. Within this level there are 6 increments, at entry point a new graduate will require professional supervision and guidance from senior health professionals. By design, the level of supervision decreases as employees develop their professional judgement through 'on the job' experience. At the maximum increment within the 4/6 level, a Medical Scientist will be an autonomous practitioner (WADH 2006c).

The intermediate levels include Level 7 and Level 8. Level 7 is the first senior position attainable, to which an employee can progress or be promoted to. Progression involves reclassification justification through practice of the described higher order duties, while promotional attainment is granted through a successful application and selection process. A senior Medical Scientist is expected to independently deliver professional services, seeking direction when required. In the Level 8 position, the delivery of specialised professional services and the coordination of service delivery is a requirement of the incumbent (WADH 2006c).

The higher level positions, Level 9, 10, 11, 12, involve managing and directing the delivery of complex professional services. Progressing through the upper echelons, the responsibility of implementing education and research programs, ensuring staff and services meet required standards, and accountability for service delivery become key operational descriptors. At the sixth promotional point, Level 12, the management and responsibility of professional service delivery and the resulting outcomes is overseen on a state-wide basis (WADH 2006c).

There is some variation in PathWest in relation to positions held and the assigned levels, as demonstrated in (See WADH 2006c).

Table 45: PathWest Positions Relating to Classification Levels

Position	Level
Medical Scientist	
Entry Graduate (Supervision required)	4/6.1 to 4/6.5
Autonomous Practitioner	4/6.6
Senior Medical Scientist / Senior Medical Scientists in Charge	7.1 to 8.2
Principal Scientist	9.1 to 12.3

In particular, variation across sites within PathWest is evident with the Senior Medical Scientist position and Senior Scientist in charge position. Either position can be found to be Level 7 or Level 8. In addition, there is also a great deal of variation with the Principal Scientist levels which range from Level 9 to Level 12. This variation in levels has a historical element whereby incumbents having already been appointed to that level prior to the existing organisation structure and review of industrial classifications. Also the number of FTEs under direct supervision of the Principal Scientist has also influenced classification levels. The size of each PathWest site and corresponding FTE requirements have contributed to such variations where inequitable differences are noted particularly with Principal Scientists performing similar roles but are being paid at different levels.

With the acquisition or progression to a post- graduate qualification, continuous experience, and movement through the levels, Medical Scientists are able to progress along this classification structure.

Barriers within PathWest Career Pathways

There are a number of barriers that can limit the entry and movement along a medical scientists' career pathway. As a result of the Health Professionals Work Value Review, and in addition the restructure of pathology services within WA Health, a new generic JDF (Job Description Form) for all Level 4/6 positions within PathWest was generated. It was noted that JDFs across sites were inconsistent therefore changes were made in order to achieve some form of consensus and to update job descriptions to reflect the agreed Specified Callings position requirements and Work Value changes (WADH, 2006c).

Prior to the modifications to the Level 4/6 JDF, the essential selection criteria stated that a "Bachelor of Applied Science in Medical Science or equivalent" was required. Following the changes the essential criteria now states "Tertiary qualifications in Medical Science" as a requirement where "applicants must provide evidence that they have a three or four year accredited tertiary degree in Medical Science". Here lies a point of ambiguity and a possible barrier, as by deleting the "or equivalent" does this now restrict students who have studied alternative science degrees to the BSc(Medical Science) provided by Curtin University, to apply for PathWest jobs as they now do not meet essential criteria? And what importance does an "accredited tertiary degree in Medical Science" really hold? Whilst AIMS (Australian Institute of Medical Scientists) accredits selected medical laboratory science programs (previously listed) it is not a requirement to be a member of AIMS to practice as a Medical Scientist, in addition professional registration is not a statutory requirement. Perhaps this will strengthen the case that registration for Medical Scientists should be pursued, whereby codes of practice, career structure, and education requirements would have to be clearly stated.

Subject to interpretation of the recent changes to entry level JDFs and associated selection criteria, a significant proportion of the potential medical science workforce could be ruled out when applying for PathWest jobs. Limiting the supply of Medical Scientists would essentially intensify the anticipated workforce shortage.

Within the disciplines of pathology, the specialty of Clinical Haematology is only offered through the Curtin University degree (BSc Medical Science). This limits the source of graduates as only those students completing this degree and specialising in Haematology as one of their three major disciplines will be considered for employment within PathWest Haematology Departments. Although traditionally considered a popular specialty choice amongst graduates, if popularity altered with a shift to say forensics, a possible trend as seen with the extent of television programs portraying Forensic Scientists, this could potentially create a shortage making it difficult to fill Haematology positions.

Although there are many learning options provided for PathWest employees, and the financial assistance to engage in continuous learning is available, there does not appear to be any reward system in place to remunerate those employees that have partaken in such activities. This may have an effect on incentive, shifting the onus from professional to personal, whereby necessity to advance may be considered with a more relaxed attitude. The lack of reward for continuous learning together with the lengthy progression to senior roles, highlight further barriers in a Medical Scientists' career pathway that may provoke elevated attrition rates.

Progression Pathways in other Jurisdictions

For a number of workplace settings, alternative models to prepare, up skill and motivate employees have been introduced. Generally termed "skills escalators" these career frameworks enable employees to increase skills and knowledge base in order to with a focus to satisfy workforce, operational and individual needs. In 2005 the UK NHS launched *The Career Framework*, a strategic skills escalator that enables staff to develop skills and competences through learning activities, whereby career progression can occur through and within each level (Skills for Health, 2005).

In a similar approach ACT Health conceived *The Health Professional Personal Up-grade for Recognition of Excellence*. This scheme recognises professional excellence streaming into management, professional or educator pathways, and was implemented to assist in retention of experienced Health Professionals and to encourage employees to update skills and knowledge in areas of organisational need. Reward is a financial incentive with progression through various pay points (ACTDH 2007).

An allowance payable for reward recognition of the undertaking of higher degrees is another strategy to motivate learning and leadership, which can have implications on staff retention. Hospital scientists, employed in the NSW Department of Health, who hold a degree of Master of Science or a Fellow of AIMS, or equivalent, and are employed on a full time basis, is one such example (NSWDH 2005).

Various reward and recognition models can be used to motivate, re-train and up skill the workforce. These may serve as potential strategies that could be adopted by PathWest to retain experienced staff, motivate new graduates, up skill existing staff, and introduce a diverse range of potential learners into the system.

Interdependence Between Job-Redesign, Role Delineation and Career Pathways

Job-redesign and role delineation are two strategies widely touted as a solution to skill shortages. They can be summarised as 'how the job is done' (job-redesign) and 'who does what' (role delineation). Although these are conceptually different, they can be interdependent. Changing the way we undertake a collection of tasks to deliver the final output can open up opportunities to change the role delineation.

Change of any sort is not a straight forward matter as it involves personal and organisational re-learning and is often met by resistance, since people have a vested interest in the status quo being maintained. Changing role delineations and job tasks (and concomitant competencies) is also complicated by the relationship with work value and career structures.

Job-Redesign and Role Delineation

The models of change applied in job redesign role delineation include:

- Development of new roles, whereby selected tasks are taken from the range of tasks normally performed by a variety of traditional roles to create a new role.
- Role extension within a profession. This represents the vertical movement within a profession, whereby individuals take on tasks not traditionally associated with their roles.
- Role extension across professions. This represents horizontal movement across professions, whereby individuals extend their breadth of skills across traditional roles.
- Existing roles in new settings, whereby individuals within a traditional role with a set of skills can be utilised in a new working environment (Department of Health UK, 2004a).

Role delineation outlines the responsibilities required of a professional and defines the competencies and didactic knowledge needed to carry out these responsibilities (Balasa, 2007). The very nature of job-redesign using the various models of change will unquestionably alter the role delineations already in place within PathWest.

The process of change to role delineations should include the following considerations:

- Tasks involved in the new/amended role.
- Training and educational needs of the new/amended role.
- Protocols and guidelines which set boundaries for the new/amended role.
- Does the new/amended role involve activities, which are regulated?
- Is the new/amended role sustainable? (Department of Health UK, 2004a).

The interdependence between job-redesign, role delineation and career pathways can be best described as a chain reaction where initiating job-redesign, alters role demarcations, and these then must be substantiated with relevant education/training pathways. These incremental changes pioneer the career pathway, offering a modernised approach to workforce management.

Automation

Technological advances in laboratory medicine are having an impact on both the skill sets required and the amount of labour input required. An example from PathWest involves automation of Enzyme Linked Immunosorbent Assays (ELISA). There are a range of specific dexterous tasks that need to be performed to complete an ELISA assay manually which can be easily replaced by a robotic automated system, improving staff utilisation (See Figure 13).

Figure 13: Impact of Automation on Operator Involvement in ELISA Assay

	ELISA Processing Steps	Manual Time	Contact Pre-Implementation	Contact Post Implementation
1	Prepare Primary Tubes/ELISA Kit/Instrument	30 mins	Operator Involvement	**Operator Involvement**
2	Prepare Worksheet Template	10 mins		Fully Automated
3	Dilute Samples	10 mins		
4	Add Samples to ELISA plate	10 mins		
5	Incubation Step	30 mins	NA	
6	Wash Plate	10 mins	Instrument driven with **operator involvement**	
7	Add Conjugate	5 mins	**Operator Involvement**	
8	Incubate	30 mins	NA	
9	Wash Plate	10 mins	Instrument driven with **operator involvement**	
10	Add Substrate	5 mins	**Operator Involvement**	
11	Incubate	10 mins	NA	
12	Add Stop Solution	5 mins	**Operator Involvement**	
13	Spectro Read of Plate	2 mins	Instrument driven with **operator involvement**	
14	Print Results	2 mins	Instrument driven with **operator involvement**	
15	Enter Results in Database	30 mins	**Operator Involvement**	**Operator Involvement**[23]

[23] Instruments directly interfaced with the ULTRA database do not require operator involvement for result entry

Tasks involved in this specific assay can be broken down to demonstrate the contact hours assigned in the manual process compared with an automated process. In total, operator involvement in the manual process requires approximately 3 hours and 19 minutes whereas the automated process utilises one hour of the operators time. Equally important, this demonstrates how the scope of work has been altered where highly developed pipetting skills and time management skills previously utilised in the manual process are used to a lesser degree in the automated process.

The Blur in Traditional Career Structures

The current career structures within PathWest are orientated around established skill sets, competencies, and work value. As a result of the interdependence between job redesign and role delineation, crossing of traditional professional boundaries appears inevitable in order to sustain the medical laboratory workforce. In recognising that working beyond the scope of practice will present greater responsibilities, accountability and competencies required, appropriate risk assessments, safety and quality considerations will need to be reviewed within PathWest.

The benefits of extended test requesting authority may become apparent with the implementation of Point of Care Testing (POCT) in PathWest, where diagnostic testing could be performed outside the laboratory i.e. ward, theatre, hospital in the home. This could be applied to routine diagnostics such as the monitoring of patients on anticoagulation therapy where patients require regular and timely results. In the UK, Biomedical Scientists provide anticoagulant therapy management services including: INR (International Normalised Ratio) generation; and recommendations to patients for daily dosage of oral anticoagulant (IBMS, 2003a).

In general to claim rebates in Australia under the Medical Benefits Schedule, services must be rendered by or “on behalf of” medical practitioners. The latter refers to where a service is performed by a technician who is acting under the supervision of the medical practitioner (Australian Government, Dept of Health and Aging, 2007). As is the case with a majority of the pathology tests performed in a laboratory, requested tests are performed by a medical scientist or/laboratory technician or/technical assistant, not in the presence of a medical practitioner and if within normal range, not validated or reported by the medical practitioner (Duckett, 2005). This is typical of tests performed on Biochemistry and Haematology analysers, having results within the reference ranges, which are interfaced to ULTRA and dispatched to iCM (Information Clinical Manager).

Increasing the range of items that do not require “personal provision” by the Medical Practitioner to obtain a rebate on the Medical Benefits Schedule, could be instrumental in the support for Medical Scientists performing tasks that could potentially cross the Medical Scientist – Pathologist professional boundary.

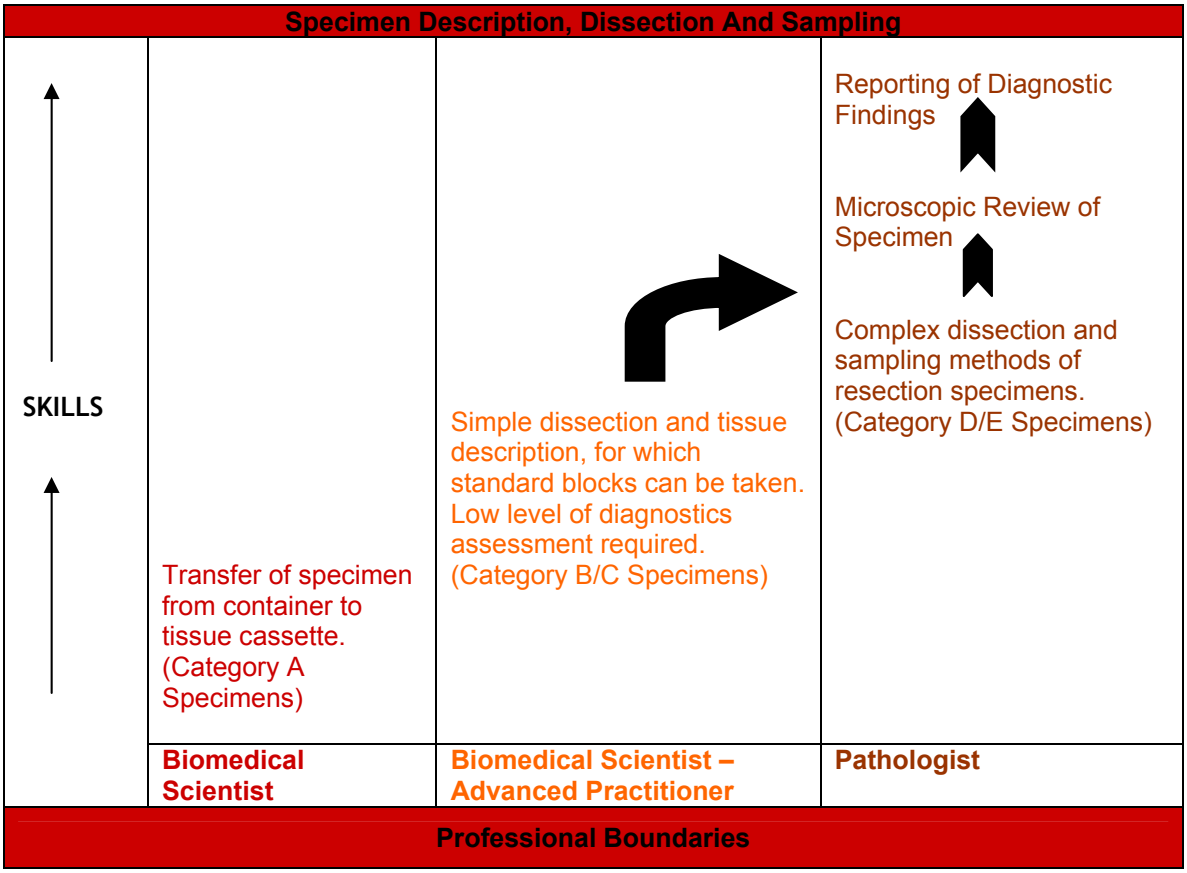
There are several Pathology Improvement Case Studies across England that demonstrate permeation across Biomedical Scientist and Pathologist

delineations, particularly in the area of Histopathology. To address the national retention and recruitment problems of Consultant Histopathologists and Biomedical Scientists in Histopathology, the development of Advanced Practitioner roles were piloted, in an attempt to handle the laboratory work load and to provide career progression for Biomedical Scientists (Department of Health UK, 2006b). An investigation throughout various Trust sites between 2002 and 2003 was carried out to determine the possibility of Biomedical Scientists, already experienced in dissecting specimens, to develop enhanced dissection skills to include more complex specimens (Horton, 2004).

Collaborative stakeholder involvement facilitated the implementation of the extended role of Biomedical Scientists in specimen description, dissection and sampling (Horton, 2004). A Joint Royal College of Pathologists and Institute of Biomedical Science Working Group was established and developed the *Principles of Good Practice for Biomedical Scientist Involvement in Histopathological Dissection* (IBMS, 2003b). Through the process of job redesign and further training, tasks can be re-assigned, crossing traditional professional boundaries, to maximise the use of limited resources. From the pilot studies between 2002 and 2003, there was no evidence that delegation of these tasks demonstrated reduced standard of practice, or detriment to histological reporting and timeliness of reports. Surveys conducted by the pilot sites had not shown any detrimental effect on training of junior Histopathologists (Horton, 2004).

The guidelines for Biomedical Scientist involvement in specimen dissection categorises specimens into five categories, from which each specimen request that arrives in the laboratory is to be categorised by the on duty Histopathologist (IBMS, 2003b). Proceeding the grouping of these specimens it can then be decided ‘who does what’, as can be seen in Figure 14.

Figure 14: Task Re-Assignment Through the Development of Dissection Skills



The broad definitions used to categorise specimens according to complexity include:

Table 46: Specimen Categories by Complexity

Category	Definition
A	Transfer from container to cassette.
B	Transfer with standard sampling, counting, weighing, and slicing.
C	Simple dissection with sampling needing a low level of diagnostic assessment/preparation
D	Dissection and sampling needing moderate level of assessment.
E	Complex dissection and sampling methods.

The decision to what extent Biomedical Scientists-Advanced Practitioners dissect and sample specimens is locally driven and is a decision to be made by the Consultant Pathologist and Biomedical Scientist. It has been proposed that the extended role of Biomedical Scientists should be incorporated into the code of practice of The Royal College of Pathologists (Horton, 2004).

The *Delegation of Controlled Acts Policy* for The College of Physicians and Surgeons of Ontario stipulates that under Ontario law, certain acts can only be

performed by certain health care facilities. However there exists a clause whereby “under appropriate circumstances, these acts may be delegated to others”. The power of delegation is particularly fitting in the current climate where healthcare is delivered by multidisciplinary teams, and when used appropriately can result in health care that is more timely, of higher quality, and makes better use of health care resources and personnel (CPSO, 2004).

Re-profiling the laboratory workforce, through the above mentioned strategies to better match the available manpower and pathology service outputs required, is a feasible solution to sustaining capacity in public pathology services. While the work undertaken in the PathWest study focussed more on Technicians and Medical Scientists, the pending shortage of Pathologists will compel pathology services across Australia, including PathWest, to identify specific areas where similar initiatives can be pursued.

Career Pathways

Altering the tasks performed and responsibility of who performs those tasks will have an impact on training needs and skills required. Educational frameworks will need to be established to up-skill or retrain staff. Flexible education arrangements may include:

- Increased graduate entry programs for health professionals.
- Development of shortened courses for professionals to acquire key skills beyond their traditional scope.
- Provision of multiple pathways for developing health professionals.
- Skill upgrades to involve universities and health agencies (Duckett, 2005).

Job redesign will transform traditional professional boundaries, promoting new opportunities along the professional continuum. With this, an employee can proactively engineer a career pathway tailored to their ability, training and ambition. One avenue that could be explored is the explicit tailoring of postgraduate studies in medical science to enable extended scope of practice into areas traditionally held by pathologists. At the middle of the skill/qualification spectrum, professional development or registered training packages could form the basis of moving staff into the void left by a shortage of medical scientists. In both instances, ensuring existing employees work wherever feasible to the full extent of their training and that no artificial and inappropriate demarcations exist should come first.

Appendix C:

Summary of Selected Issues Identified from Workshops

Batch Samples

- Capacity of instruments
- Labelling errors
- Transfers between sites
- Transfers within sites
- Poor communication with sites/clients
- Lack of standardised coding across PathWest.

IT and Equipment

- Equipment breaking down or needing re-calibration
- Delays in getting equipment serviced
- Poor integration of IT and equipment
- Lack of staff access to computers
- Old (slow) and poorly equipped computers (e.g. no USB, cannot run required software)
- Lack of suitable equipment for testing procedures (and volumes) required.

ULTRA

- Ultra interfacing with other systems
- Lack of IT staff to service faults and other issues with Ultra
- Time taken switching between Ultra & TOPAS to complete registrations
- Ultra's capacity to handle batch or repeat samples (dilutions) from a single patient
- Entering narratives on results & reports into ULTRA
- Availability of Ultra (not on all computers, or insufficient computers/number & quality)
- Lack of external access (e.g. Doctors unable to access results directly).

Many LEAN studies (studies that examine workflow and process to alleviate blockages and improve efficiency) have repeatedly shown that workplace organisation can have a huge impact on throughput, especially in sample reception. Through the workshops staff were asked to consider the layout of their labs and general organisation of them, including the relationship with other labs and shared facilities. For example, whether there are large walking distances to shared equipment. Other issues relate to poor storage, clutter and safety.

Workplace

- Location of equipment for specific tests in other areas of lab or building
- Constantly walking around objects (e.g. fridges, photocopiers, materials, samples)
- Size of lab too small for type/volume of tests
- Lack of storage space
- Inappropriate location of storage of samples.

Communication issues were a common theme in the workshops. Often they related to governance, such as poor labelling and identification resulting in call backs and delayed tests.

- Incomplete or poor labelling of samples
- Tests incorrectly (or not) specified
- Procedures not followed
- Incorrect sampling
- Lack of information from external clients or other PathWest labs
- Poor feedback form other service providers (e.g. tests referred to other specialist labs).

Appendix D

To enable an analysis of the PathWest workforce supply and demand characteristics it has been necessary to adapt administrative data. One of the key issues is how to deal with multiple employment records. Of primary interest is whether there will be sufficient people to supply the labour that is required by PathWest. To inform discussions and strategies for recruitment from universities, TAFE and other sources, PathWest's needs must be specified in terms of 'people' (i.e. Head Count).

The approach taken for the analysis presented in this paper aggregated hours worked across all jobs over a financial year and attribute them to the job (account code) where most hours were worked for the year.[24] This approach means that we are capturing the total 'service' hours required to deliver PathWest outputs for a whole year and avoid the issue of seasonal fluctuation. Of interest is whether the method of aggregating hours into one account code significantly affects the data being reported. Table 47 shows the impact on FTE by account code.

Table 47: Impact of Aggregation on Productive FTE by Account Code

		Productive FTE		
Account	**Description**	**Aggregated**	**Not aggregated**	**% FTE**
111	Nursing Services	1.0	1.0	100
121	Admin & Clerical	182.7	183.0	99.8
122	Admin Support	0.5	0.5	100.0
133	Pathology	442.0	441.8	100.0
139	Other Medical Support Services	2.1	2.2	96.4
143	Pharmacy	0.1	0.1	100.0
146	Technical	427.2	427.0	100.0
149	Other Ancillary Services	2.3	2.3	100.0
151	Catering	0.8	0.8	102.2
152	Cleaning Services	11.2	11.2	99.5
153	Orderlies/Transport	7.0	7.0	100.0
154	Patient Support Assistants	0.3	0.2	119.5
156	Stores/Supply	0.2	0.2	101.3
161	Engineering Maintenance Services	0.0	0.0	100.0
181	Medical Officers	26.4	26.1	101.3
182	Medical Practitioners	7.5	7.5	100.0
185	Pathology	38.3	38.6	99.2
189	Other Medical Salaried	0.0	0.0	100.0
191	Clinical (Sessional)	0.5	0.6	86.5
194	Pathology (Sessional)	6.6	6.5	101.0
TOTAL		**1,156.8**	**1,156.8**	**100%**

[24] The hours of interest in this instance are ordinary hours ('base' hours) and overtime hours.

The following exit rates were used as a basis for projection.

Table 48: Exit Rates by Age Group, Gender and Occupational Grouping

Specialty	Gender	Age Group	Base
Technicians & Assistants	Female	< 25	16.7%
Technicians & Assistants	Female	25 to 34	14.4%
Technicians & Assistants	Female	35 to 44	13.0%
Technicians & Assistants	Female	45 to 54	8.7%
Technicians & Assistants	Female	55 to 64	10.0%
Technicians & Assistants	Female	65 +	13.7%
Technicians & Assistants	Male	< 25	26.3%
Technicians & Assistants	Male	25 to 34	19.5%
Technicians & Assistants	Male	35 to 44	12.1%
Technicians & Assistants	Male	45 to 54	8.3%
Technicians & Assistants	Male	55 to 64	21.4%
Technicians & Assistants	Male	65 +	10.0%
Medical Scientists	Female	< 25	16.7%
Medical Scientists	Female	25 to 34	14.4%
Medical Scientists	Female	35 to 44	13.0%
Medical Scientists	Female	45 to 54	8.7%
Medical Scientists	Female	55 to 64	10.0%
Medical Scientists	Female	65 +	13.7%
Medical Scientists	Male	< 25	26.3%
Medical Scientists	Male	25 to 34	19.5%
Medical Scientists	Male	35 to 44	12.1%
Medical Scientists	Male	45 to 54	8.3%
Medical Scientists	Male	55 to 64	21.4%
Medical Scientists	Male	65 +	10.0%
Medical	Female	< 25	22.3%
Medical	Female	25 to 34	35.7%
Medical	Female	35 to 44	40.5%
Medical	Female	45 to 54	22.7%
Medical	Female	55 to 64	35.7%
Medical	Female	65 +	42.9%
Medical	Male	< 25	33.3%
Medical	Male	25 to 34	35.0%
Medical	Male	35 to 44	21.7%
Medical	Male	45 to 54	13.8%
Medical	Male	55 to 64	26.3%
Medical	Male	65 +	20.0%