The clinical scientist in diagnostic pathology

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Introduction
Under the auspices of the District Health Boards Executive, New Zealand (DHBNZ) a working party has been considering the concept and practicalities of creating a new occupational group in diagnostic pathology – the clinical scientist. Although this occupational group has existed in the UK for some time it is a new occupational group for New Zealand and Australia. In the UK, Ireland and USA there has been an increasing need to review and redefine professional roles throughout health care, which occurred especially in the UK when there were major reviews of occupational groups in the National Health Service (NHS) in 2000 and 2001.

A significant development of the reviews were the establishment of non-medical practitioners in particular, nurse practitioners who carry out many procedures formally undertaken by medical practitioners and the creation of a single group of healthcare scientists to cover the 35 occupational groups employing approximately 40,000 people in the NHS. In addition to the NHS review, the Royal Colleges of Anaesthetics, Medicine, Pathology, Radiology and Surgery conducted their own reviews to investigate the role of non-medical practitioners in extended care areas, which would normally be the domain of a medical practitioner.

The outcome of the various reviews was the development of the National Practitioners Programme which would provide guidance to the NHS on: implementation of a flexible career and skills escalator concept and enable individuals with transferable, competence based skills to progress in a direction which meets workforce, service and individual needs. This has led to the development of practitioner programmes for surgical care, peri-operative specialist, anaesthesia, medical care, emergency care, critical care, endoscopy and assistant practitioners in mental health, maternity services and operating theatres. Associated with these developments has been very close liaison with healthcare professional bodies such as pharmacy, physiotherapy, nursing and medical laboratory scientists (biomedical scientists in the UK). In addition the reports by Lord Carter of Coles (2006, 2008) clearly identified that there should be a clear career structure for all healthcare scientists.

The UK clinical scientist
In the UK there are two branches of pathology laboratory orientated sciences in the health service, clinical science and biomedical science. Both titles are protected under law and are required to be registered with the Health Professional Council (HPC). Clinical scientists come under the auspices of the Association of Clinical Scientists and the biomedical scientists under the Institute of Biomedical Scientists, both of which have undergraduate degree entry requirements and post-graduate training. The biomedical scientist is the equivalent of the New Zealand medical laboratory scientist. For the UK clinical scientist minimum entry in to the occupational group is a good first or second-class honours degree in an appropriate subject followed by an extensive four year training scheme in a specific discipline, which leads to certification and state registration. Currently the recognised disciplines of clinical science are: audiology, clinical biochemistry, clinical embryology, clinical genetics, clinical immunology, clinical microbiology, haematology, histocompatibility and immunogenetics, molecular genetics, toxicology, transfusion medicine and virology. Currently approximately 25% of the Royal College membership is non-medical clinical scientists working across a wide range of pathology specialties. The Royal College of Pathologists recognises that attainment of consultant status will be medical consultant equivalents and this status is similarly recognized by the Clinical Pathology Accreditation (UK) Ltd in its standards for laboratory accreditation which states: “Each discipline shall be professionally directed by a consultant pathologist or a clinical scientist of equivalent status”.

The role of the Institute of Biomedical Science (IBMS)
This is the UK equivalent of the NZIMLS and has over a period of many years established its own post-graduate examination systems. Typically, entry level as a biomedical scientist is with a degree in biomedical science, which has been taken at an IBMS accredited...
university. Fellowship is a requirement for advancement to senior positions and is by examination with a Specialist Diploma, which is equated with an MSc by many UK universities. Scientists can advance further by gaining specialist qualifications as Extended or Expert Practice, which allows them to proceed to Advanced Specialist Diploma in a specific area of diagnostic pathology. The specialist qualifications identify specific levels of expertise; Expert Practice is the consolidation of high levels of skill and scientific or technical expertise. Extended Practice reflects a move from core disciplines in to new areas or areas traditionally associated with another profession and Advanced Practice is taking roles and responsibilities at the highest level of clinical practice or consultation. This structure has been recognised by the Royal College of Pathologists as a suitable entry route for training as consultant clinical scientists in pathology. Funding is available for the training programmes.

What is happening in New Zealand?
In 2006 the District Health Board New Zealand (DHBNZ) established a Medical Laboratory Think Tank to investigate role extension for medical laboratory scientists in the New Zealand health workforce planning. The membership comprised of representatives from DHBNZ, NZIMLS, Medical Laboratory Science Board, pathology laboratories, Royal College of Pathologists of Australasia (RPCA), (NZ Branch), and AUT, Massey and Otago Universities (BMLSc programmes). The group was working on identifiable workforce shortfalls for both pathologists and medical laboratory scientists and to consider the development of extended roles for medical laboratory scientists as clinical scientists. It was considered that this change would improve health delivery, improve career progression and recognition what was already happening in some New Zealand laboratories, especially those with no pathologist or a visiting pathologist.

Information provided both by the NZIMLS and the RPCA indicated that there is a decreasing pathology workforce due primarily to recruitment at one end and an aging workforce at the other. In addition specific shortages for pathologists were recognised both in specific disciplines and potentially new or developing areas of diagnostic pathology. In considering possible options the concept of the clinical scientist emerged as the most suitable model to investigate based on the experiences of the UK. The RPCA was approached and indicated in 2009 that it was “willing to explore how best to implement a system of training in conjunction with the Think Tank”. Subsequently the RPCA informed the DHBNZ Working Party that it was forming a Faculty of Science within the RPCA and a working group was being established. In response, the Think Tank group nominated Chris Kendrick (Massey University and MLSB member) and Mike Legge (University of Otago) to represent the group in any direct negotiations with the RPCA. We undertook to prepare a proposal for a Clinical Scientist qualification system for New Zealand, which was approved by the Think Tank members and submitted to the RPCA, a response is awaited.

Summary of clinical scientist training in New Zealand
The proposal was to develop a two-stage qualification process based on the BMLSc, which was considered to provide a good background to diagnostic pathology and already had a registration requirement. Part A (first part of the training) would be an approved MSc programme of advanced study in one of the clinical sciences in a diagnostic pathology laboratory under supervision which would include academic papers and a clinically orientated research project based on the speciality. Completion of Part A of the training would be expected to take three to four years. Non-vocationally trained postgraduates who are registered with the MLSB may also be eligible for training but may require additional clinical science papers for eligibility. The second part of training (Part B) would be advanced study (following completion of Part A) in one of the clinical science disciplines under supervision similar to that by the RPCA specialist pathologist training. In the final year the clinical scientist trainees would prepare to sit the RPCA examinations for clinical scientists.

Considerations in establishing the clinical scientist in New Zealand
Currently the proposal is with the RPCA and awaits further discussion on structure, their thoughts on a qualification proposal and time frame for implementation. However, the Think Tank has also considered implementation issues. First, that the post-graduate courses must be university based to provide a recognisable qualification route, second that it is most likely that training could only be undertaken in the larger diagnostic pathology laboratories to provide the necessary clinical material, infrastructure and supervisory expertise, third that there would have to be specifically targeted funding to ensure that training time was appropriate (the Clinical Training Agency was considered a possible funding agency), who would the most appropriate registration agency be (in the UK clinical scientists are a separate registration group under the HPC) and recognition of stepping off points along the way for those acquiring higher level skills but not wishing to complete the full extended role. Individuals will be trained to a high skill level. In this scenario the IBMS (UK) model of qualifications of Extended and Expert Practice might be appropriate. Another consideration was whether using the Royal College of Pathologists (UK) qualification route should be adopted as it is possible to qualify overseas using their system but it was thought more appropriate to work with the RPCA.

The role of the pathologist and the clinical scientist
Evidence from the UK now clearly identifies that there are clear niches for both the medically qualified pathologist and the clinical scientist. The Royal College of Pathologists (UK) have shown that pathologists have more time for direct clinical consultation and greater involvement with their clinical colleagues as well as time for research for those who are research orientated and a general reduction in workload. Clinical scientists are less involved with direct patient care and treatment, and have a higher involvement with scientific matters, research and management. Both professional groups have approximately equal time for reporting, teaching, clinical liaison and CPD.

New and emerging areas in pathology
Although the traditional areas of pathology will still remain the mainstay of diagnosis and treatment, developments in both new technologies and medical biology will change approaches to identification of disease and disease management. Scientists are qualified in many of the rapidly emerging areas such as molecular genetics and molecular diagnostics, molecular microbiology, gene array technologies, medical bioinformatics, stem cell biology, systems biology, biochemical and immunogenetics, pharmacogenomics, etc. These and other areas of biology are making significant impacts on modern medicine and may ultimately replace some of the more traditional approaches in diagnostic medicine such as digital pathology and in-vitro imaging technologies. Many of the new and emerging technologies represent the pathology of the future with, for example, the opportunities to identify and classify a tumour based on its molecular signature and identify its response to treatment based on an individual’s genetic profile to the drugs to treat the tumour. These and related areas are where the medically qualified pathologist, the consultant clinical scientist and the clinician can work together for improved patient outcome.

Conclusion
Given the widespread international acknowledgement that there is a pending crisis in the training and supply of pathologists it is appropriate to consider alternative routes to bridge this problem. The increasing use of diagnostic pathology services and
the new diagnostic technologies will place extra demands on an already aging workforce in a profession, which is experiencing a significant crisis in recruitment. In the Northern Hemisphere measures are being taken to overcome the pathologist shortage with the training of non-medical graduates in specialist pathology disciplines, which has to be a serious consideration in both New Zealand and Australia. The changing nature and delivery of health care services will need a high quality workforce which can respond in a flexible manner to new ways of working and new roles, supported by appropriate training and education strengthened by appropriate continuing professional development. The concept of the consultant clinical scientist is now well established in the UK and has not created significant issues in either the skill base or the interface between medicine and patient care. For this to be successful in both New Zealand and Australia it will require acceptance and development of a recognizable career pathway, which would involve the RCPA, NZIMLS, AIMS, AACB, HGSA and other organizations representative for health care scientists. Suitably qualified medical laboratory scientists have the potential to fill many of the roles undertaken by pathologists with the clear exception of patient management and treatment. Nevertheless, the acceptance by the Royal College of Pathologists (UK) and the National Health Service (UK) that appropriately qualified non-medical scientists can achieve consultant status is the strongest indication yet that the system will work.

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Bibliography

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