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**WHAT ARE THE ISSUES BESETTING MEDICAL SCIENTISTS IN NEW  
ZEALAND: PRACTICAL CHANGE STEPS FOR MANAGEMENT, SCIENTISTS  
AND GOVERNMENT**

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**A Dissertation  
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**By**

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## EXECUTIVE SUMMARY

This qualitative study will analyse the views of two types of medical scientist working in one region of New Zealand. The first group, medical scientific officers (MSO) who are employed by hospital and university laboratories, do research on diseases to develop vaccines and medications. The second group, medical laboratory scientists (MLS), provides the test results essential for use by clinical medical staff in the detection, monitoring or prevention of disease. (There is some crossover of duties). The 35 scientists interviewed were told the emphasis was on issues which help or hinder their work and in particular matters of 'bureaucracy or paper work'. The aim was to find what scientists, management and government need to do to provide an effective environment toward meeting the New Zealand government's goal for growth in science and biotechnology as an export earner.

Overwhelmingly, the claim was made that scientists were beset with too much unnecessary management and government bureaucracy. Medical scientific officers (MSOs) believe hospital managers are cutting back on scientific officers and replacing them with lesser qualified medical laboratory scientists (MLSs) to the serious long term detriment of the nation. They regard science as a poor option for young people to enter, much better tenure is needed, as is more freedom to carry out productive research without people outside of their specialty telling them what they can or cannot do. A key finding is the strong need for more clinical direction. Ideas with potential are not acted on quickly enough because ideas are tied up inappropriately in intellectual property secrecy. Innovative MSOs and MLSs as well as medical doctors need more support from management and peers to develop new ideas.

Of great concern was the finding from nearly all MSOs and some MLSs, that there was deep mistrust of management. They wanted a more congenial management and thought there needed to be more management co-operation between universities and hospitals. E.g. have common administration and services. The good news is that there are some groups working well and these provide a successful model for others. Finally, as permission for this study was willingly given by laboratory and university management, this indicates a willingness from management to help scientists. However, as the theory will show, until the lack of trust is overcome, some management improvement programmes may fail.

**KEYWORDS**

Medical laboratory scientist, Medical scientific officer, Lincoln University, Medical school, New Zealand District Health Board, health laboratories, laboratory management, mutual trust, Health Research Council, HRC, MoRST, FoRST, NZBio, health research, PHARMAC, clinical leader, innovate, medical research, CDHB, Ghoshal, health management

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## **1.0 Introduction**

### **1.1 Background**

This qualitative study will analyse the views of two types of medical scientist working in one region of New Zealand. Firstly, Medical Scientific officers (MSO) who are employed by hospital and university laboratories, do research on diseases to develop vaccines and medications. Secondly, medical laboratory scientists (MLS) who provide the test results essential for use by clinical medical staff in the detection, monitoring or prevention of disease (There is some crossover of duties). The 35 scientists interviewed were told the emphasis was on issues which help or hinder their work and in particular matters of 'bureaucracy or paper work'. The aim was to find what scientists, management and government need to do to provide an effective environment toward meeting the New Zealand government's goal for growth in science and biotechnology as an export earner.

The 17 MSOs interviewed comprised about 20% of the total number employed by district health boards and universities in New Zealand. This excludes physicists. The 18 MLSs interviewed represented only about 1.5%. However, this research is qualitative and not dependant on statistical reliability.

Highlighted, are some challenges and controversy over directives and challenges faced by government, universities, hospital and private medical laboratories to be effective in carrying out medical science work.

The literature review will show there is much written about the lack of funding for medical scientists worldwide. As the issues are not just about a lack of money, this study aims to look at other issues which need to be addressed to help both managers and medical scientists at the personal level. It is anticipated that the research will hopefully have positive implications for Government, Hospital Boards, laboratory managers, co-operating businesses and scientists themselves.

It is also a process study. By process, I take from Van de Ven's (1992) third definition and from Chia and Langley (2004), who say process involves considering phenomena dynamically in terms of movement, activity, events, change and temporal evolution. By focusing on "something that people do", Whittington, Jarzbkowski, and Johnston et al, (as cited in Langley, 2007), we take a 'strategy in practice' perspective which adds a focus on micro level activities and practices. However, this dissertation aims to also apply temporally

evolving phenomena at a variety of levels such as the individual, organisational, sector, and issues related to strategy content. We are certainly looking at non linear effects under complexity. For example, there are political negotiations and the possible destruction of organisational cultures and activity systems. Variance based theories, while useful, tend to ignore complexity (Barney, 2001; Langley, 2007). Finally, while some process researchers have emphasized the importance of relating processes to outcomes, it should be remembered that “outcomes” are often rather artificial staging points amid never-ending processes and can be analysed as such (Langley, 2007).

## **2.0 Setting the Scene**

### **2.1 The Problem of Lack of Money for Health Research**

Health care systems across the world are in a state of permanent revolution as they struggle to cope with multiple pressures arising from changing demography, new technologies, and limited resources (Hunter, 2008). While other nations have rushed to increase their already high investment in research, science and technology, New Zealand’s investment has dropped as a proportion of GDP and is now in the bottom third of OECD countries, spending about half the 2003 OECD average (OECD, 2007).

Research funding in New Zealand is 12 times less than some OECD countries, and may soon affect the health of the population (Auckland-University, 2008). This report by the deans of two universities, says that funding provided by the New Zealand government for health research is currently equivalent to NZ\$10.20 per capita. In comparison, funding in Australia is around NZ\$34.60 per capita, with NZ\$54.30 per capita in the UK and NZ\$126 per capita in the USA.

In New Zealand, medical research is primarily funded through the Health Research Council. This funding has remained at a static level for the past four years despite research costs rising by almost 9% per year. Around 85% of submitted projects do not receive funding.

"The lack of health research funding in New Zealand needs to be addressed," says Professor Peter Joyce, Deputy Dean of the Faculty of Medicine at the University of Otago. "Over the next two years, this lack will translate to more of the health workforce moving overseas, attracted by higher levels of funding and the facilities these can provide. This will not only have a huge impact on the level of care available, but will also affect the ability of the academic sector to train new doctors."

## **2.2 Leadership**

From Science New Zealand (2007), we read that more money is necessary, but this is not sufficient. Other areas also need attention. All can be addressed in short order given leadership across the political, business and science spectrum. Initial discussion with medical scientists, revealed they had very serious concerns with the way management and government were ignoring the collective voice for the future of New Zealand medical science; both for the health of New Zealanders and the competitive economic advantage they could contribute if barriers were removed. Several participants said a 'revolution' had begun – that is; some scientists were now standing up to their employers and the government to forcefully make their point known.

The MLS group (not MSOs) had recently been on strike, not only for better recognition but because they believed laboratory services were being compromised and New Zealanders would lose because of this. While some scientific officers are mainly doing research, others have a dual role of research and also routine laboratory testing.

In March 2008, a report from the National Science panel of the Royal Society of New Zealand was published by a group of highly respected top scientists.(RSNZ-National-Science-Panel, 2008). Among the 10 points they made, was one that scientists were faced with crippling bureaucracy. Another was that science could, and should be seen as much more important in contributing to the economy.

## **2.3 About This Study**

This dissertation analyses data from interviews with 35 New Zealand medical scientists. This provides a window into what one sample group in the main centre of the South Island of New Zealand think. Literature is used to investigate possibly overlooked practical ways of how the goals of the government and management can be met for medical science.

### **2.3.1 The advantage of an external study**

Why carry out a study by an external person when each department has their own managers doing internal reviews? Previous studies suggest research within provides grounding of the research problem in a particular situation, while research from outside provides empirical

evidence of the pervasiveness and boundary conditions of the problem. Van de Ven, (2007) claims both kinds of insight are needed to ground a problem up close and from afar. Gathering data from across departments and organizations also allows cross analysis and comparison, thus enriching the research.

### **3.0 Literature Review of Issues That Beset Medical Scientists**

#### **3.1 Introduction**

Many tensions are evident in contemporary health policy including: the funding of health systems and the changing mix of public and private arrangements; the capture of medicine by management; the imbalance between health and health care; and the growing emphasis on markets and competition in health care systems (Hunter, 2008).

This chapter looks at literature describing the changing demands over the last two decades made upon medical laboratories and medical research science. It discusses issues besetting the medical scientist. Starting with a global view, it illuminates the changing public demands placed on both scientists and medical laboratories. Governments and funding administrators demand accountability. Astute laboratory managers are demanding changes, which mean new skills and new business models. The demands come from both internal and external sources and the emphasis is to produce 'outcome' based science.

Discussed, is commitment and trust between scientists and their organisations. Next, a review of some Canadian, U.S.A., and Australian studies provide informative debate, presenting a scene showing that all Medical Laboratories and researchers face similar constraints – and also opportunities. Then there is a brief look at Europe's 6<sup>th</sup> Frame network and an evaluation of what some Australian scientists say. Funding contestability is a major issue, and this is discussed throughout the review. There is also acknowledgement that some of the public are against government funding for never-ending scientific research and the case for tax payer accountability is noted. Finally the essential ideas from several New Zealand organisations such as the funding bodies and the Royal Society Science report are discussed. What are the issues that beset medical scientists? What can be done to help them?

From this exploration we discover a great deal of effort has gone into managing funding in

what is, for each country, a limited government research budget. The budget may be limited, but there are additional challenges for both New Zealand and Australia owing to distance from markets and small populations, 20 million in Australia and 4 million in New Zealand. Neither New Zealand nor Australia, have the local giant private companies of North America or Europe to provide on shore fund backing. The small population can also make it harder to get enough local participants to carry out large population sample medical research tests. However, even a small country like New Zealand with determined research groups can offer advantages to overseas partners. The New Zealand government is trying to grow these benefits to create competitive advantage.

### **3.2 Changing Global Needs from Medical Laboratories**

Without doubt the pressure is on clinical laboratories. The pressure is on to reduce costs and enhance efficiency as lab services are increasingly becoming commoditised. This is a global trend forcing clinical laboratories to adapt. Bossuyt, Verweire, and Blanckaert (2007), suggest that to prepare for the future, laboratories need to not only form alliances and networks, but also consolidate and integrate or outsource. More importantly, they argue, laboratories need to create additional value by providing knowledge services related to in vitro diagnostics as information on laboratory services is globally available, and consequentially clinical laboratories face worldwide competition.

### **3.3 New Skills: The Need to Become Information Literate**

According to Wilcke (2008), clinical laboratory scientists, more than any other group of health care specialists, depend heavily on computers for clinical decision making. It can be difficult to glean appropriate information from large amounts of data. Wilcke highlights that, and a new competency laboratory workers need is the ability to be truly 'information literate'. Medical scientists must learn how to separate and translate data into information and information into knowledge. Glib though this sounds, Wicke points out that the future clinical laboratory scientist must be well able to demonstrate information literacy in order to separate the important and relevant from vast amounts of data and pass this on to clinicians. A USA study agrees. Harrison and McDowell (2008), evaluate the status of USA hospital laboratory Information Systems. They say these systems are critical to high quality healthcare services, as laboratories give most of the information needed for clinical decision making. This article, at time of publication in 2008, claims to provide the most current information available on the

US hospital laboratory information systems applications.

### **3.4 New Business Models Needed**

Bossuyt, Verweire, and Blanckaert (2007), highlight that new business models are needed for the Clinical laboratory. They support an idea by Freidman (2001), and his model for clinical laboratories that is based on establishment of collaborative laboratory networks. Freidman also proposed a total laboratory solution that consists of both horizontal and vertical networks, although variants of this already exist.

### **3.5 Core Competency**

The paradox with outsourcing laboratory work, is that extreme levels of outsourcing lead to a virtual organisation. The risk with this is it may degenerate into a 'hollow' organisation that can not adapt to changing circumstances. This scenario, which is recognised by Bossuyt et al (2007), is exactly what Prahalad and Hamel (1990) talk about; that if core competences are embodied in core products, then the more these products are outsourced, the greater is the likelihood of erosion of core competences. Thus, if laboratory professionals merely focus on analytical aspects, then their professional status will become marginalised when tests are outsourced. Likewise, clinical pathologists who focus mainly on analytical and technical, organisational, and managerial aspects, rather than clinical aspects, should prepare for the future by redirecting their thinking and engage more in clinical innovation. A new core competency of a clinical pathologist therefore, should be to improve patient care by giving complementary knowledge services related to diagnostic testing. (Plebani, as cited in Bossuyt et al, 2007)

Also recommended by Bossuyt et al (2007), is that Laboratory professionals could differentiate themselves, not only by their technical skills, but also by being involved in the creation, distribution, and application of knowledge related to laboratory aspects of patient care (if this is not already done) and such extra service should be recognised and implemented in the business strategy. There are other recommendations that the authors make, but they conclude with a statement that while efficiency is a prerequisite for success, it is not a guarantee - the relevant standard is actually value (Prahalad & Hamel, 1990), and to add value, the core competency of laboratory professionals must be refocused on providing additional knowledge services related to invitro diagnostic services.

## **3.6 Management Theory**

### **3.6.1 Porter's Five Forces Model**

Management teachers have long appreciated the tension all business organisations are under. Porter (1980), presented his 'Five forces of competition framework' which is still helpful for analysing the profitability of an industry, as determined by five sources of competitive pressure. I.e. there is competition from substitutes, competition from new entrants, competition from rivals, the bargaining power of suppliers and buyers. Today's laboratories face these competitive pressures as stakeholders demand accountability. For example, fiscal pressures which lead to cost containment measures in Health, citizen pressure resulting in more assertive and demanding citizens who want rapid improvement in health care and international pressure from international management consultancy firms. These ideas possibly come from NPM (new public management) drivers. (Hunter, 2008)

Some thoughts on this from MLSs interviewed suggested internal pressures come from changing demographics of the workforce and the patients. I.e. The average age of both scientists and the patients are older now than before. More health care will be required because the average age of our population is getting older and people are living longer. The scientists also thought there was a lack of interest in science and fewer students were completing science based entry courses. They suggested there are politically expedient solutions rather than well thought out policy as the Government is sensitive to public opinion around health issues in some areas more than others. Another suggestion was that there is an expectation on medical laboratory scientists to learn the latest techniques of testing assay types where they have been introduced in only partially validated states. There is pressure to try new technique technologies before they are fully validated.

### **3.6.2 Strategic Analysis Structure-Swot-Two Way**

Let us consider a basic strategic analysis framework as presented by Grant (2005). We can apply this framework, which views strategy as forming a link between the firm (Laboratory) and the outside environment. The laboratory has three key characteristics:

- Goals and values
- Resources and capabilities
- Organisational structure and systems

The outside environment for the laboratory comprises the whole range of economic, social, technological, political and environmental factors that influence its decisions and performance. The core of the Laboratory's outside environment is its industry, which is determined by relationships with clients, competitors and suppliers. This is where most strategic decisions are made. The business strategy then, is to determine how the laboratory will deploy its resources within its environment to satisfy long term goals, and with how to organise itself to implement that strategy.

A widely used tool is SWOT analysis (strengths, weakness, opportunities and threats) and this tool classifies various influences on a firm's strategy into the four categories. Grant believes there are problems with making arbitrary classifications like this, as strength may also be a weakness. For example, the laboratory may implement stricter Intellectual Property Protection on some of its development. While this may be strength, it could also be a weakness (or a threat) as some scientists may respond by not sharing ideas and they could also develop mistrust of management. I agree with Grant who favours strategic analysis with a two-way classification of internal and external factors. It is the rigour and depth of the analysis of these factors that determines the effectiveness of the results.

### **3.7 Non-Profit and Profit Enterprises and Culture of Discipline**

One of the anecdotal criticisms of management made by health workers in New Zealand over the last 15 years, has been that hospital management sometimes forget the health system is not a profit making enterprise and the changes made have not always been appropriate to the health of the nation. To consider opportunities for non profit organisations, Jim Collins, who is founder of a management laboratory in Colorado, USA, recommends some helpful ideas (Carpenter & Collins, 2006). Collins has many views on good to great principles between not for profit health care and the other social sectors. As an example, he says it makes perfect sense to measure greatness by cumulative returns to investors in a business, whereas in the social sectors, the critical question is how effectively do they deliver on their mission and how do they make a distinct impact, relative to their resources. Collins claims great companies first build a culture of discipline, and then make a business model that fits right at the intersection of three circles: what they can be best at in the world, a deep understanding of their economic or resource engine, and the core values they hold with deep passion. A key to sustained resources is brand reputation, so key supporters will believe not only in the mission, but in the capacity to deliver on that mission. This is relevant to our study, as the laboratory carries out

both non profit as well as profitable services. Brand reputation of the laboratory is therefore a competitive advantage and management should pay attention. For example, a medical laboratory scientist or technician with a business idea may well be able to help improve efficiency and build the brand reputation of the laboratory. Even an unsuccessful attempt may stimulate motivation and enthusiasm. See the Hawthorne effect (Makamson, 2000).

### **3.8 Commitment to Work**

On improving laboratory efficiency, a USA article called 'Factors that impact on clinical laboratory scientists' commitment to their work organisations', Bamberg, Akroyd, and Moore (2008), provides useful information. It is useful because the authors set out to assess the predictive ability of various aspects of the work environment for organisational commitment. Only respondents obtaining CLS (clinical laboratory science) certification by NCA (National Credentialing Agency for laboratory personal in the USA) from January 1997- December 2006 and who worked full time in a clinical laboratory were included in this study. The results of 427 respondents which was a 22% response rate indicated a less than optimal level of organisation commitment to employers, which were predominately hospitals by CLS practitioners. The mean age of participants was 34.8 years. Results suggest there will be continuing retention problems for hospital laboratories.

One value of Bamberg et al's (2008) study in the USA, is their discovery of a lack of research on the organisational commitment of Clinical laboratory scientists and a lack of knowledge of factors that may predict or limit employee's commitment to their workplace - information that could be used by managers to better direct strategies to improve retention of their employees. In New Zealand's case, it should be very useful to find out just what does motivate scientists. Motivated people are more likely to help carry out the efficiency improvements our literature review suggests is needed. For the Bamberg et al (2008) study, results showed that laboratory employees had more organisational commitment for a USA clinical laboratory work environment when they had strong organisational support and supervisors who demonstrated transformation leadership behaviours.

### **3.9 More Trust in Scientists Needed**

New Public Management (NPM) theory has been popular with governments around the world (Aucoin, as cited in Davenport & Bibby, 2007). According to the authors, the public choice

theory platform of New Zealand's NPM model is inherently based on distrust and this distrust impacts on the environment its application is intended to manage. This distrust of permanent bureaucracy and of those not held directly accountable for their outputs results in a breakdown of social capital and collaboration, say Davenport and Bibby (2007). They conclude that with the recent devolving of funding for New Zealand Crown Health Institutes (CRIs), while still contested, indicates that after 14 years more trust needs to be built into the research system, as the lack of trust in scientists' ability to make strategic decisions about what research should be carried out has been a major element of disquiet about New Zealand reforms. A Science Manifesto or Plan for the Recovery of New Zealand Science (RSNZ-National-Science-Panel, 2008) emphatically recommends that to overcome some of this distrust, cooperation rather than competition should be promoted. This also means assisting scientists' development, particularly early in their careers. There has been distrust of government and management partly because there has not been a commitment to address these challenges. Some further discussion on why distrust exists is in the concluding theory section of this dissertation.

### **3.10 The Significance of Mutual Trust**

In his concluding chapter for a doctoral thesis looking at change in 4 different plants of the New Zealand meat industry, Addison (1998) writes that when an organization or some part of an organization is undergoing change, the environment, by definition becomes more dynamic and turbulent, and according to contingency theory, an organic operating mode is called for. Spender and Kessler, (as cited in Addison, 1998), apply this to the area of innovation management, and if we accept that innovation is a type of change, then according to Addison, it is legitimate to extend its application to change management in general. He uses the term 'prior context' which comprises the building block of change, and this has a significant effect on the success of any change management operation. Addison proposes that there is a positive and a negative prior context. The positive is characterized by mutual trust, informal communication and problem solving, empowerment and perceptions of ownership. The negative on the other hand is characterized by low mutual trust, formal communications and problem solving. The most energizing and driving of these factors is the mutual trust. There is a difference here in that scientists are better qualified academically than meat industry workers and they may possibly challenge management more easily. However, Addison says it is human qualities possessed by management (rather than technical issues) that underpin the

quality and nature of prior context. I suggest this is supported by Maslow's hierarchy of needs (Huitt, 2004) where humans need to feel a sense of belonging and acceptance (social needs), before the next levels of needing esteem, then the need for self-actualization, which is the final need that manifests when lower level needs have been satisfied. I believe self actualization is where the jump to innovation and attaining a new level of output from both management and medical scientists is most likely to occur. Addison's thesis lends support to reasoning that mutual trust (which according to Maslow is a building block upon which self actualization rests) is therefore very significant indeed to successful change in the innovating laboratory.

### **3.11 Why it is useful to look at a global perspective: Convergence thesis**

In the simplest form, the convergence thesis postulates that as economies develop along modern lines, certain common characteristics and patterns emerge. Developed countries would become more and more alike in economic and social structures (Marshall, 1998; Preston, 1993). While Preston was postulating that the convergence thesis strongly suggested social security systems in developed countries would become increasingly similar, it could also be used to support the theory that the management of medical science laboratories would become increasingly similar. Perhaps the convergence thesis is now past its usefulness? This is because we can take the converse view and look at how laboratories or some modern global organisations actually are and see that convergence has happened but they now need to diverge enough to develop competitive advantage in the global arena.

An interesting book called 'The Health Debate' (Hunter, 2008) supports the convergence thesis with the example and acknowledgement of the global reach of 'New Public Management' (NPM) and its association with public sector reform in areas such as Health.

James and Manning, (as cited in Hunter, 2008), see NPM is an example of the globalisation process in public management which has roots in a set of pressures common across countries. These acute pressures are: fiscal, citizen, government and from 'international management consultancy firms and public management organisations'. Hunter explains how the consultancy firms present their ideas to public managers as 'best practise'. McKinsey for example, have offices in over 100 countries and they can rapidly and consistently present 'market-based' ideology in which private sector practice is claimed to be superior. Doing this also provides a model for the transformation of allegedly underperforming, low quality public services and weak public sector management. It is easy to see how these international

management consultants cross national boundaries and cultures and one can see that the nation state is partly being replaced by the 'market state'. According to Bobbitt, (as cited in Hunter 2008), the nation state will disappear. Bobbitt claims the nation state is seen as too rigid and conforming. However, different cultures will adapt the market state in different ways, and for New Zealand, with its small population size and desperate awareness of the need for new and growing export markets; this makes it even more imperative to be utterly determined to succeed.

### **3.11 Canadian Study-Innovation and Critical Inquiry**

Because of the importance of convergence and consequently the rapid new opportunities in the global market, it is useful to study how other countries have progressed in Medical laboratory areas.

'No one can say with confidence just where scientific culture is going', wrote David Holdsworth (2002) in his important essay on 'Science, Politics and Scientific Policy in Canada'. Holdsworth's core thesis arises from the tension between the autonomy of science and the authority of politics. He concludes that the meaning of scientific practice and its relevance for public policy should be shaped by 'ongoing critical discussion' within civil society- a discussion that should not be dominated by either the State, or markets. The three themes highlighted are:

- The concept of science policy
- Our understanding of the relationship of science to public policy
- The emerging notion of innovation as a rhetorical centerpiece of current public debates about science.

In writing about science policy, Holdsworth gives background to the rise and fall of Canadian science policy, and cautions that the term 'science policy' must remain informal. In the 1970's science was to become 'strategic', and this exacerbated the tension between political authority and scientific discovery. In the mid 1970's the National Research Council broke up after 60 years and 3 independent institutions were formed. One, the Natural Sciences and Engineering Research Council of Canada (NSERCC), took over the funding role for Canadian Universities. The second was the Science council, and the third was what remained of the National Research Council (NRC).

Now for Holdsworth's main point of relevance - Innovation is the dominant rhetorical

element in much of the current Canadian science. But as expounded in this essay on Canadian science, innovation according to Holdsworth can mean just about anything one wants it to mean and the core meaning is lost. The general point is that a generic and uncritical notion of innovation is philosophically and politically problematic. If it is linked closely to markets in a way that minimises the capacity of civil society and the state to assess the outcomes of these processes and if it eliminates open discourse but suppresses established frameworks of evaluation, then we abandon the very possibility of critically understanding the transformations of society which innovation can bring about. Holdsworth says there is a sense of suspicion in Canada about the political agenda and the notion of critical inquiry has lost value. At the same time, from the perspective of traditional politics, scientists' resistance seems equally uncompromising.

### **3.12 Who Owns Canadian Science? - The Public/ Private Divide & N.C.E.**

At the time Holdsworth published his essay, Atkinson-Grosjean, (2002), had published her work on "Canadian Science at the public/private divide: The NCE experiment" (NCE stands for National Centre of Excellence).

Her essay traces the relationship between politics and science in terms of public/private and basic/applied distinctions. She asks, *'When the state becomes a partner with academe and industry in privatising research, does it make sense to keep distinctions between public and private, basic and applied? Are they differences that make no difference? So what if the distinctions are abandoned?'*

This is a very relevant and important question that I believe we need to *strongly* debate in New Zealand which has a far smaller economy with much fewer resources than Canada.

The author asserts that the policy of privatising public science and its institutions in Canada has proceeded ideologically rather than by rational calculation. Historically, the trust in the public institution of science rests on trust in the private morality of sciences individual practitioners. The author asserts that the nature of scientific knowledge rests on the collective construction of a collective good, which means a reliance on the work of others, and therefore within this 'moral economy of truth', public and private, scientific and social, become inseparable. New Zealand needs to listen to Holdsworth and Atkinson-Grosjean as they perhaps unwittingly give a prophetic word here for New Zealand.

There are more arguments which Atkinson-Grosjean raises when explaining the emergence of the NCE programme formed in 1990, and these may be relevant in the discussion of data

results. It is worth mentioning the Canadian Genetic Diseases Network (CGDN). The effect of NCE philosophy on practice here shows many believe the leadership of the scientific director as outstanding, and this was the single most important determinant of CGDN's success. We should take note of this. There are extensive network linkages including 11 universities, 6 federal and provincial agencies, 11 hospitals, 8 industry partners, 32 industry affiliates, 34 non profits and other affiliates and several spin off companies formed by the network.

There are critics of the programme though. Again there are constant tensions at all levels due to the values of science and the values of commerce. One scientist remarked that to ensure survival you have to be an entrepreneur. This is probably a productive tension though. In concluding, Atkinson-Grosjean says there is little point in engaging in the 'sociology of accusation' about the moral decline of public scientists seduced by the profit motive. Things are not that simple. This Canadian case article is relevant for New Zealand, and I believe it is arguable that the 'tall poppy' syndrome that the 'sociology of accusation' arouses is possibly stronger in New Zealand than in Canada.

### **3.13 Europe's 6<sup>th</sup> Framework Programme (FP6)**

According to some scientists, (Nature-Neuroscience, 2004) funding may be a big factor affecting medical scientists' motivation and hence work output. We now briefly look at an editorial, 'Time to reform European science funding' (Nature-Neuroscience, 2004). Even the Europeans lament that their young scientists are moving to America and over one third are staying there because it is easier to secure post- doctoral jobs, and not only do they more easily get jobs, but the pay is much higher. The author claims part of the problem is with how funds are administered in Europe. One claim he makes, is that only about 10% of neuroscience funding in Europe is from the EU. Funding basic research is not a priority, and the official goal of the 6th Framework Programme (FP6) is to 'strengthen the scientific and technological basis of industry and to encourage its international competitiveness'. The FP6 programme emphasises applied science. Projects, including ones on synaptic information processing, neuroimmune disorders, dyslexia and sleep, are defined in an extensive process of consultation involving national programme committees and scientific advisory boards. The main goal of FP6 is to foster cross border co-operation, so applications must be submitted by a consortia of scientists from three different countries. If the consortia are successful the grant money is given with a legally binding contract which spells out the tasks and expected results.

So what is the opinion of people involved in the FP6 programme? One reviewer found the process frustrating because there was not enough money and excellent projects missed out. Also a large portion of funds are spent on administration because of the large scale collaboration from three different countries. On the other hand, one neuroscientist at the French Commissariat for Atomic Energy believes the framework is useful in complicated areas with far reaching implications, such as prion diseases where research must be structured. The benefit with some cases like this, is not directly to fund research, but to coordinate consortium members, jump start risky projects and help groups apply for 3<sup>rd</sup> party funding. However, many Europeans find the FP6 too inflexible and at odds with scientific excellence. Nevertheless, nearly everyone, according to Nature Neuroscience (2004), supports neuroscience funding on a European level, and the programme is currently being reviewed to improve funding, and reverse the brain drain and even attract overseas scientists to Europe.

### **3.14 Lessons from the EU for Australia and NZ**

Although published in Nature Immunology two years earlier than the editorial just described, 'Basic Science funding in Australia: Lessons from the EU' (Stumbles, Upham, & Nelson, 2002), explains that many of the key features and problems of the FP6 European Union are mirrored in Australia. The main concern to the Australian authors of the FP6 approach was the peer review problems, and the stifling of innovation exemplified by Australia's small population and lack of non government funding sources. The authors believe the potential exists for these systems to act toward preserving the status quo.

### **3.15 Australian CSIRO and People Who Innovate - Australian Difficulties**

While our study is on medical science, it is worth looking at an Australian study that raises interesting points but which also includes traditional Australian science fields in agriculture, earth science, life science, as well as medical sciences. Called 'Innovation agents and innovation tracks: CSIRO research scientists and their peers' (Marceau & Turpin, 2007). This study from 2003-2004, is of 515 research scientists. Respondents worked mainly in the public sector with a significant number in Commonwealth agencies, notably the CSIRO, (Commonwealth Scientific and Industrial Research Organisation), is Australia's national science agency, which is the biggest single employer of scientific researchers in Australia.

The authors remind us that it is ultimately people who innovate, and these innovators are often scientists and technologists. The impact of monies for research on technological

innovation levels in any country depends greatly on the willingness and the capacity of researchers to take risks with their career paths. This is significant. Marceau and Turpin (2007) say that current science policies show little concern for the choices facing scientifically trained people in Australia. Many younger scientists face difficulty deciding whether to remain in science when they have held several post-doctoral positions, as they see the future as insecure. The authors' argue that Australia provides too few secure, well paid opportunities for researchers if it is to stay capable in key areas, although some such as biological science have done well, possibly because of its expectation for commercial outcomes. That is, because funding bodies can see good potential financial returns from certain biological areas, they are prepared to fund and provide secure tenure to researchers working in those areas. This follows the move in recent decades to fund more strategic and applied research, and less basic pure science.

Uncertainty about career paths is evident, and respondents to the survey were on relatively short contracts. Long term funding was the major issue confronting scientists in Australia according to 84% of participants, but the orientation of scientific practice was also important. Data suggests that researchers in science and technology are not particularly interested in working with external clients, and perhaps this is because of the complex administrative procedures with collaborative opportunities. They are also much concerned about the conditions of doing science in Australia. Significantly, more than one third of respondents resented the focus on applied over basic or pure research.

### **3.16 Funding Contestability – Excellence Vs-Contestability**

Continuing now with Marceau and Turpin's (2007) Australian study, here are points they make about funding contestability vs. community return:

Increasing the contestability of funding is often thought to encourage 'excellence' in scientific endeavor because of continuous peer review. This, according to Marceau and Turpin, runs in parallel with policy makers' increasing focus on the 'community return' from commercialisation of research results, which have less emphasis on peer review but more on reward for the profitable use of commercial results. This is very interesting in that these two policy directions may eventually prove to be incompatible. For science in general, the authors then relate research by Tijssen (2001), that claims the linear relationship between scientists and innovation dominates policy makers' minds, despite claims of long available evidence that the interplay between scientific research and technological development is a non-linear

process mediated by a complex system of social, cognitive and organisational factors.

Relevant points raised were that the most published scientists eventually move away from research activities as they progress in their careers. Greater contestability for funding will decrease the time on direct research and accelerate the loss of time for mentoring young students and scientists. More contestability also means career uncertainty and this will discourage bright people from entering science research.

### **3.17 Australia and New Zealand: Changes to Science Policy In The 1990's.**

Administrative changes and criteria of funding available to scientists

Bringing the contestability issue back to New Zealand, Davenport and Bibby (2007) write about the life and times of the Australian CSIRO. In this paper there is significant history of the New Zealand Crown Research Institutes (CRI's). These were formed in 1992, a time when major change was made throughout the public sector. Interestingly Australia did not follow the path into forming CRI's. For an informative paper on the New Zealand Science and innovation system, I refer the reader to 'The politics of discourse: Marketing of the New Zealand science and innovation system (Leitch & Davenport, 2005). This paper examines the politics of change played out by discourse dedicated to transforming the science and innovation arena. One unintended value of this paper that I see is to reassure the busy New Zealand scientist that, possibly unknown to them, researchers behind the scenes are looking at, analysing and comparing world data to try and best improve the lot of the nation. This also highlights the importance of the individual and group value of 'speaking out' and making recommendations to politicians.

New Zealand in the 1990's had several major doctrines stemming from the globally popular 'New Public Management' (NPM) or public choice theory (Wikipedia, 2008). These included:

- Hands on professional management in the public sector
- Explicit standards and measures of performance
- Greater emphasis on output controls to stress results rather than procedures
- Disaggregation of the public sector units to create efficient and manageable units and separate provision interests
- Greater public sector competition
- Stress on private sectors styles of management practice and use on 'proven' private

sector management tools

- Stress on greater discipline and parsimony in resource use –do more with less.

### 3.18 New Zealand Break-Up of DSIR and Establishment of MoRST (Fig 1)

What this meant for science, was more accountability in science investment necessitating the break-up of the Department of Scientific Investment and Research (DSIR). This is when

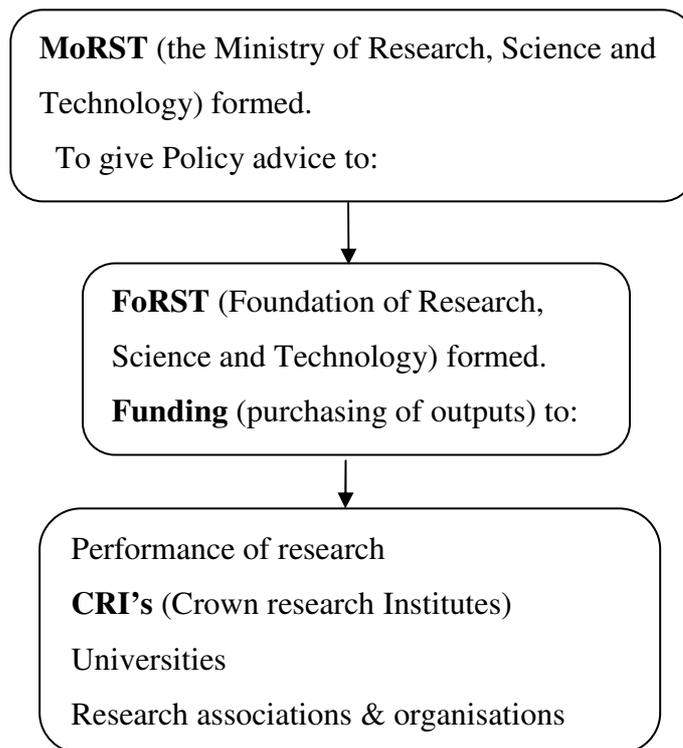


Figure 1

MoRST (the Ministry of Research, Science and Technology for New Zealand was formed. The organisation chart of today is shown in Figure 1:

The Crown research Institutes (CRI's) were to have a broad focus and be flexible and vertically integrated over the value chain. The CRI we are interested in here for medical science is ESR (Institute of Environmental Science & Research Ltd) and Industrial Research Ltd (IRL). There are many research groups providing funding and support. The CRI's are explained in the next chapter but their instruction from government was to perform research of benefit to New Zealand and to be financially viable. FoRST evolved as follows: Initially its

focus was on excellence and the ‘elimination of useless research. In the mid 1990’s this was reversed to prioritise research of ‘relevance to users’. Users, rather than scientists assessed the proposals. Then there was a move to a funding ethos driven by ‘investment discourse’. Next it moved to a system of outcome based negotiated funding. It is worth noting that one former FRST manger stated that FRST constantly struggled with the tension between running a competitive funding system, a contestable allocation system, an investment function, and a stewardship role of maintaining infrastructure, the stability of the science provider system and the staff within it (Winsley, as cited in Davenport & Bibby, 2007). The previous discourse gives an outline of the administrative changes and criteria of funding available to scientists.

### **3.19 Crown Research Institutes in New Zealand–A Paradox of Success**

An interesting fact to note is, since their formation in 1992, CRI’s increased revenue and diversified revenue sources; particularly offshore with some CRI’s creating subsidiaries overseas. This diversification was so successful that some CRI’s have a higher percentage of non –government funding than the Australian CSIRO. It is ironic that this success has caused some ‘independence’ from New Zealand government funding and government policy through MoRST (CCMAU, cited in Davenport & Bibby, 2007). However, any increases in funds from government sources may be short term. Accordingly, CRI’s may have become competitors with companies because of their increased commercial activity and commercialising their intellectual property instead of transferring it into domestic industry. Even though the CRI act states that they need to promote and facilitate the application of research results, the CRI’s increased commercialisation off shore has received adverse criticism with local industry. This has been strongly commented about to me as a researcher by at least one senior medical scientist. I now state these criticisms as they are important to this dissertation.

These comments from the CCMAU (Crown Company Monitoring Advisory Unit) in 2005 are:

- The CRI’s are storehouses of a large pool of valuable, unused IP waiting to be commercialised by the private sector.
- CRI’s charges too much for access to IP when private firms are not prepared to pay fair market value (or in my opinion simply do not have the funds).
- CRI’s prefer to deal with overseas firms than those that are New Zealand based.
- End users have already paid for publicly funded IP through their taxes and should get

CRI intellectual property for nothing.

Following this criticism, a government framework to provide more explicit direction to CRI's came about to ensure amongst other things that they played a critical and increasing part in the development of the New Zealand innovation system and to transfer the knowledge, technology and capability to the local private sector. Since the reforms, New Zealand now has one of the highest levels of contestability in science funding in the OECD (Anderson, cited in Davenport & Bibby, 2007).

Several years later, the association of crown researchers (ACRI) expressed an opinion that a problem with CRI's, was the one sided nature of the science market, which meant the universities had access to FoRST's contestability funds but that the CRI's did not have the matching access to tertiary sector funds, a mismatch that forced CRI's to cut staff (Hargreaves, cited in Davenport & Bibby, 2007). The contestability debate began to increase and in 2004 an open letter to the minister signed by 725 respondents (of which 55% were CRI staff), showed the concern that contestability was damaging careers of CRI scientists as their salaries were fully contestable, resulting in poor job security.

The prevalent concern of a dysfunctional science system prompted MoRST to launch its 'Picking up the pace' (PUP) programme to continue constructive ongoing dialogue. From this, one of the papers presented was called, 'A stable Funding Environment,' addressing the fact that short term contests were getting in the way of improved collaboration. As providers had evolved, the contestability system had lost some of its value and the government wanted to place more trust in providers allowing them to make their own detailed research decisions. A very important point I want to make here, is the authors statement that contestability was now being framed as the opposite of stability and that too much contestability was not a good thing. This is in contrast to the belief mentioned earlier that increasing the contestability of funding is often thought to encourage 'excellence' in scientific endeavour because of continuous peer review.

### **3.20 Funding Contestability vs. Stability for New Zealand Scientists**

The 2004 contestability debate got the science community responding. One question MoRST presented, inferred that stability was not only counter to contestability but it was also opposite to new ideas. Many of the responses showed the tension between what stability was or what it was not. The Royal society, the Public Service Association and others propounded different

ideas into the forum. This tension over the interpretation of ‘stability’ climaxed when FoRST gave details of how the PUP initiative was intended to be carried out in May 2006. The universities claimed the interpretation of a more stable funding would be a retrograde step and funding of quality science would not be guaranteed. After more publicity, universities and CRI researchers were set against each other in a debate as to whether universities were being shut out of funding, and whether the stable funding would result in the ‘ossification’ in the CRIs. Although the publicity and open discussion was probably necessary, it set scientists against scientist and in a small nation like New Zealand this is definitely unwanted as all scientists here should be collaborators. Lancashire, (cited in Davenport & Bibby, 2007), says the contest between universities and CRIs has not been good for science in general here. This is relevant to Medical research scientists in New Zealand as more funding is from the universities rather than CRI’s. It also raises the question of how possible is it for government or agents acting on their behalf to be an informed purchaser of science outputs. Opinion was that CRI’s had been successful in their aim of becoming viable entities with major benefits to the nation because of the commercial focus, and these were achieved in a constantly changing policy environment making it difficult to evaluate the overall success of the science reforms or CRIs. The critical point is possibly the tension between public good and commercial focus. Davenport and Bibby (2007) conclude, that not only is the funding contestability issue hindering CRIs performance, so is the ‘lumpiness’ of funding and uncertainty of regular renegotiation. However, the climate of New Zealand’s science system may be shifting to policy to increase stability and foster capability.

### **3.21 Myths of Public Science and Hidden Dynamics – USA Critics**

As a contrast and balance to the funding debate, there are some prominent writers in the USA who oppose tax payer funding to scientific research. Both writers introduced here refer to science in general. Rhetoric and emotion for public funded science is running high, writes Davidson (2006), particularly when innovation is increasingly being seen as a main engine for the economy. Davidson seems puzzled that few people undertake hard-headed analysis of its justifications. He points out that others have written about myths of infinite benefit, myths of unfettered research, accountability and authoritativeness and the myth of an endless frontier. The endless frontier is the argument that knowledge is valuable in itself and should be pursued whatever its moral or political consequences might be. These myths stifle the debate that surrounds scrutiny of the money that government spends on public science. A compelling

point Davidson makes, is that in hindsight it is easy to identify some pure research that has had great impact. However, what can not be ascertained is how much pure research has actually had an impact. The Australian bureau of statistics 'Innovation in Australian Business' report shows that employing a new graduate is the single largest technique innovating firms use to try to acquire knowledge from a university. The author argues that it is not surprising science provides few clear policy options for politicians. He concludes that the taxpaying public is entitled to more than just myths and rhetoric.

Another writer hot on voicing concern at wasted money on public science is Daniel Greenburg. This American author has expounded his views in 'Science, Money, and Politics: Political Triumph and Ethical Erosion (Greenberg, 2001). Three of his ten points are:

- Self serving money seeking scientists routinely tell the US press the Federal Government is cutting financial support for scientific research and America is losing scientific leadership. Greenburg claims the USA is world leader in virtually every field of research. (Chap.5&6)
- Lobbying for science to improve health, prosperity security and a clean environment is a major part of creating fear to get money to keep universities and jobs going. (Chap13)
- When projects fail the cause may be misuse of public money, but the claim is also made from the backers that the defeat in getting more money granted was ignorance and hostility to science.

One reviewer claims points are better documented than most National Academy of Science reports (Keay Davidson, *Scientific American*-on the cover of Greenburg's book), and that the work depicts America's big science as a 'classic self perpetuating bureaucracy'.

The problem I see here for New Zealand laboratories is that although technology is rapidly changing, there are still core competences which need to be kept. For example, take the Boeing Airline facing designing and building the new sonic cruiser aircraft. Finite resources meant Boeing had to allow for the following factors: industry experience, and according to Walt Gillette, Boeing's Development Programme Manager at the time, this meant the company needed to create a new aeroplane every 12-15 years. If this was not done, the needed skills and experience would be gone. Gone would be many experienced people including those who retired or left since the last plane was developed. Their skills and experience would not have been passed to the next generation of Boeing employees (Schilling, 2005) p118. This

was in spite of radical new technologies. On the other hand, one could argue that for management, new blood is necessary to change a poor organisation culture. However, could the thought that ‘change in leadership’ or the ‘old guard must go’ to change the culture, be wrongly extended over to apply to research scientists or technical workers whose experience is still needed?

### **3.22 Organisation for Economic Co-Operation and Development (OECD) –as applied to New Zealand**

New Zealand should strengthen its support for research and innovation to boost economic growth, according to an OECD (2007) report. GDP per head still lags behind the OECD average and growth has been mainly driven by increased labour utilisation. New Zealand has also not yet fully seized the opportunities of globalisation. Investment in business research and development (R&D) is low, less than a third of the OECD average.

Looking ahead, the OECD advises New Zealand to focus on four key areas:

- Promote innovation in the business sector.
- Improve the business environment for innovation. The government should continue to improve the supply of seed and venture capital in New Zealand. The Venture Capital Investment Fund (VIF) and Seed Co-investment Fund are commendable initiatives whose operations warrant some further fine tuning.
- Improve the effectiveness of competitive research funding. The division of labour of funding agencies needs to be clarified and their performance further improved.
- Improve the governance of the innovation system. Creating an Advisory Council on Innovation Policy could help produce a clear, concrete national policy towards innovation. The way public research organisations, including Crown Research Institutes (CRIs) and universities, get funding could also be improved. CRIs, for example, should get more core funding of, say, one-third or one-half of their budget based on five-to-seven year timeframes. At the same time, the evaluation of the CRI's funding should be strengthened.

### **3.23 New Zealand Organisations Which Contribute Funding or Policy for Medical Science**

#### **3.23.1 The Health Research Council (HRC).**

This is the Government's principal funding and investment agency for health research. (HRC, 2008) As a Crown entity the HRC is responsible to both the Minister of Health and the Minister of Research, Science and Technology. The HRC's primary mission is to improve the health of all New Zealanders through promoting and investing in high quality health research. Despite the absence of any increase in funding, the Statement of Intent for 2008 sets out the HRC's commitment to continue building on existing strategies and policies which include to:

- Engage the health and science sectors to assist the HRC in achieving their mission.
- Continue emphasis on funding excellent and relevant health research.
- Increase focus on investment in research delivering outcomes.
- Encourage researchers to engage end-users in the research process as demonstrated through the Partnership Programme and District Health Board Research Fund.
- Pursue opportunities for national and international partnership and collaboration.
- Engage New Zealanders in dialogue about health research.

The HRC distributes the majority of its funding through the annual contestable funding round. Research submitted through this round is untargeted: investigators are free to submit proposals on any topic they wish. However, all proposals received are reviewed for scientific merit and for relevance against the national health research priorities identified by the HRC, the Ministry of Health and the Ministry of Research, Science and Technology (through key strategic documents, such as the New Zealand Health Strategy). The Council monitors the investment in priority areas annually, and addresses critical gaps through a variety of targeted measures for research and capacity building. The quality of the research funded is assured through the use of peer review systems that align with international best practice for the purchasing of health research.

In 2008, the HRC will continue the development of its strategic partnership with the 21

District Health Boards to manage the District Health Board Research Fund (DHBRF). With a view to sustaining this important initiative, the HRC will also invest, where possible and appropriate, partnership Programme funds with DHBRF funds into the translation of research into health sector policy and services. The Board is committed to working with the health research community, continuing to optimise the return on the investment in health research for the health and well being of New Zealanders. (HRC, 2008)

The key questions from above are:

- How do the Health Research Council (HRC) know what is relevant research?
- The HRC's primary mission is to improve the health of all New Zealanders through promoting and investing in high quality health research. Is their vision statement too narrow by not adding a secondary focus on improving the medical science and biotechnology industry in New Zealand?
- Increase focus on investment in research delivering outcomes. But how do the HRC know what outcomes to expect and what do medical scientists have to say about this?

### **3.23.2 Science New Zealand: Innovate or Stagnate: OECD**

Science New Zealand is an associate Crown Research Institute organisation that is run by a board consisting of the chief executive of all nine CRIs. Science New Zealand's purpose is to grow the business of respective CRIs through effective collaboration on key issues.

The following are some points quoted from an OECD Report for New Zealand: Innovate or stagnate (OECD, 2007)

*“The primary message of this OECD Report on New Zealand’s national innovation system is very clear”,* says the chief executive of the nine Crown Research Institutes (CRIs), New Zealand’s largest research organisations, *“The Report is remarkably frank: New Zealand has no hope of regaining a place in the top half of the OECD nations if we continue to under-invest in Research, Science and Technology (RS&T),”* summarises Anthony Scott, Executive Director of the Association of Crown Research Institutes. He continued explaining that while other nations have been rushing to increase their already high investment in RS&T, New Zealand’s investment has dropped as a proportion of GDP and we are now in the bottom third of OECD countries, spending about half the 2003 OECD average. *“More money is necessary, but not sufficient. Other areas also need attention. All can be addressed in short order given*

*leadership across the political, business and science spectrum.*” He then remarked that while university salaries had been boosted by central government, this was not so for staff in the only research organisations clearly owned by Government.

He continued by saying that recruitment and retention issues are identified by both the OECD and Crown Research Institutes (CRIs) as critical issues for New Zealand’s future. He further states that CRI’s are very supportive of the role played by Universities as research-led teaching organisations with particular research strengths. These complement the long-term, highly sector-engaged relationships and strategic approach of CRIs.

The OECD recognises that this complete reliance upon the whims of the market limits the capability of CRIs and under-values the global knowledge, insights and connectedness of CRIs. *“Relying upon cyclical commodity booms is akin to relying upon Lotto for one’s pension.”* Boldly, the OECD report claims Crown Research Institutes are better placed than anyone else to know the best area to focus resource for long term benefit to New Zealand. At the same time, the chief executives insist that all funding must be linked to performance. Mr. Scott then explains his reasoning that this is a key for being accountable to the New Zealand public who own the CRIs. The OECD strongly recommend ex post evaluation.

The key points from above:

- Innovate or stagnate
- Other areas than money also need attention. All can be addressed in short order given leadership across the political, business and science spectrum.
- Recruitment and retention issues
- All funding must be linked to performance
- CRIs are better placed than anyone else to know the best areas to focus resources for long term benefit.
- Accountability

### **3.23.3 Ministry Of Research, Science and Technology (MORST)**

MoRST provides policy advice to the Minister and manages the government's investment in research, science and technology (RS&T). Their advice covers the opportunities and issues that affect how New Zealand manages the delivery of RS&T. They also provide advice on such areas as the structure of New Zealand's research system and investment mechanisms. (MoRST, 2006) The Ministry's ‘Future Watch’ work programme aims to build government’s

alertness to new scientific knowledge and technologies. They advise government on how to get value from the money it invests in research, science and technology. The government finances about half of New Zealand's investment in RS&T, and owns significant science infrastructure - notably the Crown Research Institutes (CRIs) of which the relevant one for medical science and technology is Industrial Research Ltd (IRL). IRL undertakes world-class science, development and technology commercialisation in areas of communication, information and electronic technologies, advanced materials and performance, intelligent devices and systems, biochemical technologies, energy technologies, complex measurement and analysis. In some cases government departments also carry out science and research activity. MoRST advises the Government on opportunities for how investment in RS&T can deliver on the Government's priorities and it directs that investment.

MoRST actively builds networks between research providers and the business sector.

As the majority of the world's Research and development takes place outside of New Zealand, international research, science and technology (RS&T) links are crucial. MoRST facilitates international contacts between researchers and research institutions to develop collaborative programmes, and raises awareness of N.Z. science and technology capabilities. MoRST recently strengthened the science and technology agreement between the New Zealand and German Governments. A fund to support the exchange of N.Z. and European Union scientists was set up. MoRST advises government on how to get value from the money it invests in research, science and technology (MoRST, 2008).

A key point to ask is: How do they know true value in someone else's area of expertise?

#### **3.23.4 Statistics New Zealand: Biotechnology in New Zealand**

Published in 2005, this presents a statistical picture of the state of biotechnology in New Zealand (Statistics-New-Zealand, 2005). It says that often the CRI is better placed than anyone else to know the best area to focus resources for long term benefit to New Zealand.

The biotechnology sector can be associated with innovative activities, and innovation has been cited as a key factor in sustaining economic growth, and in developing a more flexible New Zealand economy capable of competing successfully on the international stage. This sector is seen as important, due to its high growth potential, and its ability to contribute

technologies and services across the economy. Also see NZbio website for similar information (NZbio, 2003).

The key point from above:

New Zealand needs to be successful competing internationally.

### **3.24 A Science Manifesto or Plan for the Recovery of New Zealand Science (2007)**

This was written by the National Science Panel of The Royal Society of New Zealand (NSP-RSNZ) to encourage urgently-needed public discussion about research, science and Technology in New Zealand. It outlines a vision for the future of science in New Zealand. Included here are only parts which are relevant to this report. The plan says they have deep concern about the careers of students. The public value of science is not being fully recognised or realised... science policy over the past decade in New Zealand has resulted in a gradual disempowerment of science and scientists. Needed is an energetic and passionately practiced science system that is a visible contributor to the nation's wellbeing; for science to be central to the New Zealand identity in the same way that sport is already, and the creative arts are becoming.

*“We must, as a nation, use science and scientists better than ever before and find new ways of enhancing their contribution.”* (NSP-RSNZ, 2008).

#### **3.24.1 How Should This Be Carried Out? – Recommendations from The Science Manifesto’ 2007 (NSP-RSNZ, 2008)**

##### **3.24.2 Enhance Innovation Policy**

Have a national policy on innovation which must recognise the critical contributions that research, science and Technology (RS&T) each make to innovation. To build innovation-based economy policies that enhance relationships between the wider business sectors, the Crown Research Institutes and universities are needed. Science institutions need to co-operate with businesses, not compete with them as they do under current policy. *“Excessive competition creates barriers to knowledge transfer and a breakdown in trust. Instead we need an innovation ecosystem in which intellectual property and new business opportunities flow better from primary science organisations to the private sector.”*

##### **3.24.3 Ensure that government policy processes are evidence based**

We need to reduce transaction and compliance costs. For many researchers, the current

administrative overburden is simply crushing. We must change the way our science is funded and make the process less bureaucratic, with lower transaction and compliance costs.

New Zealand also needs to develop high-quality retrospective science monitoring processes involving peer review (NSP-RSNZ, 2008).

#### **3.24.4 Continue to increase both public and private RS&T investment**

Most science funding applications in New Zealand have a failure rate greater than 80%, with some, like the Marsden Fund, consistently rejecting over 90% of proposals – not based on the quality of the proposal but solely as a consequence of having insufficient funding available.

New Zealand needs:

- A deeper pool of research knowledge, ideas and opportunities
- It needs to retain excellent people and build critical mass.
- It needs the resources to attract internationally-leading individuals and their teams to New Zealand, as Australia and many other nations now do. Critically, it has a very low capital investment in research equipment and infrastructure.
- Needed is a vital culture change to encourage greater private sector research investment. Again, less competition with the public sector and more collaboration are needed. *“Staff must be able to move freely between private and public sectors without compromising their careers”* (NSP-RSNZ, 2008).

#### **3.24.5 Improve the path to commercialisation**

Many people have good ideas but they often fail to successfully implement or develop them to get them to market. The report says the link between innovation and economic transformation must be addressed. Perhaps public research organizations are not equipped or funded to take the work to the point where businesses or individuals will invest (NSP-RSNZ, 2008).

#### **3.24.6 Promote science across the entire education system**

New Zealand needs to at least double its number of science PhD graduates in order to provide the human capital needed to drive an internationally competitive knowledge economy (NSP-RSNZ, 2008).

### **3.24.7 Build national recognition of the value of science**

The application of public and private scientific research underpins the overall health and wealth of a nation. Science is not simply about individual achievement. It is a vital factor in determining both our nation's performance in an increasingly competitive world and our ultimate survival with respect to the mounting challenges. We must nationally embrace the public value of science (NSP-RSNZ, 2008).

### **3.24.8 Trust science, scientists and scientific institutions**

Promote cooperation rather than competition, and it means assisting scientists' development, particularly early in their careers. We must now demonstrate a determined commitment to address these challenges (NSP-RSNZ, 2008).

### **3.24.9 Key points from above**

- As a nation, New Zealanders should use science and scientists better than ever before and find new ways of enhancing their contributions.
- For many researchers, the current administrative overburden is simply crushing. Science policy over the past decade in New Zealand has resulted in a gradual disempowerment of science and scientists.
- Needed is a clear national policy on innovation.
- Excessive competition creates barriers to knowledge transfer and trust breakdown.
- New Zealand needs a deeper pool of research knowledge, ideas and opportunities.
- We must capitalise on scientific and technological knowledge to achieve a competitive edge.
- Science institutions need to co-operate with businesses, not compete with them as they do under current policy.

I refer back to the earlier article by Atkinson-Grosjean, (2002) about the Canadian NCE experiment where she asks,

*'When the state becomes a partner with academe and industry in privatising research, does it make sense to keep distinctions between public and private, basic and applied? Are they differences that make no difference? So what if the distinctions are abandoned?'*

This is a challenge to address. How to carry it out is certainly going to be challenging for

scientists, lawyers and the organisations they represent. Could answering this question and forming a written policy surrounding this topic help New Zealand by opening communication amongst New Zealand scientists employed by District Health Boards (DHB) to innovate? I suggest it could –or at least help to increase trust between DHB’s and their employees.

### **3.25 Health Services Planning –Canterbury District Health Board**

The Canterbury District Health Board (CDHB) has started a planning programme (2003) that will take a fresh look at all of the health services that it provides and funds. The purpose of this programme is to plan Canterbury’s health services for the next ten years and beyond. It is expected that this planning may significantly reshape our health services. This may require a look at better ways of delivering health services to improve the health of Canterbury people. (CDHB, 2003)

A key point to look at:

- Is the vision statement of District Health Boards too narrow? Will it encompass the opportunities for economic growth presented above by the Science panel? Or will it focus policy makers and management minds on local health issues to the exclusion of what could be small changes in actions to expand New Zealand health to a global economic competitive advantage?

### **3.26 Concluding Comment about the Literature Review**

We have explored different ideas and discovered medical scientists and their organisations in several western countries seem beset with similar problems and opportunities. It is surprising that organisation and administration issues are globally similar and their evolutions over the last two decades follow a similar time line. What we do know is that laboratories and their organisations must innovate to survive, owing to the internet and access to new suppliers, distributors, technology etc. However, how they innovate is a source of tension and a challenge for their leaders. This must be carried out with support from scientists and management, and also Government backing, business, and possibly support from the taxpayer. There is a warning for New Zealand – innovate and seize opportunities while the window is open. Change the way scientists are treated and funded- reduce the amount of stifling bureaucracy or fall even lower in OECD ranking. The trust between medical scientists and management needs to be positive. Addison, (1998), in section 3.10 says, “*The positive is*

*characterized by mutual trust, informal communication and problem solving, empowerment and perceptions of ownership”*

This thinking leads us to the research question...

#### **4.0 The Research Question: what are the issues that beset New Zealand medical laboratory scientists and also medical scientific officers in carrying out successful work?**

The Research design question asks:

- What knowledge claims am I making as a researcher?
- What strategies of enquiry will I take to inform my procedure?
- What data collection and analysis methods will I use?

There are many types of knowledge claim but an interesting paradigm fit for this study and because I was initially not sure of what the issues were and what questions to ask, ‘grounded theory’ became the obvious choice. Grounded Theory is claimed by some experts to be useful for ‘exploratory researchers which this is. No hypotheses were proposed as the questioning was carried out to gain information. Literature reviewing was carried out during and after the interviewing as an iterative process.

### **5.0 Research Framework Methodology**

#### **5.1 A Qualitative Process Study**

The framework here is qualitative. Empirical data is gathered from interviews rather than questionnaires. Interviews allowed open ended questions to probe the participants’ thoughts, follow a lead of enquiry, and discover what scientists wanted to say.

Creswell (2003), p183, provides some characteristics of Qualitative Research (QR)

The research takes place in the natural setting... this research mostly took place at the participant’s work place. It uses various interactive and humanistic research approaches to involve active participation by participants. Data collection for this study was by face to face interview.

Qualitative research is emergent rather than prefigured. I quickly discovered my questions needed to change and be refined as I started to ask questions. For example, initially I intended having Medical Laboratory Scientists as the only participants and started with a line of questioning for them but I immediately found the Research Scientists volunteered other

important things to say. It is best to let the unfolding theory dictate the method.

It is basically interpretative. I recorded participant's thoughts in their setting, analysed the data for the themes or categories and then interpreted these by drawing conclusions about the meaning both personally and theoretically.

It views social phenomena holistically...an initial driver for embarking on a study might include strong personal bias and in my case I found some bias dissipated as the holistic picture emerged. Instead of unhealthy bias, my attitudes changed to a genuine desire to discover the true picture and propose solutions. I discovered each participant revealed new information –but up to a stage when I began to hear the same message, signaling I had reached the saturation point. The theory from the literature also helped provide a holistic picture.

Reasoning is complex, multifaceted, iterative, and simultaneous. The reasoning is largely inductive but inductive and deductive thinking take place iteratively, cycling back and forth from data collection to analysis, to problem formulation and back. This happens while the recording, analysing and writing up are taking place.

A qualitative researcher adopts one or more strategies of inquiry as a guide so to help design my questions, I considered several including the Advisory/ Participatory paradigm. The method I use is Grounded Theory.

An important point I wish to highlight, is that it is also a process study. By process, I take Van de Ven's (1992) 3<sup>rd</sup> definition, and from Chia and Langley (2004), who say process involves considering phenomena dynamically in terms of movement, activity, events, change and temporal evolution. By focusing on 'something that people do' (Whittington, Jarzbkowski, Johnston et al, cited in Langley 2007), we take a 'strategy in practice' perspective which adds a focus on micro level activities and practices. However, Langley's perspective, which I also show in this dissertation, aims to apply temporally evolving phenomena at a variety of levels such as the individual, organisational, sector and issues related to strategy content. We are certainly looking at non linear effects under complexity. For example there are political negotiations, and the possible destruction of organisational cultures and activity systems. Variance based process theories, while useful, tend to ignore complexity. (Barney, 2001; Langley, 2007)

A problem with attempting this qualitative process research is that parsimony is sacrificed and because of scope and time constraints; interviews were restricted to one regional area of New

Zealand. I also agree with Weick (1989), that whatever strategy is used, there will always be an uncodifiable step that relies on the insight of the researcher. Finally, while some process researchers have emphasized the importance of relating processes to outcomes, we should remember that “outcomes” are often rather artificial staging points amid never-ending processes and can be analysed as such (Langley, 2007). Perhaps a popular lay version of this is’ *‘the solution to one problem is often the cause of the next’*

## **5.2 What Is Grounded Theory (GT), And Why I Use It for This Study**

Grounded Theory (GT) methodology emerged from doing research on dying patients in 1967. It is a research method developing theory from data instead of from predetermined hypotheses. As researcher I begin with data from the interviews or elsewhere and progressively develop more abstract categories which integrate and explain the data and organise the relationships within them. There are varying interpretations of GT amongst scholars. I think this is because the original has been adapted and one of the original authors, Glaser, has many refutations and criticisms of how others have misunderstood him. Creswell (2003), says GT is an inductive approach moving from the specific to the more general as far as understandings; categories and theory are developed directly from the data, rather than by approaching the data with predefined hypotheses or constructs to test. Next, as analysis progresses the researcher tries to develop understanding and hypotheses as to what is going on. These ideas are then tested deductively through more data collection and analysis. So, doing grounded theory means carrying out inductive and deductive thinking throughout the process. The whole process is iterative and it also relies on an uncodifiable intuitive step by the researcher to interpret and make the data become useful information.

It was discovered, not invented, 40 years ago by Glaser & Straus, who complained that much of the research in the 1960’s was verification of theory or development of theory through logical deduction rather than from experimental data itself (Glaser & Strauss, 1967). Their claim was researchers were using logical deduction from past studies too much rather than building new theory from qualitative data. They thought it better to approach field observations without preconceived theories and to let the data speak for itself.

Much Grounded Theory (GT) interviewing, according to Glaser, involves passive listening. This is followed later, during theoretical sampling, by focused questions to other participants

which are based on emergent categories (Glaser & with-the-assistance-of-Judith-Holton, 2004). I thought this way of interviewing, listening then prodding with new questions was worthwhile as more was discovered than expected. Some participants were quiet at first and had little to say, and then as the interview neared the end they become animated with ideas. As interviewer, I initially did not know what questions to ask or what hypothesis to test. This is why my initial research proposal changed so much as the themes were revealed.

GT is a perspective based methodology and peoples' perspectives vary. My participants had multiple perspectives. The GT researcher raises these perspectives to the abstract level of conceptualisation hoping to see the underlying patterns which are yet other perspectives. Perhaps it happens to the participant firstly at a basic level simply because they are being listened to.

Some of the early points raised during the interview were not answered immediately but only spontaneously later in the interview as rapport was strengthened. Everyone had intelligent thoughts and opinions about their work, the organisation and politics. As interviewer, I tried to find out the degree to which their thoughts and opinions affected the performance of themselves and others. Each participant was told at the beginning of the interview that there was no right or wrong answer and that I was interested in their own opinion. They were told the results were confidential and others would not necessarily know I had spoken with them. They were asked not to tell others they had been interviewed and they would not be identified in the results. They were also made aware of my qualitative enquiry approach and that the grounded theory ideology meant I would possibly refine data, and ask their opinions again as the study progressed. As mentioned earlier, we try to look at a situation with a blank slate. It is perhaps impossible to approach a problem without bias, which brings the discussion to the subject of honesty in research.

### **5.3 Honesty in Research**

Abraham Lincoln reportedly said, *"You can fool all the people some of the time, and some of the people all of the time, but you cannot fool all the people all of the time."*

So what about fooling ourselves? Care is needed in order to answer the questions in the search for answers to problem and evaluation with our theoretical models, that we do not fool ourselves. Interviewer bias should be acknowledged, but in the original 1967 grounded theory, it was proposed that a situation be looked at with a blank slate. Some scholars disagree

with this, claiming it is impossible to approach a problem without bias. A salesperson needs to be biased to believing her product and company are the best. This is biased objectivity. On the other hand, it is important for the salesperson to retain integrity and honesty. But even this opinion and a business person's actions can be blinded by bias as to what is truly honest.

#### 5.4 Participant-Personal Data

Participants in this study are homogenous to the extent they are all medical scientists in one region. This has the advantage of keeping to a minimum the many alternative explanations for developmental process. So being able to compare cases that are similar in as many ways as possible, facilitates deciding whether the change processes are due to transient effects or more basic developmental models, but it does not control for cohort effects. A homogenous sample of scientists in the medical field facilitates the study of precise, focused questions or hypotheses (Van de Ven, 2007).

Before looking at the themes it is helpful to look at the various groups and types of medical scientists and how they are funded. Table 1 shows the various laboratory departments under a typical main regional health laboratory. Some of the participants interviewed worked in these areas.

|                                       |  |
|---------------------------------------|--|
| ▶Anatomical Pathology Department      | ▶Haematology Department                |
| Cytology                              | Core Haematology                       |
| Histology                             | Specialist Haematology and Haemostasis |
| Electron Microscopy                   | Surface Markers                        |
|                                       | Cytogenetics                           |
| ▶Biochemistry Department              | ▶Microbiology Department               |
| Automated Biochemistry                | Bacteriology                           |
| Immunology                            | Virology                               |
| Molecular Pathology                   | Serology                               |
| Protein Chemistry                     |  |
| Specialist Biochemistry               | ▶National Measles Laboratory           |
| Steroid and Immunobiochemistry        |  |
| Toxicology                            |  |
| ▶Endocrinology                        | ▶Point of Care Testing                 |
| <b>Table1 Specialist Laboratories</b> |  |

Other participants were employed by the New Zealand Blood service or under some of the University departments of pathology and departments of medicine that are listed in Table 2. For each hospital laboratory, and also some of the university departments, there are both medical laboratory scientists and scientific officers. They are funded in 4 main ways; either completely by hospital laboratory, by New Zealand Blood Service, by University, or by a mixture of Hospital laboratory and University/research organisations. The age range of participants was from 23 to 66. The average age was 50 and the median age was 49. Of the 35 participants, 34% were female and 66% were male.

**Department of Pathology**

Angiogenesis Research Group, Betaines Research Group, Cancer Genetics Research Group, Canterbury Cancer Network, Carney Centre for Pharmacogenetics, Free Radical Research Group, Gene Structure and Function Laboratory, Haematology Research Group, Liver Sieve Research Team, Retinoblastoma Diagnostics

**Department of Medicine**

Canterbury Respiratory Research Group, Christchurch Cardioendocrine Research, Clinical Pharmacology Research Group, Eye Movement Research, Health Care of the Elderly  
 NZ Multiple Sclerosis Study Group  
 Van der Veer Institute for Parkinson's & Brain Research

**Table 2 University Departments**

**5.4.1 Demographic data**

In total, there are over 1600 Medical Laboratory Scientists & Scientific officers employed in hospital and community laboratories throughout New Zealand (Massey-University, 2008). There are thought to be less than 80 medical scientific officers in District Health Boards in New Zealand. This does not include physicists or radiation scientists (P Elder, personal communication, Nov 12, 2008). (P Elder was not a participant for this study.) The significance of this is that about 20% of New Zealand's medical scientific officers were interviewed for this study. This study does not include physicists or radiation scientists.

## **6.0 Results and Analysis:**

### **6.1 Summary of Themes to Have Emerged From Interviews**

1. What works well now?
2. New Zealand compares poorly with other countries for funding research and development.
3. Scientists need to be much more pro-active as knowledge providers.
4. Scientists need to improve public awareness of new discoveries and relevance and importance to health and or the economy.
5. What funding issues are there?
6. Government barriers for scientific officers.
7. How medics could make a difference.
8. Management issues for scientific officers.
9. Barriers and concerns: medical laboratory scientists.

Note there is quite a bit of crossover of issues in the 9 themes.

#### **6.1.0 Theme 1: what works well now?**

One hospital group and some of the university groups were outstanding in enthusiasm for their work and regard for team members and their group management. The enthusiasm was exceptionally high compared with other groups. However, caution in comparing groups is needed because not all of the university research groups were interviewed. It is possible scientists in these groups could be equally enthused and have high regard for their management.

It was notable that the MLSs and MSOs had high regard and access to their senior scientific and clinical leaders. There was a congenial working group.

The interviewees in one hospital group who worked closely with a university group provided very positive comments such as:

*‘Our group works well with a flat management structure which means a group of us, scientists meet over lunch with our manager and we keep minutes to satisfy IANS for documentation’.*

*‘It’s a very good system here with our hospital lab and a university research group working*

*together. I do very little admin – we have a manager and a clerical worker to help- most is done by them’.*

Some comments on what they thought could be helpful to other groups included:

*‘Our group is very fortunate as we have research and hospital work and other departments should be doing this’.*

*‘We don’t look for grants - we have enough ideas here to do research but it’s possibly not encouraged or given financial backing in other areas –comes down to individual scientist. Managers need to suggest ideas –if publishing is not happening enough it comes down to the whole group not doing enough –this is the whole idea of the quality group we have in our section.*

Some positive remarks about their group culture were:

*‘Scientists are responsible people –we work in a small lab which is very responsible – we depend on the culture and individuals –we are responsible to the Clinical Director’. ‘Our group has very tight collaboration and we are tightly integrated with school of medicine – others don’t. Hospital and Government needs to promote collaboration with private and or other groups such as School of Medicine’.*

Overall, the groups which had close access to their Clinical Director were the happiest.

In most cases participants thought their laboratory was highly regarded by world standards. This suggests a good brand image. Older scientists attributed this to foresight of excellent Clinical Directors decades ago. They claimed their lab had an international reputation around the world but the public did not have a clue about that.

The happiest scientists were ones who were challenged, but some, especially MLSs were feeling some degree of stress which they believed impacted negatively on their organisation.

Clinical Directors were well respected for academic ability and were generally good to deal with. Section heads in the laboratories were also generally appreciated and some participants thought the section head pay was poor for the work load in some areas. Participants spoke positively of their peers.

Some scientists published a lot and participants thought this brought high regard to their organisation. They said that as a result of the Government’s need to know how money is spent, a lot of bureaucracy is caused. However, a plus for New Zealand Health bureaucracy

was made by one senior person:

*‘However it is probably better in New Zealand as the District Health Boards have a fair bit of control and the government distances itself, so we may be unique in the world’.*

### **6.1.1 What Works Well Now Specifically for Medical Laboratory Scientists**

Medical Laboratory scientists generally thought well of their section heads. On the whole, MLS staff relations were good. MLSs spoke positively of their peers. Medical Laboratory scientists enjoyed good opportunity for ongoing training. *‘We are able to give conference talks and have good communication with colleagues from other labs –this is totally dependent on manager’s personality and ego’.*

*‘The prime advantage of doing research in a hospital is that we have intelligent medics (clinicians) who need a challenge and this would keep them in the country- this would encourage people to do research and if they do it this makes them at the forefront of their field. This also benefits patients as they get better treatment and the chance to get the drugs years before they might otherwise become available’.*

The business development group was achieving success in bringing work to the Health Laboratory. Participants were pleased with this (although not with the lack of staff to cater for the extra workload.)

Overall, MLS participants were much less concerned with funding or politics than were scientific officers. However, most thought there were too many middle managers.

*‘Our section heads are great –I only get told about other sections from outside. – with laboratory work we get immediate results and feedback’*

*‘Line manager is good at delegating because it’s a big section; delegating helps give delegees a sense of ownership’*

One MLS said that management is ok and *‘the business manager is looking at more space for us as we are crammed and work load has risen dramatically because of the new system of technology and marketing success’*

Another remarked that management seem to be heading the right way to improve, as instead of going to private labs, the private labs are coming to us and that private labs have less work. *'We have good management relations –they are aware of our problems with lack of space and lack of staff –we as well as DHB management want to introduce lean methods to look at constraints and what's holding us up to become better'*.

MLS participants who reported directly to the clinical director were more satisfied than those who had middle managers. Comments included:

*'Our department is ok as we report to clinical director and patients are first. Too many middle managers in hospital though'*

*'I'm lucky as I have a good boss who is a clinical director of high profile'*

*'Our Medical Director's goal is to make us a centre of excellence –I can work with him because he says what he is thinking –he is encouraging toward publishing'*

*' Management has improved in 6 years and are now less autocratic –we now have less paperwork –have good dealings with them –they are receptive to improvement –have listened to some changes I have suggested'*

Another MLS explained that a major advantage their group had is, *'we have no middle managers but we work under clinical director which is not possible for some larger groups'*

A manager in one lab confidently remarked, *'Our group is very fortunate as we have research and hospital work and other departments should be doing this'*

Overall medical laboratory scientists were not concerned about top management and some were unaware what top management actually did.

*'Difficult to say what management are doing but they appear to be moving in the right direction'*.

*'I'm happy with things as is- but young students could find not enough challenge- About the management, doesn't matter to me- not concerned –not directly affected'*.

### **6.1.2 What works well now -Union representatives**

Most participants saw the contribution of the union representatives as valuable. Several staff had found the union representatives very helpful and an asset to the organisation. Some were concerned the union rep was undervalued and discriminated against by management.

*‘Our union rep boosts morale and has done a great job for us but the management see him as a nuisance –our union rep does a great job- is severely curtailed but he does the job because he has a passion for staff – union reps are a great resource’. The medical workers union rep is very helpful.’*

### **6.2 Theme 2: New Zealand Compares Poorly With Other Countries For Funding Research And Development.**

There were very strong feelings about this from most of the research scientists. One very senior person remarked that if a research scientist made it in New Zealand, they could succeed anywhere *‘as funding is so cut throat and hard compared with some other countries’*.

Participants were concerned, and well aware New Zealand invested comparatively less to Research & Development than most other OECD countries. One participant remarked that this was crazy because we needed investment in innovation because it led to results.

*‘Not doing pure science is short-sighted but Government says we can take research results from others. This is crap. We need to include pure science as well as applied for best results. Target of Government is for getting employment rather than investing in research’*.

One young post graduate PhD said, *‘It is not always possible to get funding from here so PhD’s go overseas and stay and none come back’*.

Several participants highlighted the point that without R&D and any infrastructure or Research atmosphere at multiple levels in New Zealand, people won’t go to university to do science. The top flight people interested in science will go elsewhere. As an example, in hospitals, the top doctors won’t come to New Zealand because they cannot get funding.

It was mentioned more than once by senior research scientists that there were good reasons for getting funding by not only government and local organisations, but by overseas investments. However, Government put up barriers to this and Pharmac was cited as one barrier. Ironically, the Ministry of Research, Science and Technology was another.

Several comments indicated the need for scientists to speak up and be more proactive in

keeping government informed. Several said that Scientists needed to be more political. *'Government Ministry is not really aware of the need to support us. Research funds are not indexed but go into funding salary increases to keep up with cost of living index only'.*

Again it depends on the political driver –for example heart research is high and others are lower'.

### **6.3 Theme 3: Scientists Need To Be Much More Pro-Active about promoting themselves to government.**

Several participants said scientists need to individually and collectively lobby Government and Management. This is to make the scientists heard and to get across the importance and value of medical science and research to New Zealand. They believe Government and management are not taking enough notice of them. Here is what some Scientific Officers say:

*'Government need more input from us as a group to show what we are doing in the way of teaching and maintaining standard of work as we offer a specialist service'.*

*'It is our fault that we have not spoken up enough and conveyed our concern'.*

The universities also came in for criticism by senior researchers. *'The university management support are not supporting properly as they need to listen to what we need rather than being dictated to from above. The Crown Research and Foundation are adept at slotting in with what government says it wants, but where does Government get its info –Crown Research Institutes are good at telling Government what we need to do and this is where university misses out –university are trying but are way behind'.* *'Pressure has to go on government –scientists need to drive this but it must come from both'.*

One scientist with a dual role of hospital and research work thoughtfully posited,

*'I think its time to show that management needs to listen to scientists –everything being equal both scientist and management need to challenge each other'.*

A top level business laboratory manager stated that Scientists and technicians need to challenge everything such as what and how they do things –*'as a group they don't sell themselves very well and labs tend to be silent services and they need to be more outgoing'.*

Over half of the Laboratory scientists dully remarked that Medical laboratory Science was not a very recognised profession as they worked in the background and they had indifferent esteem. *'People don't appreciate what we do'.*

### **6.4 Theme 4: Scientists Need To Improve Public Awareness**

A remark which came up several times was that the general public have a perception that science research is not important for New Zealand. The participants blamed scientists themselves as a group because they have not expressed ideas. Feedback here was along the line of:

*'Media can help influence private grants and donations'.*

*'Public perception may affect Government response but it doesn't help change the work – politicians are not scientifically literate'.*

*'There is a distrust of academics and this is not unique to N.Z.'*

*'Scientists are our own worst enemies as we don't publish to popular media and we have a responsibility to publish responsibly but this doesn't happen –trouble is the media sex things up and everything gets blown out of proportion'.*

As can be seen, there was acknowledgement that better public awareness was needed, but none were sure how to effectively do this.

## **6.5 Theme 5: What Funding Issues Are There?**

Comments here were very strong, with a sense of despair over the funding system. Funding of course affects every aspect. Funding had implications for work and poor tenure made the future of science as a career unattractive. A pertinent comment was that for medical scientists employed by district health boards, any extra money the boards got from government would go to nurses and doctors first.

### **6.5.1 Time wasted applying for funding**

A participant said there was too much time applying for research grants -10% time applying – grants are under funded –only 10% granted from Marsden and 15% from HRC that means 85% waste.

*'There is not funding for us to do our proposals which can take 2months –this eats into research time'.*

*'Government needs to get serious in terms of where they get money. It is too short sighted – overseas countries will invest in Pure Research but New Zealand won't'.*

When it was queried whether the proposals were written as effectively as they could to persuade the funding assessors the reply was, *'Our team are very experienced and put in well written grants and the grants have 3-4 reviewers who rate it for particular political driver*

*criteria –this is a ridiculous amount of time for us. How do the assessors know the value of the research and what benefits might accrue from it?’*

### **6.5.2 Better Tenure needed**

The strain on participants of short tenure for their research was obvious. They needed better tenure –the 1-3 year grants did not give them a career.

Several senior participants explained that Research is not a good vocation for the young as there is no money and it’s insecure and that the biggest strain on scientists is the lack of tenure and consequentially time spent on grant applications’.

One said they have seen young bright people go into finance instead, because of poor job prospects and long term job security would advice bright young people interested in research to go into medicine first and get a vocation before doing research.

However, some seemed to appreciate that it was not just a government responsibility. They were not sure if we can blame Government but said the young are not choosing science because it is insecure and we need government backing.

### **6.5.3 Why purchasing research will not work**

Some politicians want to purchase or capitalise on research from overseas instead of doing the pure research here. Politicians and the public seem to think this is the obvious choice for pure research here. It is also reflected in the ‘accountability’ or ‘outcome science’ getting most of the funding. One scientist frustratingly exclaimed, *‘I am angry at having to promise to account and state what will be achieved at milestones, or contract to produce results, and annoyed that science journals in our area want to publish pure or research hypotheses but we only get funds for practical science’* Funding was judged by how much and in what journals their work was published. It was catch 22 for this scientific department. However, most participants said most of their work eventually got published but the process took time and the more prestigious journals attracted better funding points.

A very experienced participant said, *‘If we don’t have pure or applied research it would be like fishing in muddy water with only being able to see the fish a foot ahead. If we are already up to date in the field we can see ahead a long way and discover opportunities we may not otherwise see. If we rely on overseas research to give us ideas for applied results we will always be fishing in muddy water not knowing where to look and catch’.*

They thought that bringing in research from overseas is a naive political idea as they all do this anyway as part of any research.

*'Purchasing science is crap'*, exclaimed another. This remark was indicative of the frustration of the research scientists as a whole.

#### **6.5.4 Is the Government behaving like a spoil brat?**

*'New Zealand biomedical science has survived in spite of government but the government is behaving like a spoiled brat wanting products now'*, remarked one research scientist, who then said, *'New Zealand needs an attitudinal shift toward medical science and to write off \$200m a year for the next 5 years on innovative research and development'*.

#### **6.5.5 Funding criteria and publishing research to get funds**

What criteria are needed to get funding and what does someone who is not a scientist in one specialist area know or determine why someone should get funds?

A remark was *'Funding is too targeted. Crown Research and Foundation are adept at slotting in with what government says it wants but where does Government get its information? Another said, 'How do the assessors know the value of the research and what benefits might accrue from it?'*

*'We have to produce results that, say, benefit the Maoris and other politically correct stuff'*.

(To gain a better funding outcome)

One scientist explained that for the gold publication standard, New Zealand has the lowest cost to publish at about \$70,000 to produce a paper. In some countries it is double that. Also in other countries with larger populations the private sectors pick up the slack –we are too small. Finland was given as an example of how strongly and supportive their Government backing was. New Zealand with a small population only 20% less than Finland therefore needs an attitudinal shift and to write off \$200m a year for the next 5 years. *'At a micro level, the Chancellor of Auckland University has been prepared to 'blow' IP with the belief they may at least get the benefit of some success out of it'*.

There was concern that the outcome from the Government can change depending on the current buss word. An interesting comment that deserves debate was, *'The Crown Research Institutes keep in house ideas they develop using government money, but this is tied up and*

*the public end up paying again –they have a commercial business model –no ‘public good’ science is being done and public end up paying twice when they get to use the science’.*

An interesting point about distribution of HRC money was, *‘I resent the fact Public Health Research is funded by HRC. This should be, and is the responsibility of the Ministry of Health! MoRST have their own minister and budget and they only need to go to one place. The HRC needs to go to 2 ministers which is B\*\*y stupid as they should only need to go to one place’.*

Some participants pointed out the different ways they were funded and how this affected their work. *‘There is a gap as some of the work we do for the District Health Board science is funded differently so some don’t need as much publishing to get funds or have as much need to.*

*‘About funding, soft money goes to haematology but no one gives to microbiology’.*

#### **6.5.6 More on funding for pure and applied medical science research**

All scientists that were asked about this area seemed to agree with one participant’s remark that, government have obsession with objectives or translational science to give funding but we must have more pure science and we must have people aware of base and able to see applications from that. *‘The HRC is good to deal with –the science system is over managed in attempting to direct outcomes and they don’t understand the nature of serendipity –they should give more funds to motivated people -there are not enough funds for pure science – funding is too targeted’.*

A pertinent point about training was that most economic benefits will come out of the researchers own work. *‘ we can’t train scientists if they are locked into one area of doing things –we need freedom rather than only having to show benefits as scientifically we don’t always know what we might discover’.*

#### **6.5.7 PHARMAC -a help or a hindrance?**

PHARMAC (the Pharmaceutical Management Agency) is the part of the New Zealand Medicines System that works to ensure New Zealanders have affordable access to medicines, and that they use those medicines optimally.

However, while some scientists appreciated Pharmac saved the country a lot of money there was a problem side to this. One said, that Pharmac save the country heaps but it stops overseas drug companies investing here and with New Zealand scientists so patients miss out on getting new drugs earlier and top medics are not given their ‘toys’ to keep them in the country.

Several others said that we need to get rid of Pharmac.

### **6.5.8 The consequences of lack of funding for scientific offers**

This is deeply concerning scientific officers. Older scientists were disturbed that their laboratory would lose the ability to carry out in house research and development work because of a financial squeeze which in the long run would make it hard if not impossible for the Hospital laboratories future scientific officers to regain lost knowledge. This is what they say:

*‘Without R&D and any infrastructure or Research atmosphere at multiple levels in New Zealand, people won’t go to university to do science. The top flight people interested in science will go elsewhere. As an example, in hospitals, the top doctors won’t come to NS because they cannot get funding’.*

Research scientists were very concerned at the District Health Boards cut back on scientific officers. *‘Long term development comes from scientists so if cut backs are caused by lack of finance or if District Health Boards have Government squeeze, the short term gain in employing fewer of us will ultimately make future progress suffer’.*

A very serious concern was outlined by some scientific officer participants that our district health laboratory wants to reduce the number of scientific officers but in 10 years most of the senior ones will have retired anyway. –who will do the development that is expected of the PhD and masters type scientists? –the Medical laboratory scientists won’t have time and will they have the rigorous training and ability that comes with the extra study years? Scientists do more method development and pass it down.

One suggestion was that maybe the competition grant money model is not good as short term nature needs to change –perhaps instead of cutting funding they should only cut half –a grant of 1-2 years was too short.

A problem with collaboration was that if collaborating with say the university or others, they take 11.5% overhead which inflates the budget.

A business manager said, they were reaching a point where lab service is limited by Government but Government funding is flattening out so if we introduce new tests some will eventually need to be funded by user pays.

Another senior scientist said, *'The system needs more money –there is not enough change to system but if there is not enough change it can't be done. –Government could help by funding the 'Gap' to trainees on site and bring in replacements'*

A comment reflecting the perceived value of medical scientists, was that if District Health Boards had more money it would go to nurses and Drs, but not to scientific work. The same person said the Government needs to get serious about where they will get money. *'We could do a lot more if we had money'*.

A few scientific officers claimed they had had the odd issue with unfair treatment of their budget by superiors.

## **6.6 Theme 6: Scientific Officers: Government Barriers**

### **6.6.1 Government Bureaucratic problems:**

Some comments are repeated here from earlier sections.

One manager remarked that managers were too busy with meetings and paperwork required for government bureaucracy.

*'Government looks for short term benefit but scientists need a longer term'*.

*'There is too much red tape – too much time applying for research grants - Grant system is too competitive and difficult –they have obsession with objectives or translational science to give funding but we must have more pure science and we must have people aware of base and able to see applications from that'*. (All research participants made similar comments.)

### **6.6.2 The effect of improved Quality checks and more computer power**

All scientific officers thought they had more bureaucracy or paper work to do. *'The new system created a bizarre paradox as others used to do it for us but now we have to do the compliance work ourselves although there are now more people involved –applying for grants has more people in the research offices in both University and support services but we have to do more work than we used to'*.

### **6.6.3 There is a drive to innovate but is it misguided?**

*'The CRI's (Crown Research Institutes) keep in house ideas they develop using government money, but this is tied up and the public end up paying again –they have a commercial business model –no public good science is being done and the public end up paying twice when they get to use the science. –yes there is a drive to innovate but there is not enough investment in the background science or technology'.*

#### **6.6.4 Legislation**

*'There is too much marginal time consuming legislation e.g. dangerous goods –blocks us from seeing real things or degree of importance'.*

#### **6.7 Theme 7: How Medics (Clinicians) Could Make a Difference**

The points raised here appeared to be very important as Medical doctors had more authority to authorize and or influence the work for the laboratory. *'Medical doctors need to tell us what will have a future for us to develop and more consideration to this should be given by the medical doctors'.*

*'There is no short term or medium term or long term development – development is ad hoc'.*

A comment for consideration was that projects such as assays get developed then die –*'we need to identify the projects that will be useful for us to further develop and not waste time on developing things that can already be done quickly and efficiently already in Australia. - we need to improve and develop new tests and methodology and medical directors need to tell us what will have a future for us to develop'.*

However, a senior hospital clinical director who was not a participant in this study, told me of their frustration at being blocked by peers and the difficulties their department had from shortage of staff and funds. *'I just wish \*\*\*\*\* (the general manager) would get up out of their chair and come and talk to me rather than send emails'.* This supports the empirical findings in this study that although the manager may not be able to solve the clinician's problems, the clinician still valued a personal meeting or for a more congenial management.

#### **6.8 Theme 8: Scientific Officers: Management Issues**

All scientific officers raised concern over management. Caution is needed here. This is not intended as an attack on the integrity of a select group of existing managers within a particular district health laboratory or health board. Some participants indicated the issues with management were common to others at a national and global level.

Earlier it was recorded that a senior research participant said the New Zealand district health boards and laboratories were given more freedom by the government than some other countries. I interpreted much of the frustration as being aimed at successive management and management as a profession. However, this does not excuse existing management from taking these comments on board and acting to improve the situation. One manager remarked strongly that *'some of them (MSOs) haven't published anything for years'*. This manager was acknowledging or suggesting they lacked motivation to publish and get more funding. When this was suggested as a problem to participants, the response evoked strong and very useful data. Here are some comments:

*'Lack of publishing is probably the result of bad management –they need to tell us what they expect and give us the resources' –its bad communication – we could make time if we knew what priorities were –perhaps they could pay bonuses for published work –to publish one needs to be driven –journals change'.*

More than 80% of participants commented on lack of management caring. This seemed so serious I quote them as such:

*'My impression is Management only care about their agenda but say 'we don't care about your agenda'*

*'Human resources or management shows no sympathy whatever. They probably consider us a blot on the landscape –we are tolerated because we (our group) bring in money'.*

*'If you have a good idea and tell management it will be the death knell for it –it is better to get on with it –some opportunities are given but the Health Board patent and then the whole thing slows down and gets bogged down'.*

*'District Health Board management as a whole has had a benign neglect for scientists'.*

*'There is a barrier between management and scientists'.*

*'It's hard for Joe blocks the scientist to be bad –management doesn't care –only care about their bonuses. Management not really interested –don't care –futile. H.R. doesn't care.*

*'Management has not allowed some scientists the climate or environment to publish'.*

*'We are pulled down by senior persons or management'.*

*'Place thrives on micromanagement –bureaucracy feeds on itself –need to appreciate why'.*

*'Make less demand on the scientist for bureaucratic staff reports so we have more time for*

*science*'.

*'We need more staff'* (on the other hand one respected senior section head said we don't necessarily need more PhD's but better pathways for them in which to work).

*'The university management support are not supporting properly as they need to listen to what we need rather than being dictated to from above'*.

*'Now we have too many managers and there is no productivity sending memos and having to keep our own management documents'*.

*'Get rid of managers and red tape otherwise New Zealand will keep failing –they are too short sighted.*

*'Management don't appear to trust or support scientific officers'*.

*'There is a lack of ability of bosses to give good feedback'*. (For some participants)

*'In the process of developing work others up the line can commit people further down the line to work without checking to see if the people are in a position to do the work'*.

There was some frustration with getting maintenance or equipment when university and hospital staff share rooms e.g. One medic having two separate computers in same room because the university computer cannot talk to the hospital one, and freezers not getting a proper alarm system because of disagreement over who should pay, and in this case the consequences, could result in loss of payment from the drug company for research.

## **6.9 Theme 10: Barriers and Concerns: Medical Laboratory Scientists**

### **6.9.1 Layers of management**

Generally, the more layers or channels of management between the scientist and the Clinical Director, the less job satisfaction Medical Laboratory Scientists had. Conversely, the more access MLS participants had to managers and Clinical directors, the less frustrated they were.

Comments from participants strongly suggest that scientists want and need managers to be proactive in not only asking about work but in socializing with them more. They wanted a more congenial management style.

### **6.9.2 Peer resistance**

In contrast to many MLS's who were content to just do their job, several strongly revealed their desire to try new things. *'It is frustrating that some scientific and management staff don't want change to new techniques and they even resist change'*.

*'Peer resistance is possibly slowing progress with new assay methods'*.

One participant expressed concern about new techs and scientists as to whether they will really understand work - *'It's important to go into small areas and new areas for experience'*.

### **6.9.3 Constraints**

A senior MLS manger pointed out that they were constrained by working for the District Health Board as the structure did not allow time to develop their own ideas. They were primarily there to serve the patient which constricts some personal science ideas that some may wish to develop as the ideas must translate into patient care.

*'Compliance regulations have us caught and trapped tying us in knots. Now more form filling than used to be'*.

One remarked that they thought many are going to Australia and it is difficult to get staff. However, difficulty getting staff was refuted by a manager. But another participant said, *'it was hard to find staff and management doesn't believe we need staff'*.

Others felt the pressure, *'There is so much work pressure and time restrictions make it difficult to get staff levels right.'*

### **6.9.4 Management issues**

*'The management doesn't have tea with us –they don't associate with us –they are told to keep separate from us. This is current management teaching'*. In response to this comment, one senior manager said they wished they could have tea with staff but they did not always have time.

A comment from another senior MLS was, *'Biggest bureaucratic issue is communication and management don't involve people they should –management have difficulty understanding basic concepts of what we do and of science –poor communication–however department managers are generally very good'*.

*'Team leaders have too much work for their pay level'*.

Even though most were appreciative of line management or section heads, the same participants said there were now more channels of management and managers gradually lost

touch with the coal face. Also, several commented that the more channels of management, the further away they were from clinicians. This complimented the earlier statements under ‘what works well now’ heading where it was recorded that staff felt fortunate to report directly to clinicians.

*‘Oldest staff used to rotate sections but not now and this is a bad thing’.*

*‘We need more space as we are cramped and work load has risen dramatically because of the new system of technology and marketing successes’.*

*‘Don’t think our boss appreciates what is involved and how much work is done’.*

*‘Management should act more on what the coal face say –sometimes they do – they listen but don’t act! –This is not acted at the top level by the medical director –it is blocked if money is involved!’*

The above comments can be countered with several positive statements by MLS’s that management was good.

### **6.9.5 Encouragement and work feedback**

Several remarked that the union representatives had been very helpful but were unappreciated by management.

One person said, *‘We don’t get much in the way of congratulations and social info from other labs outside.’* Also they thought the pay was pitiful.

A senior MLS expounded that, *‘There are some aspects of people needing to be spoon feed but I refuse to do that –the scientific role of people is to expand and push boundaries but I don’t think I should be on their backs –they should be more self motivated –how long do you spoon feed people?’*

A respected worker exclaimed *‘Management has no respect for us whatsoever. The managers can’t manage – if someone does a bad job the managers don’t come up to the person and say ‘hey you have done a bad job’ – it’s ignored’.*

### **6.9.6 Human Resources (HR)**

From the overall comments, participants were positively and negatively polarised on the helpfulness of HR. Generally, most participants viewed the Human Resource people as management pawns. A common remark was, *‘Human resources department are not helpful to*

*workers –too anonymous and don't have enough presence –they stand back and wait to see what happens –to understand legislation they need some science understanding –good on protocol but not on details'.*

*'Human resources department are severely handicapped by not having a scientific background. –they are not there for staff but only for management'.*

There was some appreciation of the 'rock and a hard place' position of the HR department. *'I feel sorry for some –depends how well they get on with management –some are excellent and some are horrible. HR gets caught between workers and management. Managers forget they are working with people'.*

However, one participant commented that *'Human resources have been personally helpful in the past'*. Another made quite a point of reporting that the HR person had been excellent helping their department.

*'Human resources are helpful but are under similar stresses'.*

## **6.10 What Do The 10 Themes From The Interviews Tell Us?**

They tell us:

Facts – An example is that government funding to hospital laboratories is limited.

Inferred data- For example, because some participants say it is very difficult for the organisation to get qualified staff and they are overworked, but another participant who is a manager says they can get staff if they present a good case to top management, the inferred data is that management will let the staff be overworked because the staff have not made their case known, or staff are afraid to speak out, or managers are afraid to present the case for more staff, or one of several other points.

Emotive information- Every participant showed degrees of emotion. Some were enthusiastic. Some were disillusioned. Others were concerned. A few were angry. Most were appreciative and yet for various stages of the interview they displayed any one of the above emotions.

At the lowest level of abstraction, we get data. Information is the next level, and finally, knowledge is the highest level among all three. Information becomes knowledge when we can act on this information, either to solve a problem, for example, to motivate a manager to spend more time socializing with staff, or to gain insight into an issue such as why some

scientists are not publishing enough. (Wikipedia -the free encyclopedia, 2008)

## **7.0 Recommendations from Analysis and Combining of the Literature Review and Empirical Data**

What is significant from the interviews (Section 6.1) is that the team with the least frustrated scientists enjoyed close teamwork and participants in this group believed they had a comparatively flat management structure with all workers having access to the clinical director. While some of these participants in one team were funded by the hospital and another team was funded by university, there was some cross funding and a definite co-operation between workers. Workers shared the same building for most of the time. The two groups each had a Medical laboratory scientist as administration manager, who worked together when necessary, but who had converse situations to deal with. The MSOs were not burdened as much by bureaucratic issues as their counterparts were in other laboratories.

The university funded team mentioned above was highly regarded by younger participants for the team's work which was seen as a leading world standard. Participants also said the clinical team was enthusiastic and the medics world leaders in their field.

The enthusiasm and approachability of all clinical leaders was acknowledged to be a huge factor in motivating MLSs and technicians as well as MSOs. Some participants thought their group was very fortunate to have both research and hospital work and that other groups should do this. On the other hand, some MSOs in other groups were very frustrated that they had too much hospital work which hindered them doing research or publishing.

The 'happy' group had 'tight collaboration with and were integrated' into the school of medicine, whereas other groups were said not to be. For all laboratory groups, section heads were appreciated and participants generally spoke well of their peers.

The results above are similar to the American findings of a study by Sapienza (2004).

In her introduction to 'Managing Scientists', Sapienza writes that between 1996 and 1999, her group surveyed 147 scientists, of whom two-thirds were PhDs, 14% were MDs, 5% were PhD-MDs, and the remainder MS technicians (and students). Most were from the life sciences, some had doctorates in engineering, mathematics, and physics. A slight majority was working in academia, the rest in biotechnology and biomedical companies. These scientists provided a window into what it felt like to lead and to be led in scientific endeavors. Sapienza says,

*'The importance of leaders' care and compassion to scientists and technicians working in the laboratory was striking. The best leaders were characterized as scientifically very competent, and compassionate and caring deeply for collaborators and subordinates'.*

One respondent in Sapienza's study noted, the best leader was "*caring but assertive*". There was good working rapport as well as friendship in the lab, and an overall feeling of appreciation for the work done. Similarly, in contrast to the use of negative reinforcement by ineffective leaders, the best leader not only criticized but also praised. "*A lot of people tell you when you've done something wrong. Very few people tell you when you've done something right*".

However, a comment was made from one participant in my study that *'no one tells anyone off when they have made a bad job.'*

Results also suggest workers rated having bosses as 'nice people' more highly than scientific competence. While Sapienza doubts it could be proved that effective leaders caused good science, she asserts that surely with good leadership, more "brain power" can be employed in scientific endeavours under effective leadership conditions than under the opposite conditions. Consider how difficult it is for people to focus on the science, says Sapienza, if they are caught in unresolved conflicts, the crossfire of sniping and negative criticism, or work thinking they are not valued or the bureaucratic paperwork is simply to keep the boss and their boss in a job.

Consider this in relation to the comments from (6.1.1), clinical directors and the participants worked with or for, were well respected for academic ability and were said to be good to deal with. In fact older scientists claimed their lab had an international reputation around the world but the public did not have a clue about that. The high reputation was attributed to foresight of excellent Clinical Directors decades ago.

The importance of clinical directors was pointed out in (3.12), where the Canadian Genetic Diseases Network (CGDN) and the effect of the success of the NCE was largely attributed to a single most important factor, that being the outstanding leadership of the clinical director. Findings show the high importance of excellent clinical leadership and the positive effect on having charismatic leadership who inspire teamwork. Findings from my study indicate this applies also in New Zealand.

Consider the statement from an MSO (6.7.0) on how clinical leadership could make a

difference. *“Medics (medical doctors) need to tell us what will have a future for us (scientists) to develop and more consideration to this should be given by them”*. From the point of view of this study and the comments from leading scientists in sections (2.1, 3.5, 3.12 and 3.22), this ranks high in importance. Clinical leaders need to tirelessly advocate their cause by inspiring, caring for, and motivating people around them. More money is needed. But it is not the entire answer. This study, together with the literature suggests the leaders can do a great deal to influence the productive output from the laboratories of New Zealand simply by good leadership skills. I would add here that unless the leaders and management have a genuine concern for MLS’s and MLO’s, any attempt at introducing programmes for motivation may not be effective. The old saying,

*‘People don’t care how much you know until they know how much you care’* should be taken note of.

In contrast to clinical leaders, there is very strong negative criticism of managers and the amount of bureaucracy. However, the comment from 6.10.4, *‘Management should act more on what the coal face say –sometimes they do – they listen but don’t act! This is not acted on at the top level by the medical director – it is blocked if money is involved!’* This shows some difficulty managers face. How much more motivated would MLSs and MSOs be, if instead of believing the comment from 6.8.1,

*‘If you have a good idea and tell management it will be the death knell for it – it is better to get on with it – some opportunities are given but the District health Board patent and then the whole thing slows down and gets bogged down’*, they instead believed they would be taken seriously and could not only have a part in carrying out the project, but to even share in the financial rewards. Consider this statement, *‘Management don’t appear to trust or support scientific officers’*, and from another scientist *‘My impression is Management only care about their agenda but say ‘we don’t care about your agenda’*

*‘Human resources or management shows no sympathy whatever. They probably consider us a blot on the landscape –we are tolerated because we (our group) bring in money’*.

Unfortunately, nearly every MSO and some MLS’s had little trust in management. This is not necessarily the same as thinking management ‘were doing their best or were improving’. I remind readers that the answers from some participants inferred that management possibly

included health management in general. As one MSO said *'trust is not there'*.

Returning to the literature section (3.10) and the significance of trust (Addison, 1998), showed trust as a 'prior context' comprised the building block of change. Positive prior context is characterised by mutual trust, informal communication and problem solving, empowerment and perception of ownership. The participants in our study did feel some empowerment, especially MSOs. The MLS felt less empowered and most MLSs said this was because of time constraints, but they were not overly concerned by it. For all MLS participants the average results show a slight positive prior context. However it is noted that even so, for some MLSs, trust with management was a problem affecting their work. Very significantly however, for MSOs there was a strong negative prior context in the area of trust. What is so serious about this is that not only do we have frustrated people; the economic progress of the Nation may be affected.

Therefore, empirically from my interviews and also the literature results and from Sapienza and Addison's findings, it is clear there is much benefit to be had from both leadership and management taking initiative to become more 'caring' and effective and to develop trust.

Why is there a problem here? Scientists and technicians know managers are well qualified and hard working people. They may also believe Gary Hamel (Hamel & with-Bill-Breen, 2007) one of the world's top management advisors who writes for Harvard Business Review, when he reminds us that most of what we have is the result of management. Hamel says *"...We should bow at the feet in front of shrines to Daniel McCallum, Frederick Taylor, Max Weber, Chester Barnard, and W Edward Deming, Peter Drucker and all the other apostles and prophets of modern management"*.

During the interviews I had an impression that many participants could be helped by first helping themselves – by learning to communicate better –by becoming more assertive – and by studying their own character to see if perhaps they could be part of the 'problem'. For me as researcher, this would have to be the most outstanding lesson I learnt. It was a deep privilege to listen to participants. I also saw my own weaknesses reflected in others as I have faced work and life issues. I recommend reading Fielder (1993) p155 'Does someone at work treat you badly?' The author explains how to handle difficult bosses and co-workers. He says that as therapist and seminar leader he has seen very intelligent people plagued by their own

harsh 'Inner Critics' and these people need to stop being so hard on themselves by asking if this self criticism was necessary or useful and would the energy be better spent getting support and ideas for solutions.

## 7.1 Theory

‘The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood,’ wrote John Maynard Keynes, (as cited in Ghoshal, 2005). ‘Practical men, who believe themselves to be quite exempt from any intellectual influences are usually the slaves of some defunct economist...It is ideas, not vested interests, which are dangerous for good or evil.’

The late Sumantra Ghoshal claims this is exactly what happens in management. In courses on organisation design, grounded in transaction cost economics the need for tight monitoring and people control has been taught - the reason is to prevent opportunistic behavior. Alongside this, management students have studied Porter’s five force theory which teaches that companies are competing against competitors as well as suppliers, customers, employees, and regulators. These ideas have been ingrained into management practice and according to Ghoshal, and of great concern; the result has been the delegitimisation of companies as institutions and of management as a profession. These theories have affected the way day to day decisions are made.

Ghoshal (2005), then argues that academic research related to conduct of business and management has had some significant and negative influence on the practice of management thereby affecting the world view of managers. The result has been propagation of amoral theories freeing students from any sense of moral responsibility. Business schools have extensively adopted the scientific model. There is not room to delve into the fascinating background here but it is worth mentioning Hayek’s 1989 Nobel lecture, “The Pretence of Knowledge” which says the pretence has demanded theorising based on partialisation of analysis, the exclusion of any role for human intentionality or choice, and the use of sharp assumptions and deductive reasoning (Bailey& Ford, as cited in Ghoshal, 2005). A precondition of making business studies a science has been the denial of any moral or ethics in business theory and hence management practice.

Continuing with Ghoshal’s idea, there is a theory called ‘liberalism which is ideology grounded in a set of pessimistic assumptions about people and institutions. Hirschman, (as cited in Ghoshal, 2005), called this ‘Gloomy vision’ which views social theory as solving negative problems of restricting the social cost of arising from human failings. This ‘Gloomy

vision' theory combined with the 'pretence of knowledge', set management research headed in the direction of making excessive truth claims based on partial analysis and unrealistic and biased assumptions, claims Ghoshal. Now according to Gergen (1973), unlike theories in physical sciences, theories in social sciences tend to be self fulfilling. Therefore if a management theory gains enough attention it will change the behaviour of managers to start acting in accordance with the theory. So the theory that assumes people behave opportunistically, and draws its conclusions for managing people based on that assumption, can induce actions that are likely to enhance opportunistic behaviour among people. I believe this is so and can give practical examples from my own work experience. Osterloh and Frey, (as cited in Ghoshal, 2005), say that a theory that draws from corporate governance on the assumptions that managers cannot be trusted can actually make managers less trustworthy. The theory may have been wrong to start with but it becomes right as managers conform their behaviour to the doctrine. Ghoshal demonstrates this is precisely what has happened to management practice over the last several decades the collective pessimism about managers has become the realised pathology in their behaviour.

If business schools have adopted the 'scientific approach' this may have given some significant benefits but the costs have been high. The methods of physical science can not always be applied to business studies. Ghoshal goes on to say that when managers and CEO's justify their actions by pleading powerlessness in the face of external forces, it is to the dehumanisation of practice that they resort. Claims of competition or capital markets being relentless and management has no choice, it may be on the strength of false premise of determinism that they free themselves from any sense of moral or ethical responsibility. I would not go as far as to say this would apply to Hospital or Laboratory management – although it possibly manifests in other forms - but I suggest Ghoshal's premise that common sense has also suffered a toll, definitely applies to the whole New Zealand Health area including the managing of medical scientists. If you do not believe that common sense has suffered just reread the participants' comments from my study. Despite this, it needs to be acknowledged here that with medical laboratory and hospital issues, what may appear as ridiculous bureaucracy to some workers may actually be essential for safety reasons such as infection control.

There are apparently numerous examples of how the applications of social theories like scientific methods, had lead to poor public policy decisions in the United States (Campbell,

1988). The academic world, Ghoshal says, needs to acknowledge the serious problems of social theory and in particular the issue of management and corporate governance, and to rethink these issues and change them. – For instance, the fact that years of business school teaching has resulted in practices that are now loudly condemned. The honest reason according to Ghoshal, is because such a perspective cannot be modeled due to such a theory being unable to give simple reductionist prescriptions or to easily yield testable propositions. As well as this, the math does not work, which results in no protection for the '*Pretence of knowledge*'. This would mean that business could not be treated as a science and we would have to fall back on the wisdom of common sense. It is interesting that with Ghoshal's theory here about social science and management, I have brought this into the study to consider his idea as it might apply to managing a district health laboratory where the workers and indeed most managers are scientists. This is not meant to be an attack on laboratory managers, but rather it possibly explains how managers can be trapped by their own bosses and or health boards and government bureaucrats.

An excellent book, '*Managing Scientists*' (Sapienza, 2004) and in my view, essential reading for all Laboratory managers, was originally written because she believed that effective leadership of scientists requires surmounting several difficulties that are different from those found in "nonscience" situations. Sapienza, a professor of management, does not agree however with some who believe scientists do not need leadership.

Could it be therefore, that the decisions of all of the funding bodies and the government minister, to make funding available to applied science where the expected outcomes are stated and assessed by people outside of the discipline in which the research is being carried out, is actually a fundamental error and lack of common sense for the aforementioned reasons? Is it possible the proponents have been brainwashed by 'physics envy', and by the 'boundary setters' defunct economic blindness? I would of course be foolish not to acknowledge that in our world of Porters 5 forces and the World Wide Web, accountability and limited finances are reality. It just means that the accountability needs to be different, which is where recent challenging ideas from respected popular management writers Gary Hamal, Peter Drucker, Tom Peters and Robert Grant should be taken notice of.

Consider Hamel's (2007) theory from "The Future of Management" from the chapter on Management Myopia.

*“Strangely, managers are unsurprised when science advances by leaps and bounds, yet seem unperturbed when the practice of management fails to do the same.”*

He continues by saying that Management is stuck in a time warp –or have we mastered the science of organising human beings? Management has evolved rapidly in the first half of the 20<sup>th</sup> century but now peaked, and the S curve of evolutionary management has matured. Hamel boldly punctuates his beliefs with the words, *‘We are at the end of management as we know it.’*

Hamel also says management has not changed much in 30 years compared to scientific progress. In fact management has changed but perhaps in the wrong way?

While there has been strong criticism of Laboratory management, this needs to be balanced with the many positive statements. This is particularly so for line managers. Also of note is the senior management experience and qualifications along with obvious drive to make their organisation succeed for the benefit of the local area. It is clear management and scientists have been caught in a crippling bureaucratic system and while acknowledged by all, there is no quick way out of this unless each manager takes more risk and has the courage to allow scientists to carry out research and innovate more on their terms. Administrators and politicians need to give scientists the playing field they need. Of course this is risky! But I believe the rewards are high. Scientists need flat management with opportunity for technician to Research scientist, to innovate if they wish. For any person, from maintenance technician to the CEO to block them is cowardice in the face of strong empirical and theoretical demand of the philosophy of science. This statement or words embracing the intent should become part of the proposed policy of innovation.

Scientists and managers see that the Internet is shifting bargaining power –e.g. some local individuals have produced and sold products or biotechnology to Europe. We can compete with anyone. It does not take Gary Hamel to point out Strategy life cycles are shrinking. To survive we must out-invent, and outthink a growing number of upstarts. However, we need to listen to Hamel (2007), when he blatantly states –**‘we don’t need bureaucracies of government departments** –we can negotiate ourselves directly.’

When confronted with why management has not changed as much as other disciplines, Hamel says that the reply is that there are limits, they argue, to the number of people that can be

effectively supervised by one person, to the degree to which accountability can be distributed, to the extent to which employees can be trusted, to the willingness of individuals to subordinate their self-interests to the interests of the corporation as a whole. Hamel believes most of these are imaginary excuses which offer managers a soothing alternative to the premise that it is a lack of imagination that constrains management innovation.

My question is, perhaps also that it is not so much a lack of imagination but more to do with the way state owned enterprises or health managers are rewarded with high salaries.

Consider one participants statement,

*“I think when budget cuts are needed the managers cut out research as it is a long time before results can be seen- if they can be seen –this way they keep their bonus- tacit knowledge of the scientist is then lost for not doing the research.”*

As well as that, perhaps laboratory management need to stand up to superiors such as the CEO of the district health board who may demand for example that ‘no more staff shall be added,’ and actually present a case to justify the need for extra staff as a means of bringing in extra funding in years to come.

The only present way up the pay scale is to manage and be accountable to managers higher up. They are trapped - trapped by the Government funding and accountability system and a comfortable remuneration, secure in the comfort that the CEO’s of the hospitals to which they provide service earn even far more for being their spokesperson and attending meetings and Powhiris. As one scientist put it,

*“There is too much paperwork which is administrative trivia given to justify admin jobs—I ignore as much as I can and it goes away – there’s too much duplication of data which is available on data bases already. Management can’t think outside the square -management feel threatened by staff and put up barriers and get us to fill out forms –they keep separate-build up their own control and don’t contribute anything meaningful to the organisation.”*

Consider the statement from two participants: *“... I’ve noticed in the last 10 years there are more middle managers creating more memos and manager ‘speak’ to justify their positions – this is the New Zealand district health board culture now.”*

*“Management doesn’t care –only care about their bonuses- Management not really interested –don’t care –futile. Human Resources don’t care. My impression is they only care about their agenda but say ‘we don’t care about your agenda’*

Returning now to Hamel (2007), in ‘Management Myopia’, “most managers see themselves

as pragmatic doers, not starry-eyed dreamers. In their experience, management progress is accretive rather than revolutionary—and they have little reason to believe it could ever be otherwise. But it can be otherwise, and it must be—the future demands it.”

Perhaps management does care? Perhaps they are trapped and too busy with bureaucracy to truly help their staff? Likewise, employees in MoRST and other organisations may also be trapped with the same problem. Or perhaps there could be other reasons. Whatever these reasons are, if we take Hamel’s beliefs seriously, and we consider the empirical results from this study, the current management paradigm of these organisations is obsolete. (I fear to make this claim myself but regrettably the study indicates that it is.) The good news is that existing management of the laboratories where this study was conducted and who authorized this study, are to their credit, high achievers who truly appear to want the best for their laboratories.

The other reasons I wish to pursue, have to do with communication. One can take a lesson from Chapman and Thomas (2006), authors of ‘The languages of apology’. We each have a language of response. For example when a participant said, ‘*We don’t get much in the way of congratulations and social info from other labs outside,*’ it suggests this person responds well to words of affirmation. When another participant said, ‘*The management doesn’t have tea with us –they don’t associate with us –they are told to keep separate from us- this is current management teaching,*’ it may also mean this person has a high need for affirmation or recognition. On the other hand, some managers have a primary language of ‘works of service’. These people don’t need affirmation but show and respond by doing deeds. The point Chapman and Thomas make is that we need to appreciate the different ‘love or communication’ languages people in the laboratory have. Results from interviews tend to suggest we all need to be reminded of the different ways people respond to and benefit from affirmation. We are not all the same!

## **8.0 Summary**

Top points to come out of the data are:

### **For Scientists**

- Medical scientists need to be much more proactive in informing government, management and the public about the value and benefits they can make to New Zealand

economy and health. Scientists need to better sell themselves and challenge the status quo.

- Some scientists need to take bolder steps to overcome personal difficulties, e.g. learn how to be more assertive and congenial. These are issues common to all people who work in teams.
- Scientists need to see beyond the failings of management and government but work to become ‘part of the solution’ rather than blame inadequate management.

### **For Management**

- There is too much unimportant bureaucracy, much of which is to support managers and their bosses. If it is important to managers then the reasons should be explained to workers. Some of this bureaucracy hinders scientists and technicians from acting on the important issues.
- A very serious concern was outlined by some scientific officer participants, that our district health laboratory wants to reduce the number of scientific officers –who will do the development that is expected of the PhD and masters type scientists? –the Medical laboratory scientists won’t have time and will they have the rigorous training and ability that comes with the extra study years? Scientists do more method development and pass it down. District Health boards need to consider this wisely in terms of the long term damage reducing medical scientific officers may have. The theory in this dissertation supports the need for more scientific officers and to give them more freedom and allowance for ‘failure’ but it also demands accountability from them.
- Managers are caught in too much bureaucracy generated by their own bosses or government. Perhaps they need to question their own superiors on the value of this.
- Scientists and technicians are well qualified and capable of making good decisions. They resent being mistrusted by management. Nearly all MSO participants thought management did not care and they did not trust management. The result of this is a huge waste of human intellect and output. As researcher, I believe there is huge potential for economic gain yet to be released by medical scientists and clinicians and although their organisation’s management may not be perfect, the potential is there regardless of the ‘perceived’ lack of funding.
- Data shows scientists want and need more encouragement and socialising from the management. Because managers tend to be ‘power’ or ‘achievement’ orientated this can

mean they may overlook the value of socially interacting with others who are ‘affiliation’ motivated. Scientists and technicians work better if they feel part of a caring team.

- Managers should trust scientists and involve them more in decision making where appropriate to make them more part of the team. Many scientists had little idea of management issues.
- Both MLSs and MSOs should be given opportunity to develop their ideas but these need to be followed up by management at regular intervals to check on progress. Note that some world leading innovators such as Dean Kaman and Bill gates did not complete university degrees. (Kamen was awarded the USA National Medal of Technology in 2000 by President Clinton for inventions that have advanced medical care worldwide.)
- Intellectual property owned by laboratories or funding agencies needs to be acted on and individual scientists encouraged to work as a team to bring products to market. At present scientists are wary of management. Ideas are ‘locked’ by deep mistrust of management and fear of legal and management retribution.
- Clinical directors need to be asked to provide definite leading and direction for the laboratories. Clinical directors need to develop the economic potential of the Medical scientist and laboratory and realize they have a part to play in leading economic growth of New Zealand as well as working on local health issues. Health Boards and hospital CEOs need to allow clinicians more latitude in work which could help the economy rather than just local health. There needs to be a much stronger focus on encouragement for clinicians wishing to innovate. Within reason, the fear of legal restraint should never stop an innovator.

### **For Government**

- The New Zealand Government has defined direction and we need to be very grateful for this. Scientists and the public need to appreciate the work government have done, but the government could help by routing out the ‘Tall poppy syndrome’ endemic in New Zealand.
- Organisations like MoRST, who claim they are the best people to tell government what needs to happen, should be seriously challenged. There are too many layers of bureaucracy with people who are not capable of making correct scientific decisions in someone else’s area of expertise.
- MoRST and other organisations should allow more cross fertilization of biotechnology

ideas and not tie up ideas in patents unless they give others within New Zealand opportunity to develop or work with the inventors.

- If the government believes what it says about the importance of medical science as an export earner, then it needs to provide much better tenure for researchers.
- Governments should force health boards and government departments to reduce management obstruction and appreciate that workers are more qualified than they used to be 20 years ago.
- Universities and hospital laboratories that share premises need to have a common management of buildings and plant, computing etc. Much frustration to scientists is caused by duplication of resources but denial of responsibility. Hospital and university management need to sort this problem out urgently and make financial savings for both institutions.
- Government need to listen more to medical scientific officers rather than just district hospital boards and MoRST.

### **Final comment**

The New Zealand public has a right and a need to demand action on the issues raised. It needs to be emphasised to the minister of health that medical scientists believe there is too much of the wrong kind of bureaucracy.

At a local level, while it is widely acknowledged that more money is needed for medical science and that scientists and management of laboratories may be trying to take a global view to bring in more work, more trust and management congeniality of their scientific staff is needed. As one MSO participant in this study said,

*'It is time for scientists and management to challenge each other'*

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## APPENDICES

### 10.1 Appendix 1

#### Sample question and response

What do you like most about being a scientist? *Everyday is different –\*\*\*\*\* –enjoy being able to take initiative on tests and \*\*\*\*\* –enjoy the work and people*

What are you good at? Give me some examples *–good multitasker –good planner –don't like \*\*\*\*\* –good at work practice*

When you think about bureaucracy what thoughts or feelings do you get? By bureaucracy I mean: Official procedure, Red tape, Rules and regulations, Formalities, Paperwork. There is no right or wrong answer here. I only want your opinion as related to your job as a scientist. Are there any issues here?

*We don't always get credit for the work done. –those at coal face don't always get recognition and this applies across whole organisation from what we hear gets talked about- certain favorites get funds for conferences and merit pay and projects and the sexy stuff.- possibly a combination of personality and ability but some quietly proceed with work but don't get feedback and recognition. E.g. (so and so) developed a \*\*\*\* in their own time which the health laboratory claimed the IP for and made lots of money but the individual scientist got no royalties –there is no difference made to those who work and those who don't –there needs to be something in it for me to encourage scientists.*

Would others feel the same way? *Yes –in \*\* years working I've noticed in the last \*\*years there are more middle managers creating more memos and manager 'speak' to Justify their positions –this is the organisation culture now.*

What about management: *It seems there is a lack of ability of bosses to give good feedback –with more managers I fail to see what they do –how many managers do we need?*

What about the Government -is there anything they can do to help: *Long term development comes from scientists so if cut backs are caused by lack of finance or short term gain in employing fewer of us ultimately future progress will suffer*

What about the registration board and \*\*\*\*\*? –not asked

One manager said to me that the scientists are not publishing enough –some haven't published for years –true some haven't and this is the role of the scientific officer if they are into method development and if they want to maintain that role they need to publish more. –however, over the years they have been told to do more diagnostics work so they are doing more MLS work

Do others at different levels feel this way? - Not asked for this participant

Do other scientists in say, private labs feel this way?-not asked

Human Recourses department people –can they do anything –they only do what they are told.

Getting back to the earlier question of could you be any better- what would you or management need to change in order to do better? The management thinks we are top heavy with scientists (masters and PhD types) and if we went on strike it would take 3 weeks before anyone felt the effect. If MLSs strike it is felt straight away. However, what management doesn't appreciate is that the scientific officers develop new methods and tests and for the MLS.-there is a role change as MLS have moved up and closed the gap and expectations between MLS and scientific officers so the management have tried to bring us down to the same level and pay less.-however, as an example one scientific officer set up a new assay which now do 100 samples a week and make \$5000 a week- when there is a problem and the system falls over they call the scientific officer to fix it as the MLS have no time or ability to fix it.

The organisation wants to reduce the number of scientific officers but in 10 years most of the senior ones will have retired anyway. –who will do the development that is expected of the PhD and masters type scientists –the MLS's won't have time and will they have the rigorous training and ability that comes with the extra study years? MSOs do more method development and pass it down.

Scientists doing research need opportunity to a make the demarcation between MLS and scientific officers but because some do diagnostics they don't get the time or opportunities as much to do research and publish –because some do all research and no diagnostics they get all research and have more opportunity to publish. –medics get increase to attend conferences e.g. \$16000 –scientists don't.

There is no short term or medium term or long term development –development is ad hoc – projects such as assays get developed then die –we need to identify the projects that will be useful for us to further develop and not waste time on developing things that can already be done quickly and efficiently already in England.-we need to improve and develop new tests and methodology and medics need to tell us what will have a future for us to develop. In the process of developing work others up the line can commit us and those further down the line to work without checking to see if the people are in a position to do the work. (Gave example here)

When I write up my assignment the management might see the overall result –doesn't worry me.

## 10.2 Appendix 2.

### Sample responses from Medical laboratory scientists

Medical Laboratory Scientists Group. –Government & Registration issues

When you think of bureaucracy what thoughts and feelings do you get? By bureaucracy I mean: Official procedures, Red tape, rules and regulations, Formalities, Paperwork. There is no right or wrong answer here. I only want your opinion as related to your job. Are there any issues here? Responses here relate to Government and Registration body rather than management.

1. *The government made bureaucrats but they don't have to accept the responsibility. E.g. CEO has high salary but they don't have to justify it. Compliance regulations have us caught and trapped tying us in knots.-Q.A. is good but compliance is costing too much and they keep moving the goal posts to justify what they do and this costs us a bomb. Our union rep boosts moral and has done a great job for us but the management see him as a nuisance –he is severely curtailed but he does the job because he has a passion for staff – he is a great resource.*
2. *There is lots of paper work –sometimes too much but it is necessary for records, fairness and day to day running –I can delegate because it's a big section delegating helps give delegees a sense of ownership. We could visit other labs as there is open communication and we can work together. NZMLS Registration board is aware scientists are not recognized for what they do. For research and diagnostics we need*

- more funding –more staffing as staff feel the pressure.*
3. *Has to be done –but appears to be too much bureaucracy. What about the registration board and NZIMLS? We need to be registered for clinical work –at first I thought it was silly but now see it as ok –possibly puts our esteem up –possible helps on safety issues –doesn't do any harm –although we advertise in Australia and UK we can't get enough staff –the ones who come are not just for money but for lifestyle.*
  4. *As part of NZ Blood service our section is based in hospital whereas other sections are outside. We are more involved with patients. –We should be part of hospital –while NZBS is excellently run, they don't really know what we do in our section. We can't just go home at 5:00pm we stay and tests are needed outside of normal hours-however we have to say we can't do the tests because NZBS doesn't offer this service now. The test then will take a lot longer to get done as it goes through a private lab. At least we are part of a national body –NZBS which is a good thing –we are now half way back to how things were.*
  5. *Nil*
  6. *Its not good having to strike –wages too low (gave examples).Not happy with Registration Board –doesn't give feedback-one person had pharmacy degree but was initially declined registration –a Philippines scientist came here but was put as technician-a south African came and was accepted –a French scientist came and one was accepted but other not –same qualifications –seems to depend on who the examiner is –techs actually do same work but can be abused.*
  7. *I'm not a member of NZIMS and I don't check their website –unions are good at sorting problems- our registration board requires we do Prof Development and what they do is enough as I don't want them being nosey and creating more work-their site is user friendly. Need more funding for Health –I think Government is culling Management*
  8. *IANZ stuff is s\*\*t and pedantic –but certain aspects necessary – some aspects are too nitpicky- they have run out of ideas but think they need to come up with stuff but this doesn't improve things as some don't get to the real issues but pick on extremes – creates more paperwork. Not enough money forces management to buy cheaper equipment rather than listen to clinicians preference*
  9. *I think of legislation as to protect –one need to understand the system which takes a long time to do –difficult to change things and bureaucracy is a barrier to change –*

*bureaucracy is improving for some –but some have lack of autonomy in their jobs. We need more money– Govt should realize value of MLS and we weren't mentioned in a report but we contribute to the DHB budget –Labs are too unrecognized –I would like to see more young people into science. Government could help set up research labs as separate with half pure science and half applied –hospital labs should primarily be in patient care. –About funding, soft money goes to hematology but no one gives to microbiology –scientists should make more noise to channel public perception. –We need good PhD's and scientists but career structure is poor –career in science is good for women but not for men. - we are constrained by working for DHB as the structure doesn't allow us to develop our own ideas –we are primarily here to serve the patient which constricts some personal science ideas we may wish to develop as the ideas must translate into patient care.–About funding, soft money goes to hematology but no one gives to microbiology –scientists should make more noise to channel public perception.*

10. *They can stop or make it illegal for DHB's to pay bonuses to managers –this is the problem and the management are 'threatened' not rewarded. They are threatened to have bonus's cut –the bonus is actually a threat not a bonus. We are heading into 'creating a Revolution –we are not creating evolution –we are creating "revolution" The conditions are heading this way –this is what we are in now- we are heading for revolution. Look at the pay –scientists earn a lot less than others over there (hospital) who are doing less.*
11. *Doesn't affect me –no issues. We need more money for research –we can't comment as to where the money is to go as they decide. About Registration board and NZIMLS or MLSB? These are good as they help keep technologist and techs in touch –attending conferences contributes to CPD points. Science in NZ is underpaid but I do job because I love it –they need to pay more to keep people in it –prestige is ok –public awareness does make a difference by helping with private fund donations*
12. *Reliance on overseas such as suggested by Jenny Shipley and others is naive –we can't import everything and if we do people who are the top drivers and world renowned like Dr \*\*\* would leave.*
13. *What about the registration board and NZIMLS? No can't do anything –their bureaucracy is not required although conferences are well run by the institute –the board is not needed as much as they think they are. The government problem is*

- allocating money in the wrong places –more input at the coal face is required*
14. *Government has helped with pure science (Marsden?) PSA has helped us with pay – NZIMLS helped with Prof Development but IMLTB is a pain in the neck*
  15. *We try not to let it affect us but with IANZ accreditation some aspects of bureaucracy make it better but some aren't – takes too much time writing up stuff for our CPD proff development - What about the registration board and NZIMLS? –We need this for our protection –but no point for those who don't have to take responsibility for decisions - technicians also now have to have registration if they do clinical work. –but its not particularly helpful –does it really matter or make us better –for CPD if we do 60points or 80 what real difference does it make to our performance?*
  16. *We are always under funded- What help is NZIMLS? It is proactive- support special interests groups –have big scientific meetings –good notification*
  17. *Government have been very helpful in our area of cervical screening by consolidating and streamlining labs –this is good for country and accepted by staff as a good thing but the unknown aspect of how the changes affect our jobs is stressful –massive increase in workload which is stressful. What about the registration board and NZIMLS? -Good thing as it gives more faith in co workers and me. Initiated CPD which is good but cumbersome and a lot of paperwork –have to do CPD in lunchtime meetings or own time.*
  18. *Don't know –we are now in more automated equipment –so long as Government don't obstruct. What about the registration board and NZIMLS? –Not really good as it makes people go to irrelevant stuff –not necessarily the best way –we should have continuing exams as refreshers*

### **10.3 Appendix 3**

#### **Medical Laboratory Scientist Group.**

##### **What do you like most about being a scientist?**

1. *Love job –feel it makes a difference to patient –enjoy people –challenge –collegiality among scientists and techs - gets me out of home*
2. *Patient contact first –helping patients- most others would possibly say the same, of course there are other reasons like staff contact, the job work, science etc. Money is not main reason-hardly anyone would say that.*
3. *Variety –interesting cases and aspects and can follow these through – we see patient*

4. *Job security-but I like challenge-lifestyle better than teaching –routine could be boring but we can make decisions which are meaningful-the reference lab is well organized – helping patients —like being responsible although work is often routine.-like opportunity to be on call and making decisions after hours which help. I like being able to work part time. Money pathetic.*
5. *Challenge of the hunt –we are looking for abnormalities and searching for an answer – like working with people but I spend a lot of time alone looking down a microscope which is a slight downside to job.*
6. *Close contact with staff –being part of a team –doing something –helping people- dealing with mothers and babies and patients –patients and family and friends come to visit and our location of lab makes that possible as its off main thoroughfare in hospital. What about money –is that important to you? Well that’s why we don’t have enough scientists- we get below nurses –we are also dealing with life and death –our training is longer but nurses start at a much higher salary.*
7. *The job is worthwhile*
8. *Diagnostic work, finding & providing a service –making people get better –every day is different –enjoy the people aspect –seeing staff grow –helping them- as section head, trying to make it a better place to work.*
9. *Enjoy mental stimulation –hands on work –hate having to do Management –like new challenges –don’t like routine – could do job with eyes closed but this is not what we do as we add value which differentiates us from private labs –like arriving at the correct method. I looked at a job their but withdrew my application because it did not add the value that the hospital scientist could achieve and it would be too routine.-here we have an opportunity to do research which they may not have in the private lab –they have pressure to do the numbers but the quality may be questionable and they don’t spend the extra money to do extra’s on certain patients.*
10. *I like working with technology and up to date equipment –like the satisfaction of providing good results to clinicians – like making changes to procedure and processes- Like the clinical contact by phone regarding patient tests.*
11. *I do more good than harm –make a difference- preventive medicine*
12. *Being able to produce results for clinicians –our area is now more automated or mechanical but 60% is still manual*
13. *Job is unique –variety –I have 2 main areas and in charge of one –very interesting –we*

- are close to patients here and this makes it interesting*
- 14. Work is easy and I enjoy work and getting it right and on time- enjoy technical hands on and also theory –enjoy the routine and happy to do spadework*
  - 15. When I started it was all hands on doing chemistry or hematology and I enjoyed that – enjoy the feeling that maybe I'm helping someone –feels like I'm doing good.*
  - 16. I like to think we improve the quality of health care which is my reason for being here – surrounded by people more skilled than me – being part of a team that drives changes*
  - 17. Enjoy coming to work each day –variety in research –I'm a manager dealing with people*
  - 18. Love job –feel it makes a difference to patient –enjoy people –challenge –collegiality among scientists and techs - gets me out of home*