DISCUSSION PAPER

Medical Training Board

The Future of the Medical Workforce

MEDICAL TRAINING BOARD

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Discussion Paper

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INTRODUCTION

This discussion paper from the Medical Training Board proposes that New Zealand will need to train more doctors in the coming decades. Estimating just how many will never be an exact process. What is clear, however, is that there will be a significant effect on the doctor numbers judged necessary irrespective of whether New Zealand plans to expand the health system based on existing structures, roles and systems or whether change occurs in health systems, structures and roles, thereby accelerating the pressures for system-wide leadership. The Medical Training Board has estimated the impact of these generally unknowable, and certainly unknown, effects on the reach that the medical community has in serving the health needs of New Zealanders.

As New Zealand doctors become increasingly scarce in parts of the health service, the country has relied on seeking alternative sources of doctors, which in itself can only ever be a partial answer. Some New Zealand doctors are working fewer hours, thus exacerbating the imbalance. The visible implications of pressure on the health system may have been obscured by the large and rapid build up in the number of overseas-trained and partly-trained doctors in New Zealand. As a consequence, New Zealand has placed huge, but only occasionally visible, pressures on the whole system of training doctors and may have slowed the preparedness of the health sector for the much larger changes it will face over the next few decades.

Part 1 of this discussion paper, entitled "*Getting it Right*", presents the Training Board's analysis of the number of doctors New Zealand is likely to have to train over the next thirty odd years. It takes account of potential influences whose impacts are able to be known and makes reasonable assumptions about those whose impacts are difficult to predict. Part 2 of the paper includes the initial stages of a statistical portrait of the medical workforce and medical training environment today. The Medical Training Board intends to report each year on the most relevant statistics, to develop a longitudinal picture that tracks New Zealand's development in supplying the medical workforce required to meet changing and increasing health needs.

The Training Board recognises that perceptions vary about the conditions and responsiveness of the medical workforce today and the country's preparedness for tomorrow, depending on where one sits in the system. Some of the information and ideas in this discussion paper naturally fall within the mandate of the Medical Training Board and for some this is not so clear. The Board makes no apologies for that. It aims to bring together enough information to act as a base for further discussion and debate.

The complexity of the health service and the duration of medical training lead to a multiplication of the potential influences on the system. These need to be accounted for. The judgements that the Training Board has used in determining what is of consequence naturally reflect both the advice the Board has received, and the judgment and experience of the members of the Board. Many of the things that the Board considers of importance to medical training, and to the demand for doctors, are well outside the ambit of those normally involved in training to rectify. The Training Board has found a number to be of such significance that its concerns could not have been reported competently without reference to them. The aim of this paper is to compellingly challenge existing practice, at a time when receptiveness to change appears to be strong.

The Medical Training Board believes it is necessary to have a very long time horizon for its work, because of the scale of change in the national and regional population composition, the long time period taken for doctors to complete vocational training, and the huge shifts expected in the care and management of chronic conditions. The paper has attempted to identify when particular levers for change might take effect and influence the number of doctors in New Zealand. As the Board will have more robust data over time, it is proposed to review its estimates in three years.

The Board is most grateful to those who have peer reviewed its discussion paper: Rienk Asscher from The Treasury, John Bryant from Statistics New Zealand, Dr John Morton from Canterbury District Health Board, Jean Pierre de Raad from the New Zealand Institute of Economic Research (NZIER), George Salmond, and Graeme Scott who is the Director of LECG.

In drafting this paper, the Training Board is especially indebted to Lindsay Beck and David Adair of the Clinical Training Agency for their statistical modelling. James Hogan assisted with statistical analysis and Angela Yeoman with editing the report. Statistics New Zealand and the Public Health Intelligence Group of the Ministry of Health also provided their expertise and assistance.

Marilyn Goddard and Sandra Cumming from the Ministry of Health have well supported the Training Board in its work, and the publishing team at the Ministry of Health has been of much help in the timely release of this report.

Len Cook

Chair
Medical Training Board

DEFINITIONS

Term	Definition
• CPD	Continuing Professional Development.
• CTA	Clinical Training Agency, Ministry of Health, funds medical clinical training as well as some non-medical clinical training.
• DHB	District Health Board. New Zealand has 21 regionally-based Boards that provide secondary and tertiary health care.
• Epidemiology	The branch of medicine concerned with the incidence and distribution of diseases and other factors relating to health (Concise Oxford English Dictionary).
• GDP per capita	Gross Domestic Product (the country's wealth), per person.
• GPs	General Practitioners.
• Locums	Doctors who choose short-term employment by more than one DHB at a time rather than permanent employment with one DHB. Locums are increasing in number among registrars.
• M10 directive	A salary-band system for doctors-in-training that links to specified ranges of hours worked; introduced in 1986.
• OECD	Organisation for Economic Cooperation and Development.
• PGY 1, PGY2	Post Graduate Year 1, Post Graduate Year 2.
• PHOs	Primary Health Organisations. Groups of primary health care providers established through the Primary Health Care Strategy.
• Prevocational years	The years between graduation from university and entry to a medical college vocational training programme (includes the trainee intern year, PGY1 And PGY2).
• Primary Health Care Strategy	New Zealand strategy focusing on improving access to primary health care and placing emphasis on population health and health promotion/disease prevention.
• Tertiary Education Commission	The New Zealand organisation which funds tertiary education including medical education.
• Training posts	Positions within DHBs and general practices for clinical training.
• Vocational qualification	A qualification gained after having completed a medical college vocational training programme and identifying the area of medicine a person is registered in (e.g. general practice, anaesthetics).

PART 1:

GETTING IT RIGHT

OPTIONS

The Medical Training Board suggests:

- changing the rationing of students into medical school;
- increasing the focus on general practice;
- co-ordination of funding for medical training;
- establishing a national medical training body strengthening linkages between training and delivery aspects of the health service;
- implementing clear performance assessment expectations; and
- increased accountability for the obligations on secondary schools to develop more Maori and Pacific people in the sciences and in medicine.

The Medical Training Board suggests options that:

1. increase the number of medical school entrants by 100, by 2012;
2. aim to attract a larger share of medical school entrants into general practice;
3. relate medical school graduate numbers and trainee posts for vocational training to workforce need;
4. strongly link the funding determined by the Tertiary Education Commission with that of the health service (through the Clinical Training Agency);
5. strengthen linkages between medical schools, the health service, and medical colleges; and
6. improve the way secondary schools work to lift the representation of Maori and Pacific students studying in the field of science, including as doctors.

THE ISSUE

Medicine, including service delivery, treatments and outcomes, has changed markedly over the last century, and the pattern and rate of change is likely to continue for the foreseeable future.

Throughout the changes, the role of the doctor has remained pivotal.

New Zealand needs the right number of doctors and the right types of doctors, in the right locations, providing the right care.

New Zealand needs to make this occur through design, based on insights and understanding of the many unknowns that heighten uncertainty about how to balance the demand and supply of health services.

Overall, New Zealand's health service has long compared well with other OECD countries. Recent OECD studies, however, have highlighted the comparative vulnerabilities of New Zealand in its health workforce, particularly its relatively high number of international medical graduates and New Zealand's ability to compete for medical graduates in an increasingly global medical workforce market.[1] Other vulnerabilities include New Zealand's small size, the geographical spread of its population, and the need for a critical mass of population in any one place if specialist doctors are to provide value for money.

International comparisons

As New Zealand faces pressures associated with demographic changes, epidemiological trends and technological and treatment advances, there will be greater challenges for New Zealand's health service in meeting the demands for its services and in comparing favourably with other OECD countries.

A literature review of some of the countries facing issues similar to those in New Zealand is included in Appendix 1. This review concludes that historical arrangements for the provision of health services and the training of medical professionals are unsustainable in other countries like New Zealand such as Scotland and Ireland.

Background on New Zealand's reliance on international medical graduates, in an attempt to cope with unsustainable practices in New Zealand's health system, is included in Appendix 2.

OECD figures show that New Zealand has been falling further below the OECD average in its doctor/patient ratio over the last couple of decades:

- In 1980 New Zealand's doctor/patient ratio was around 1.6 per 1,000 population, while the OECD average was 1.9.
- In 1990 the ratio in New Zealand was 1.8 per 1,000 population compared with the OECD average of 2.2.
- By 2006, New Zealand's ratio was 2.2 per 1,000 population while the OECD average rose to 3.1 in the same period.[2]

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[1] OECD. 2008. *Health Workforce and International Migration: Can New Zealand Compete?*

[2] OECD. 2008. *Health Workforce and International Migration: Can New Zealand Compete?*

This report predicts how many more doctors New Zealand is going to need by 2012, by 2021 and by 2041, and why. It considers ways of achieving those predictions.

The New Zealand health service is complex. The sustained implementation of changes to medical training will depend on how far they address the many concerns that exist.

Canadian Stephen Birch states that: *"productivity depends on a variety of factors, including the intensity of work (proportion of paid hours given to patient care), how work is organised, technological inputs, and inputs of other types of professionals"*.

This model or approach to analysing the demand for doctors underpins the methods of the Medical Training Board.

While New Zealand does not compare well with other OECD countries in its doctor/patient ratio, the nurse/ patient ratio is above the OECD average. In combination, this may suggest that the New Zealand doctor and nurse ratios reflect a difference in the delivery of health services that is well established in New Zealand, as well as the lower wealth of New Zealanders relative to populations in most other OECD countries.

Demand and supply

Whether or not the key elements of the New Zealand health service are changed over time, the number of doctors needed for the future is greater than the number needed now. This paper endeavours to build an approach to forecasting future demand for health services, together with the supply of doctors that might be needed to meet that demand. In this, the Medical Training Board has taken account of the impact of changes that might be made in health systems, roles and structures over the next three decades.

The training system must bring about opportunities for ongoing change in demand and supply at local, regional and national levels. It must be robust to demographic trends, and provide a strong foundation for strategic structural and systems-related shifts in the New Zealand health service.

Forecasting model

The Medical Training Board's forecasting model of demand and supply of doctors is adapted from a needs-based analytical framework developed in Canada by Stephen Birch.

That conceptual framework assumes that the requirement for human resources depends on four separate elements: demography, epidemiology, standards of care, and provider productivity.[3]

Assumptions about the trends in these elements in the New Zealand context have been drawn from the forecasts of the Ministry of Health, as developed for its *Long-Term System Framework*.[4]

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[3] Birch S, Kephart G, Tomblin-Murphy G, O'Brien-Pallas L, Alder R, and MacKenzie A. January 2007. *Health Human Resources Planning and the Production of Health: Development of an Extended Analytical Framework for Needs-Based Health Human Resources Planning;* SEDAP Research Paper No. 168; A Program for Research on Social and Economic Dimensions of an Aging Population.

[4] Ministry of Health. 2008. Draft. *Long-term System Framework: Environmental Scan.*

Statistics and assumptions of health service demands from the Ministry of Health's long term study of the health service, together with demographic projections from Statistics New Zealand, are used in the Training Board's model to predict doctor demand in New Zealand.

The New Zealand health system is largely publicly-funded. Approximately 78 percent of total health expenditure is paid for by government funds.

Additional trainee doctors will involve a cost to the state, as well as to the individual trainees. This can be compared to the cost to the state of continuing to pay the higher costs of locums, as well as the cost to society of **not** training enough doctors to meet demand.

The conceptual framework and the assumptions from these forecasts of the demand for health services upon which the Medical Training Board's predictions about doctor supply and demand are based, are discussed in the body of this report. Additional detail is included in Appendix 3.

The predicted additional need for doctors

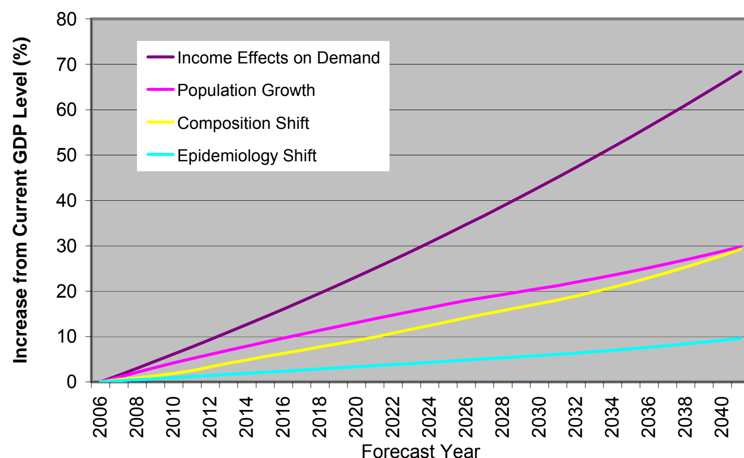
Based on assumptions of future demand, the Medical Training Board estimates that if an additional 100 doctors were to be added to the health service within one to three years, the number of doctors in New Zealand would steadily accumulate to meet the needs the Board now judges as apparent, over the next three decades.

The Training Board's estimate of the future number of doctors that New Zealand needs to be trained in order to meet future demand will need to become greater if the other factors assumed in the model (such as changes to health systems and an increased reach of health services) do not eventuate.

Any significant increase of the number of doctors in New Zealand before then will come from decisions about roles, systems and structures in the health service, as well as training processes and the employment arrangements for those currently being trained.

Figure 1 shows the contributors of the forecast increased demand for health services over the next three decades by the Ministry of Health.

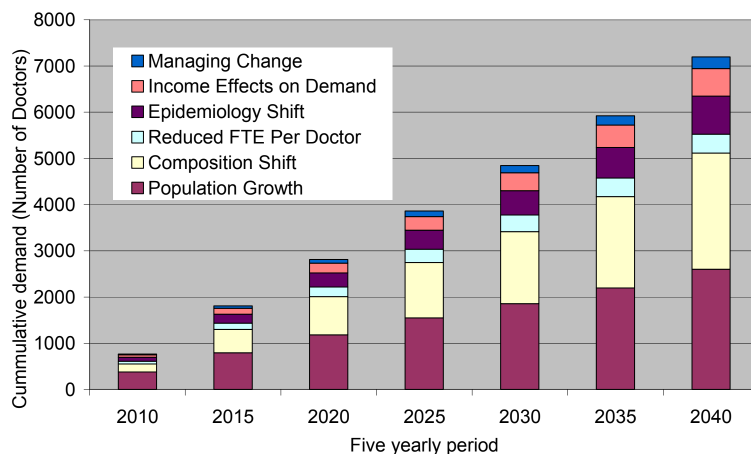
Figure 1: Increase in the demand for health services 2010-2040



If the proposals in this report are implemented, then an additional 400 New Zealand-trained doctors will be in the medical workforce by 2021, and over 1,700 by 2041.

Figure 2 shows the main contributions to increased doctor numbers.

Figure 2: The effect of health services change on the medical workforce



This report discusses the extent of increased demand and how many new doctors New Zealand might need to meet that demand. It proposes ways to achieve those predictions.

DEMAND FOR DOCTORS: IN THE RIGHT PLACE, AT THE RIGHT TIME, AND WITH THE RIGHT SKILLS

For the foreseeable future, health services overall will need to continually expand. It is very hard to forecast how needs might change, but some of the strongest influences can be identified.

The health service already faces huge change from population growth, population aging and the shifting mix of health conditions and prospects. Regionally, there are huge differences in the impact of population change.

In the past decade, the urgency of these changes has been met by increasing health funding to pay for the costs of locums and the costs of pay increases, but not for increases in the number of trained doctors.

Change is expected to be unrelenting, but it cannot be assumed that large budget increases will be sustainable in the long run.

The year to year volatility of population change in New Zealand makes the short-term forecasting of the supply and demand of doctors very difficult. This volatility undoubtedly is a disruptive influence on the capacity to detect long term shifts in demand For example, over the past 25 years for nearly one-third of the consecutive two-yearly periods, population growth in Auckland has been close to five percent or higher, the highest regional growth rate in New Zealand.

Population size, composition and geographic distribution

Changes in population size and composition are the most readily measurable influences on the demand for medical services. The population is projected to increase in size by an average of 0.7 percent a year between 2006 and 2036.[5]

One reason why the demand for health services is projected to increase significantly more over the same period than might be expected from the population increase is because people are living significantly longer. This leads to expectations of a large increase in those needing treatment and care for chronic conditions associated with ageing.

New Zealand's geographical features and population distribution mean that the distribution of health services across the country is important, and the health system as a whole should be considered.

Shift in focus to older people: For most District Health Boards (DHBs), services focused on younger populations will soon reduce, as their populations decline. The smaller DHBs (the majority) will be most affected by this, leaving many services at a level that is appropriate for the population size, but below the critical mass required for a safe service.

Figure 3 below shows that currently some 40 percent of public health resources relate to the needs of people over 65, although this varies between the DHBs from about 32 and 55 percent.

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5 Information provided on request by Statistics New Zealand.

Demographic change will mean that within 25 years all District Health Boards (DHBs) will eventually have to apply almost all of their additional capitation revenue to services for people aged 65 years and over.

Over the decade from 2021, it is forecast that all except the five largest DHBs will need to service a shift in focus from the population aged under 65 years, to those aged 65 years and over.

Such service shifts will have a continuing impact on the ability to provide the critical mass needed for safe services in the many specialities, and in the many localities, that exist now.

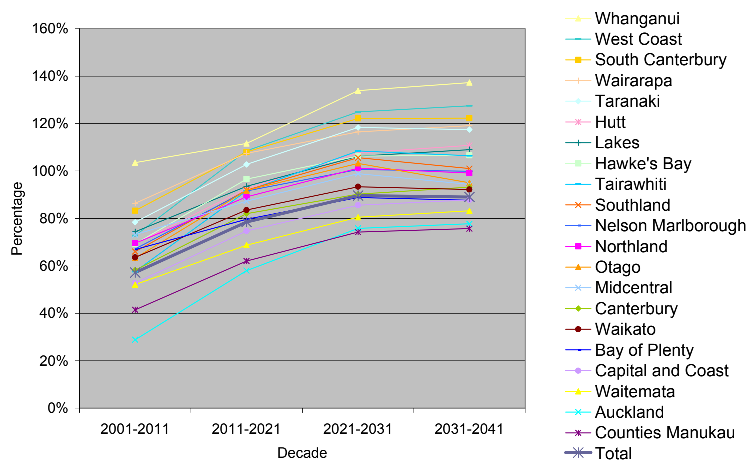
Already, hospitals in some regions are finding innovative ways to continue to maintain the delivery of specialist services in the way they now do.

The ad hoc nature so far of such innovations makes the forecasting of doctor needs very difficult.

It is also shown that of the additional money likely to be spent on health over the decade to 2011, some 57 percent will be allocated on account of growth in the number of people aged 65 and over, while in the following decade to 2021 over 78 percent of the additional allocation of population-based funding nationally will be allocated to this group. In the following two decades to 2041, this share will rise to 89 percent.

DHB data is provided in Figure 3 that encompasses the range of estimates from Counties Manukau and Waitemata at one end of the spectrum, to Wanganui and the West Coast at the other.

Figure 3: Of every extra dollar of funding, the proportion needed to be spent on the population aged 65 years and over 2008-2041



Without different ways of delivering specialist services, the costs to a region of the minimum scale needed to guarantee service integrity would result in a level of service not justified by the scale of local demands. The central region has recognised the enormity of this issue in its recent regional plan,[6] but its analytical approach has yet to be given the same emphasis on a national scale.

[6] Central Region District Health Boards. May 2008. *Regional Clinical Services Plan.*

There is likely to be continual change over the next three decades in the service mix available at hospitals outside the main centres, as rural and smaller city depopulation and the concentration of population in the main centres typify population shifts around New Zealand.

The significant projected rise in the number of people who will have chronic conditions that need care and management, along with a continuation of the development of the role of the primary care sector, means that New Zealand will need a substantial increase in the number of general practitioners, alongside changes to the nature of general practice.

The shift in the care and management of chronic conditions is expected to necessitate change from the current mix of vocationally-trained specialists, and also to shift the mix of roles among health professionals.

Special issues for Auckland: The Auckland region has the largest population mass and is the most significant growth centre in New Zealand. It is the main region that is expected to see continued strong growth over each of the next three decades. Over the same period all other regions will begin to decline, some quite significantly.

The Auckland region has a younger than average population and a higher birth rate. As the major business centre, it continues to be the focal point for internal migration, and it is the dominant point of entry for international immigrants. The region contains one-third of the population now and is expected to contain 38 percent by 2031.

The Auckland region faces extremes of income and health conditions and its health services need to anticipate the huge change that is expected. The medical workforce that will adequately serve this population will need to reflect the special ethnic characteristics of this region.

Epidemiology

A large shift in the share of medical services is expected over the next three decades focused on: (a) prevention; and (b) treatment of chronic conditions.

Prevention: early evaluation studies indicate that a greater emphasis on primary health care appears to be bringing about change:

- the cost to patients of access to primary health care has reduced;
- there is an increase in the utilisation of primary health organisation services; and
- new programmes of care for people with chronic conditions have been developed.[7]

Epidemiological analysis points to windows of opportunity for the long-term management of health costs. The return on investment for actions that enable early diagnosis and treatment are well known, such as in cases of diabetes, and early childhood hearing and vision screening.

[7] (1) Cumming Dr J and Gribben Dr B; September 2007. *Evaluation of the Primary Health Care Strategy: Practice Data Analysis 2001–2005*; Health Services Research Centre.
(2) Ministry of Health. December 2006. *Review of the Implementation of Care Plus, as at August 2006*.
(3) Ministry of Health. June 2008. *A Portrait of Health: Key Results of the 2006/07 New Zealand Health Survey*.

As they move across a range of environments and services, doctors-in-training can be a key component in spreading medical innovation.

New Zealand's health system has avoided reviewing and changing its unsustainable structures, roles and approach to training doctors, by relying more and more heavily on locums and international medical graduates.

Treatment of chronic conditions: patient volumes have continually increased over the last decade, as those in the New Zealand population live longer, and the incidence of age-related and chronic conditions increases. The concentration of costly care in the last months of life means that we need to anticipate longevity increases in order to build up the resource base associated with the consequent shift in services needed.

Innovation

Medicine is experiencing sometimes revolutionary shifts in diagnosis and treatment, and doctor training is evolving from teaching about practices and skills to building up a continued capacity to learn. This is reflected in the institutionalisation of continued medical training for clinicians in all specialities.

Increasing the opportunity for doctors-in-training to work in a mix of environments (most particularly health centres and rural services, but also small and large hospitals) will increase the capacity and stimulus for research and innovation.

Coping with uncertainty in demand

The health service has a degree of resilience which reflects the high uncertainty about the extent to which shifts in demand for doctors occurs.

The supply of international medical graduates, however, is much more responsive to short-term demands, such as the recent record level of births, than is the supply of New Zealand graduates.

The supply of doctors in New Zealand is less able to respond to short-term changes in demand because of the comparably small number of medical graduates in any one year. This is further exacerbated by:

- the volatility of year to year changes in demand;
- rigidities relating to medical specialisation;
- the working environment and conditions; and
- rigid systems and structures.

MEETING DEMAND

The need to increase the adaptability of the health service is urgent, and for the next five to 10 years this must become a significant priority.

The complexity of the health system means that simple solutions can sometimes have consequences that offset predicted gains.

There is continual, growing change at local, regional and national levels, all of which need insightful leadership in order for the health system to be capable of more consistency in how interactions occur, and in exploiting technological and medical innovation.

Also released by the Medical Training Board on 30 September 2008 are two accompanying papers that complement this discussion document:

- *Integrated and Co-ordinated Medical Training*
- *The Curriculum Framework*.

The Medical Training Board has developed long-term predictions of the demand for doctors over the next three decades, but these predictions are conditional on the adaptability of the health service, including the continually evolving roles of medical doctors and other health professionals, and more effectively integrated systems and structures.

The Training Board has made very strong presumptions about how, and how far, these factors might evolve and adapt in order to respond to demand. This paper considers:

- **more doctors with the right skills** including:
  - trainee doctor numbers;
  - specialisation of doctors;
  - the role of international medical graduates;
  - retention of doctors;
  - working conditions;
  - the interface between training and service delivery; and
  - inadequacies in the oversight of training working.
- **the impact of systems** including:
  - leadership;
  - reducing the fragmentation of the health system; and making decisions about regional versus central structures;
  - the reach of health services;
  - the role of health centres; and
  - productivity.

The Medical Training Board's accompanying discussion document (*Integrated and Co-ordinated Medical Training*) also considers how New Zealand might achieve the aim of the right doctors in the right place with the right skills and at the right time.[8]

Some of these factors, such as the training and supply of doctors, are within the scope of the Medical Training Board's purview. Others, such as systems, structures, and funding, are not. Nevertheless, for the purposes of provoking a wide-ranging discussion about the issues for the New Zealand medical system at this time, the Board has chosen to stray into areas that sit outside its official mandate.

[8] The Medical Training Board. 30 September 2008. *Integrated and Co-ordinated Medical Training*. Discussion Paper.

MEETING DEMAND: MORE DOCTORS WITH THE RIGHT SKILLS

Training and education, coupled with research and innovation, need to be embedded as core goals in the health care system, if New Zealand is to have a sustainable health workforce.

Limiting the number of doctors entering medical school has no significant relevance as a means for rationing the level of publicly funded health services. Over-provision has fiscal costs, as it typically costs nearly $400,000 to train a medical specialist.

There are strong forces leading to increased specialisation of doctors and other health professionals. Such specialisation increases the necessity for greater overall cohesiveness of the health service.

The less integrated the health service, the greater the lost potential for productivity gains from increasing specialisation.

For over two decades, until 2004, had been no increase in medical school entrants when demand pressures became significant. New Zealand does not have enough doctors in training to meet the increased needs of the next decade, and the decisions taken in 2004 and 2007 to train more doctors will take a decade to have an effect.

This section of the report focuses on educating, training, and retaining doctors with the best skills.

Trainee doctor numbers

New Zealand rations the supply of doctors trained in New Zealand. In 1982, the number of medical school places was reduced by over 50 to 285 per year, and this was unchanged until 2004. Since 2004 the number of funded medical school places had been raised twice:

- from 285 to 325 a year in 2004; and
- to 365 a year in 2007.

As the scarcity value of doctors increases, the medical school cap may have perverse effects. The fiscal risks from over-provision need to be considered alongside those from under-provision. There are high opportunity costs from increasing medical school numbers. For example, if the medical school intake was to increase by 250 students, then over 20 years New Zealand would have absorbed into health some 5,000 additional scientifically-inclined individuals who were, therefore, unavailable for training in other disciplines.

Specialisation

Continued medical specialisation has underpinned some of the efficiency gains and innovations in the health service. To effectively realise the benefits of increased specialisation there needs to be increasingly strong systems within hospitals and among DHBs.

The near nationwide availability of many medical services in New Zealand has been founded on the general competence of doctors, regardless of their degree of specialisation. The general nature of the foundation training received by medical practitioners has made the training system more capable of responding to shifts in the mix of demands on medical specialists.

The trend to higher specialisation makes it unlikely that smaller district health boards with all but their older populations declining in number would be able to afford the capacity to have immediate access to a variety of medical services, without placing at risk the quality overall of national services.

The OECD recently reported that for every doctor trained in New Zealand who lives overseas, there were two doctors living in New Zealand who were trained overseas.

According to the Medical Council's 2006 publication The New Zealand Medical Workforce, 40 percent of all practising doctors in New Zealand in 2006 were international medical graduates.

Governance of training and the linkages between medical school, the health service, and medical colleges need to be strengthened.

Stronger links could help reduce the variability in experiences of doctors-in-training on matters that are critical to their completing training, and getting the most from each experience.

Hospitals in some localities are unlikely to be able to continue to operate specialist services where, in order to function on the scale needed to guarantee service integrity, the costs to the region would result in a level of service not justified by the local resources.

This is likely to be a cause of continual change in the service mix available at hospitals outside the main centres, as rural and smaller city depopulation and the concentration of population in the main centres typify population shifts around New Zealand over the next three decades.

The management of regional disparities in health services provided by medical specialists, particularly general practitioners, could be alleviated by finding new ways to ensure that a significant share of additional medical trainees are employed in ways that reduce specific concerns about maldistribution of doctors.

The role of international medical graduates

International medical graduates have long been a main stay of the New Zealand health service. Changing demands that reflect the volatility of population change in New Zealand have long been met initially by international medical graduates.

The skewed distribution of doctors in regions and in some fields of medicine has been mitigated by the recruitment of international medical graduates for these posts.

There is a concern that the source of international medical graduates may diminish as other countries offer more attractive employment packages and living conditions. There is a danger in being as reliant as New Zealand is on overseas-trained doctors.

Appendix 2 provides additional background information on international medical graduates. This paper assumes that additional doctor demand over time will be met by New Zealand-trained doctors. As a consequence, the share of international medical graduates would fall to about 30 percent of doctors in New Zealand over the next 30 years, compared with about 40 percent in 2006.

Because of the generally independent operation of regional health services, there are uncertainties about what the local trends in medical services mean nationally.

The rise in the number of junior doctors who choose locum work has had different consequences for DHB services, depending on the location and the medical speciality service.

The wide range of causes complicates developing a national focus on mitigating their consequences.

There is a growing gap between the number of graduates from any one graduate year who remain in New Zealand, and the number of training posts to be filled.

Retention

To ensure that New Zealand has a sustainable medical workforce to provide health services into the future, a significant proportion of staff in all medical centres should be in permanent positions with less reliance on locums.

The Medical Council's 2006 workforce survey shows that by the third year after graduation, 25 percent of New Zealand graduates are not practising in New Zealand. This figure has been consistent for some years. There is a risk, however, that it may change in the future as the impact of student debt and higher overseas salaries is felt. If New Zealand was to reduce this loss by 20 percent it would gain the equivalent of an extra medical school year intake every 15 years.

Working conditions, including the need for long hours, may also contribute to the loss of doctors from the health system.

Working conditions

The working life of doctors has changed considerably over the past decades, and there is a high probability that these changes will not abate. The most obvious trend has been a reduction in the length of the working week. There is also a continued marked preference for New Zealand graduates to work in a specialist field and in a major centre. How these trends will evolve is difficult to foretell.

Industrial agreements bring a rigidity to conditions of employment that might otherwise be influenced by the continuing pressures and demands faced by health professionals, and which cannot be predicted at the time awards are settled.

Alongside the introduction of the M10 working time directive in 1986 there have been changes in the employment of doctors-in-training in hospitals. As the demand for doctors-in-training to provide services in DHBs has expanded, the annual increases in the demand for junior doctors have exceeded the capacity of the medical training system.

Organised and regular engagement providing leadership to medical training as a rigorous process has not occurred among the university, DHB and medical college partners in the medical training system, despite a high degree of bilateral exchanges.

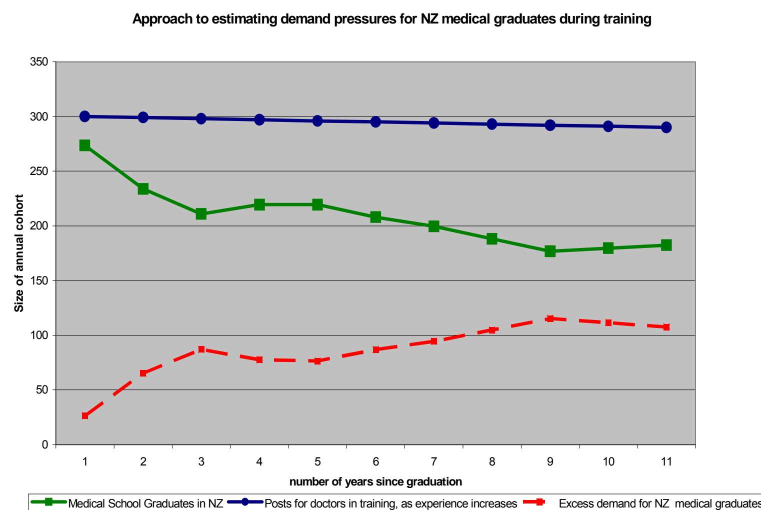
There has been little in the way of common, ongoing governance of these complex medical training arrangements and linkages.

Direct measures are required of the number of hours of vocational training that now provide effective and relevant experience and guidance to doctors-in-training. The Board has heard arguments that the range of effective experiences has reduced, and that there may be a large but unmeasured variation in the experiences of any one group of doctors.

Doctors-in-training may have longer periods of practising under some form of supervision. At a time when there is pressure to reduce the time taken to train doctors, the country can ill afford this outcome.

The gap between demand and supply reflects both the past failure to adjust the medical school intake, and growth in the number of training posts not associated with long-term vocational training needs. There may be a mix of reasons for the excess of posts, including the obligations within industrial agreements, the belief that doctors-in-training reduce costs compared to senior medical officers, or a failure to rethink the roles of doctors compared to other health professionals. We have not been able to draw this chart exactly from DHB sources.

Figure 4 Approach to estimating demand pressures for New Zealand medical graduates during training



Interface between training and service delivery

The hospital has remained the predominant place for training doctors. The inextricable ties between training and service delivery in a hospital make it difficult to direct training activities without having to regularly face service delivery pressures.

This gives rise to a tension between training and service delivery that has been exacerbated through the specification of working arrangements for doctors without regard to the nature of the apprenticeship model, and the changing clinical context within which it operates.

This is further exacerbated by the inadequacy of co-ordination and monitoring of trainees' progress, and lack of co-ordination between service needs, training posts and medical school trainees.

The dominance in clinical training of the hospital industrial setting means that new practices involving service delivery, patient safety, efficiency, and innovation are often established independently of their impact on training.

Currently, medical education and training follows a rigid path that is structured around set timeframes.

Trainees learn at different speeds and some have different home environments that are not conducive to a time-based linear training structure.

A move to a competency-based structure that includes experiential learning would better support the different needs of trainees. Clear assessment programmes would better ensure quality compared with the current training system.

Industrial agreements cover the working conditions of doctors, including those in-training, and their working hours. They also specify workforce balances and places of work, and intensively monitor changes to agreed arrangements.

Inadequacies in the oversight of medical training

There are a number of key players involved in medical education and training and each has been separately constituted with a high degree of autonomy.

The universities and medical colleges have, respectively, academic autonomy and professional independence. The undergraduate training in universities, and at vocational training level in medical colleges, is subject to standards and regular review by the Australian Medical Council on behalf of the Medical Council of New Zealand.

The 21 DHBs operate independently and, at present, the mechanisms for external review of the early postgraduate learning experience in DHBs are relatively less structured.

The Medical Council has statutory independence for its role in the accreditation of medical practitioners as being fit to practise.

Doctors-in-training continue to deliver health services while the inadequacies in the medical training system continue to grow. These include:

1. inconsistent oversight of trainees;
2. local variations in consultant training capacity;
3. inadequacy of the number of training places in general practice settings to provide certainty of access to primary care services;
4. inconsistencies in availability of trainee funding at different stages of the medical training continuum;
5. variation in standards of entry to medical colleges and uncertain recognition of prior learning;
6. doctors can conclude their medical training by obtaining posts as a medical officer, but are not recognised by colleges, with a consequent impact on Continuing Professional Development (CPD), training, and continued lack of clarity in their standing in a medical vocation;
7. limited national oversight of the impact of local failures on health service confidence and increased precautionary actions by clinicians; and
8. an absence of performance measures to recognise and evaluate the significance of training to health providers.

MEETING DEMAND: IMPACT OF SYSTEMS

Through the absence of systematic leadership of what have become critical integrating elements of the health service, New Zealand fails to bring much needed cohesiveness to medical and non-medical facilities essential to the country's health services.

Unless this changes, New Zealand will miss significant opportunities for increasing the reach of medical and other health professionals, and ignore the considerable potential to drive productivity change by active leadership at the national and regional levels of systems, roles and structures.

Regional and national leadership is needed now to plan for sustainable service delivery in different ways. Without this leadership, planning future medical workforce levels will continue to be a fraught process.

The forecasting of future doctor needs is further complicated by the need still for a cohesive direction for extending clinical service networks at both national and regional levels, although the DHB system does not of itself prevent this happening.

The Medical Training Board recognises the potential benefit of work being carried out now by the central region DHBs as a role model for future approaches to service delivery. This will have an impact on where trainee doctors are placed during vocational training years.

The Board is of the opinion that the implementation and operation of better health service systems will significantly impact on the working conditions, training, performance assessment, and retention of New Zealand medical graduates. Factors central to this achievement are:

- leadership;
- reducing the fragmentation of the health system, and making decisions about regional versus central structures;
- the reach of health services;
- the role of health centres; and
- productivity.

Leadership

Without system-wide leadership, the expansion of the health system will not necessarily bring about the significant improvements in health care expected when doctor numbers increase.

Rigidities in the health service reduce the impetus for developing the existing mix of health professional roles in a cohesive manner.

System-wide innovation is difficult in the fragmented DHB system, particularly when it involves multiple services.

The health care system must also recognise and support the increasing role that patients play in the management of their own health.

Not only is productivity reduced because the capital base of the health service is larger than necessary, but many of the costs of exchanging staff, patient and diagnostic information among DHBs reflect fragmented investments.

A simplistic focus on cost efficiency can reduce the opportunity for taking advantage of innovation, and reallocating resources and capital, yet these may be critical in the coming decade.

The way the medical workforce is rigidly grouped within 800 or so small labour markets makes it very difficult to estimate future medical workforce needs and costs.

Fragmentation, and central versus regional structures

New Zealand's health system structures (including the hospital/DHB and general practice settings) were designed for a health service that emphasised local responsiveness rather than preparedness for the scale of change needed for the emerging characteristics of the New Zealand population, its location and health, and potential changes to treatment practice.

The division of the New Zealand health service into 21 distinct economic entities (the DHBs) adds rigidity to the way the New Zealand health system evolves in this regard. This has meant that policies that stimulate system-wide productivity have less consequence than improving individual DHB performance. Yet many innovations in health will have the most benefit only if the health system itself changes.

The health service will face growth in demand, reducing doctor hours, and accelerating innovation, irrespective of how financial resources are allocated. Expanding the New Zealand health system without considering how to influence the rigidity of structures, roles and systems is unlikely to lead to the standardisation of service capacity and quality across all DHBs.

The reach or volume of health services

In almost all fields of medicine, the capacity to both accurately diagnose and treat conditions has increased. Advances in technology and treatment have resulted in a continuing reduction in the length of stay in hospital.

This, in turn, has led to an increasing acuity of hospital-based activity. Furthermore, patient expectations and patient advocacy are increasing continually, bringing about a greater recognition for patients and carers to be well-informed and offered choices they might not have been offered in the past.

The role of health centres

The primary care sector is long overdue for: an acceleration of the introduction of community health centres; medicine practised within a wider set of health services; the training of new GPs; and strengthened localised links to the supporting capability of the full health system.

Productivity and cost

Change in the productivity of health services is difficult to measure, as quality and equity of access are often significant drivers of change, yet they are not effectively encapsulated in measurement processes. New services are often separately recognised in measurement systems only after some delay.

Recognising productivity gains is a fraught activity in all public services, nonetheless so in health. Productivity gains in one service do not easily translate into resources that can be transferred to other services, because of the critical mass needed to provide a service that meets and sustains standards of care. Because investment decisions are made at DHB level rather than for the health service as a whole, the result is the duplication of investment in information-related technologies.

The separate operation of the 21 DHBs has led to the creation of many separate medical labour markets, each of which reflects the demand and supply pressures in their own mix of services. Industrial agreements codify the management of these small markets for trained specialists and doctors-in-training. Locums, however, tend to move across these markets.

BRINGING IT ALL TOGETHER

The Ministry of Health predicts that population aging will increase the demand for labour in the health and disability services by between 2.5 and 4.3 times the rate of increase in the population as a whole.

Demand for labour in the medical workforce is predicted by the Ministry of Health to outstrip supply (by 2011) by between 27 and 42 percent of the 2001 workforce.

The rise in significance of the prevention and treatment of chronic diseases in determining the right number and mix of specialists will test the health service's capacity to adapt. This will have a significant impact on diagnostic services.

Key to meeting this emerging shift will be the selection and development of an appropriate number and mix of medical trainees.

The working hours of doctors are predicted to reduce. This report assumes that for the next 25 years, doctors who complete medical training will have a working week that is five percent shorter than the working week of those who retire.

Forecasting demand for doctors

The Medical Training Board has estimated the increase in demand for doctor care (Figure 1 refers) based on:

1. the Birch 2007 needs-based analytical framework focusing on four elements:
   - *demography*: the population is going to increase; it is going to age; and it will shift its geographical distribution;
   - *epidemiology*: the focus of the health dollar will shift towards (a) primary health care, and (b) chronic age-related conditions;
   - *standards of care*: with increases in technology and increased disposable income, standards of care will increase; and
   - *provider productivity*: including aspects such as new ways of working and working hours.
2. assumptions about the demand for health services described in the Ministry of Health's draft *Long-Term System Framework* (Figure 2 refers), include:
   - *the aging of the population*: by 2028, almost 50 percent of all health expenditure (and between 80 and 100 percent of each additional dollar of funding) will be on people 65 and over. This will occur because of the growth in the sheer number of people in this age bracket, and not necessarily because these people will be sicker overall;
   - *projected growth in people living with long term conditions*: more New Zealanders are expected to be living longer with chronic diseases, reflecting advances in treatment and management of chronic disease;
   - *increasing demand for health services*: in most developed countries, there is a strong correlation between GDP per capita and health expenditures. New Zealand's GDP per capita is expected to rise over the next 20 years, and it is likely that there will be an increase in the order of 50 percent in health expenditure as a percentage of GDP; and
   - *technological advances, prices, service coverage, and productivity*.

In New Zealand, an increase in the volume of health services per capita can be observed between 1950 and 2006 of approximately one percent for every one percent increase in GDP.

The continuation of the past tendency for the volume of health services to grow by this amount would make health one of the major sectors of continual investment in technology, human capital and research in New Zealand.

The Board predicts that a comparatively small share of this income growth will influence the scale of labour resources. It provisionally assumes that up to 10 percent of economic growth will influence the growth of the medical labour supply, adding to the influences of population growth and changing age composition.

The proposed changes to the curriculum are predicted to result in one half of the intake of the medical school ultimately completing their vocational training one year earlier than now.

Appendix 3 contains details about the Medical Training Board's modelling of demand and supply of doctors, and its assumptions.

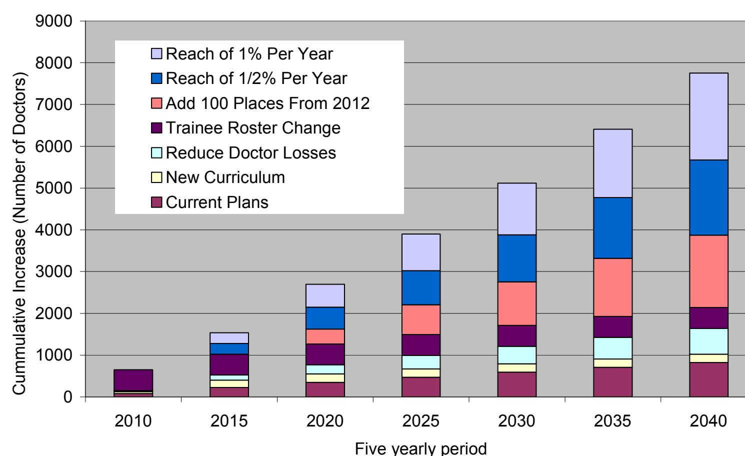
Forecasting supply of doctors

The Medical Training Board has estimated how various factors might influence the supply of New Zealand-trained doctors working in New Zealand over the next three decades. As well as the status quo, it modelled:

- increasing the cap for new trainees by another 100 places between now and 2012;
- changes to trainee rostering, resulting in more effective use of resources and opportunities for training;
- establishing a new, integrated, and far-reaching curriculum to respond to future medical demands, including the capacity to start the training earlier;
- increasing the 'reach' or volume of health services *either* by one-half percent each year, *or* by one percent each year; and
- reducing doctor losses by up to 20 percent if the other policy measures are implemented.

Figure 4 demonstrates the increases in numbers of doctors the New Zealand medical system will have available to it if some or all of these proposals are implemented.

Figure 5: Predicted increases in doctor numbers by type of change implemented 2010-2040



The Board is confident that an increase of 100 doctor trainees by 2012 is necessary, and advises that thinking should begin now about the timing and expansion path for that.

Measures to increase the number of New Zealand doctor trainees will result in almost all additional doctors needed in New Zealand being trained in New Zealand. This would reduce the potential risks to New Zealand if the international supply of doctors were to significantly reduce.

If the Medical Training Board's proposals are implemented, the share of international medical graduates is expected to decline from about 40 percent of all medical graduates to close on 30 percent over the next three decades.

Even if only a long-run annual average increase of doctors of one percent is assumed, there would be an increase in the capacity of the medical workforce by some 1,700 doctor equivalents by 2025, and another 1,400 over the following 10 years.

For this forecast to be achieved, the role of health professionals and the relevant service models would need to evolve more rapidly than at present. The health system would need to bring about change to health centres and stronger national services leadership.

New Zealand also needs a health workforce that reflects its population composition. Although Māori and Pacific people comprise nearly 15 percent and nearly seven percent of the population, respectively, they comprise less than three percent and less than three percent of the medical workforce.[9] The Training Board has not yet addressed this issue, and recognises that it is a priority for its second year.

Bringing together the modelling of demand and supply

Figure 5, below, brings together and models the range of influences on doctor demand and supply. This figure indicates the need for an additional 100 places in New Zealand medical schools in the very near future. Such an increase will need to be staged over several years.

A health service in New Zealand in 2030 will require this number of additional entrants to its medical schools because of the changes to the size, composition and health of New Zealand's population over that time.

Of special importance is the need to direct much more of the medical school intake of the future into general practice, as well as the need to build confidence in young doctors in the extended significance of general practice in the health service.

There are many ways in which the reach or capacity of the medical workforce in providing health services to New Zealanders could be extended. If the doctors who graduate in 2020 work in an environment which is not significantly changed from now, there will be a greater demand for doctors than that which the Board has forecast under its assumptions for change.

[9] Statistics New Zealand. 2007. *Population Data*. Ministry of Health. 2007. *Health and Independence Report 2007*.

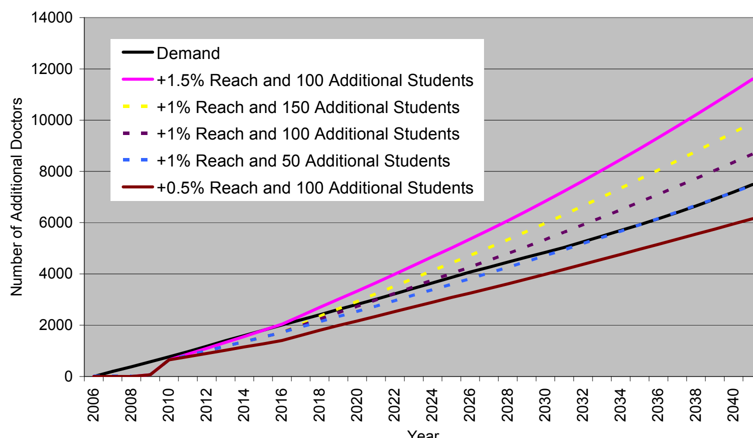
The capacity for vocational training of the existing flow of medical school graduates is being tested by the current inflexibility of structures, roles, and systems.

The Medical Training Board has drawn on previous reports on medical education and training that have highlighted the problems arising from the lack of co-ordination in the current system between:

- the under-graduate years;
- the transitional years;
- vocational training; and
- difficulties with the apprenticeship model in the service delivery environment.

Changes need to begin now to the training of the health workforce and to the leadership of health service roles, systems and structures.

Figure 6: Matching supply and demand determinants for doctors to 2040



Interfaces

New Zealand cannot face up to future demands on the country's health service by increasing doctor numbers alone. If it were to leave its systems, roles and structures unchanged, then the country would need at least a further 250 entrants a year into medical schools.

The Board currently estimates that the gains in productivity from system-wide leadership of the way the roles, systems and structures of the health service evolve will be more significant than increases in the number entering medical school.

These gains will be especially critical in the coming five to 10 years, at a time when New Zealand has few other ways of building up the capacity of the health service. An early focus on the placement of doctors-in-training, and a stronger emphasis on the consistent oversight of their training, both need to begin now.

Recent additions to the number of medical school entrants, together with the Board's proposed changes if they are implemented, will place the vocational training system under greater stress, and immediate steps need to be taken to mitigate this.

Most particularly, the roles and expectations on trainers need to be made explicit, as do the obligations on health employers to support the delivery of training.

Integration

If New Zealand is to provide in a sustainable fashion the required number of medical practitioners for the next 50 years then the education and training system must be characterised by:

- the integration of education, training and research into all aspects of health care provision; and
- the co-ordination of education, training and research enterprises at national, regional and local levels.

Details of the Medical Training Board's proposals for integrated leadership and implementation of relevant medical training and education into the future can be found in an accompanying and complementary publication *Integrated and Co-ordinated Medical Training*. The end purpose of medical training is the development, by design and not good fortune, of a competent medical workforce: the right number, right type, right location, and providing the right care.

APPENDIX 1: LITERATURE REVIEW FROM SCOTLAND AND IRELAND

By Dr J Morton Canterbury District Health Board

Studies in comparable countries with small unevenly distributed populations demonstrate how forceful reports are necessary to drive home the reality that historical arrangements for the provision of health services and the training of medical professionals are unsustainable.

The medical workforce in Scotland is under pressure. Service demand is rising and will continue to rise; the capacity to respond is already limited and will be further restricted as the Working Time Directive is applied across the workforce and as practitioners seek and expect less demanding hours of work.

Scotland

Scottish Executive; *Future practice: a review of the Scottish medical workforce*
http://www.scotland.gov.uk/library5/health/fpmr-03.asp
Accessed November 2002

1. The core service issue is the delivery of a 24-hour, acute care service for primary and secondary care.
2. We should plan for tomorrow and for the next 10 years: a sound nationally-led workforce planning process is essential, and must be informed by authoritative evidence.
3. We need more doctors to support a specialist-delivered service: doctors in training provide too much care.
4. Scotland should be organised around much larger regional health economies than exist at present: each should address workforce planning and the delivery of all but the most highly specialised services. The public must be involved in service redesign.
5. A review of the traditional hospital career and training grade structure for doctors is required.
6. Team-delivered care is an overarching theme: the workforce must accommodate new and changing working practices.
7. Travel time increases clinical risk for emergency care, but so can lack of capacity, critical mass or experience in a small unit: this applies across the whole of Scotland.
8. We need the right incentives to recruit the doctors we require and to retain enough of those we already have: we need to promote and publicise medical careers in Scotland.
9. The output of basic medical education must produce new doctors who are fit for the purpose: further work is required to identify the options for modifying the present arrangements for entry to Scotland's medical schools.
10. Political, professional, public and service leadership is needed to create a clear and realistic public awareness of the issues and priorities.

The vision in Ireland of high quality training and the production of competent doctors is undermined by deficits in the current medical training system.

Strategic management will be required to introduce changes to the education and training of doctors.

Value for money and efficiency can be achieved through a more streamlined health system.

Ireland

The vision in Ireland is that the postgraduate education and training environment will be attractive to all medical graduates, and deliver high quality schemes that will result in a sufficient number of fully trained, competent doctors to deliver a patient-centred health service in this country.

Central Training Authority

The proposed new model of hospital service delivery will require major changes in postgraduate education and training. While acknowledging the positive developments that have already taken place in recent years, the taskforce believes that there are deficits in the present system of postgraduate medical training:

1. the distribution across many different agencies of various and overlapping functions and responsibilities in relation to the organisation of postgraduate medical training. The present postgraduate medical education and training system is complex and the number of different bodies involved, with various and overlapping functions and responsibilities, reflects the piecemeal development of the system over the last 50 years or so;
2. the lack of regulation of the numbers of training posts in the senior house officer (SHO) and registrar grades and the accompanying rapid and uncontrolled expansion of NCHD numbers;
3. the lack of alignment of the numbers in training to future vacancies and the estimated staffing needs of the health service;
4. the predominance of service requirements over training needs;
5. the lack of a single authoritative advocate for postgraduate training;
6. the lack of co-ordination of data collection in relation to medical education and training; and
7. the absence of any formal involvement of medical schools in the delivery of postgraduate medical education in Ireland.

A more streamlined system will facilitate better value for money and efficiency. Strong strategic management will be required to drive the change implementation process throughout the postgraduate medical education and training system.

A streamlined system will need to take account of:

- the relationship between population size and services/specialities that can be offered;
- staffing levels based on identified need; and
- better understanding of the relationship between the training and service delivery roles of trainee doctors.

Regionalisation guidelines

Populations of 200,000–250,000 are required to support hospitals with **the minimum range of acute services** required to deal with emergency and acute patients. The international literature indicates that hospitals providing the **full range of regional services** require even larger catchment populations (350,000–500,000) to ensure safe and effective patient care, support training and allow staff to maintain expertise. Taking account of these factors, and in order to improve equity of access for all areas consistent with best medical practice, the Irish Medical Training Board believes that specialties can be described within the following structure:

1. *Regional specialties*: those specialty services that can be provided safely and effectively in a region of 350,000–500,000 catchment population.
2. *Supra-regional specialties*: those specialty services that, taking account of catchment population, workload and case mix, can only be provided in a limited number of locations, each of which serves a catchment population of 750,000–1,000,000.
3. *National specialties*: tertiary care services, which for reasons of caseload, quality and cost-effectiveness, are only provided at single, individually recognised sites which meet the national requirement for the diagnosis or treatment of all patients with a particularly complex or rare condition.

Frequency of service provision

The requirement to participate in on-call or to deliver on-call services within individual specialties or sub-specialities has a significant influence on workload and staffing requirements. There are three levels of staffing need:

1. *24-hour on-site availability:* there is consultant availability on-site throughout the 24-hour period.
2. *Frequent on-call:* consultants are called into the hospital on a frequent basis, often twice, three or more times per week outside their scheduled commitment, to meet patient needs.

Reports on the medical workforce that have a small list of absolute requirements are necessary in New Zealand to focus clinical and community leaders, the media, and politicians on the need for change.

International guidelines provide potential frameworks around which the debate needs to occur.

Professional leadership is required because regionalisation is the politicians' pariah and since winning office is their imperative, they will avoid any perceived threat to the local hospital.

Professional leadership is required to drive home the urgency of the need to change now, the way New Zealand trains its doctors and the number that are trained.

3. *Infrequent on-call:* consultants are called into the hospital to deal with patient need infrequently. The vast majority of consultation is done by telephone.

Patients achieve better outcomes when treated in units with sufficient numbers of cases, specialist staff and diagnostic facilities. Hospitals with low volumes of patients cannot sustain large numbers of consultants. They become de-skilled if they do not treat a sufficient number of patients. In turn this means that they cannot guarantee high quality care or adequate training.

In reality, a minimum of 45 to 50 consultants would be needed to provide comprehensive acute care, including other specialties such as emergency medicine, radiology, pathology and obstetrics/gynaecology. There would not be enough work for this number of consultants in smaller hospitals.

Genuine training posts for all trainees are required for a modern service

Achieving this requires approval mechanisms that are sufficiently independent of service pressures to ensure the posts are genuinely training-based rather than purely service-related. Of course, medical training will continue to be intertwined with service provision.

1. Not only the organisation of training, but also its content, must change. This will mean developing modules on such topics as team-working, clinical governance, management, communication skills, IT and multidisciplinary working. Existing specialists also need opportunities to 'upskill'.
2. At present, too many medical education and training functions are scattered across a range of agencies. A more streamlined, integrated, structure will be needed in order to drive the major change programme that is necessary.

Other key medical education and training issues requiring urgent attention include training to accommodate the changing role of specialist doctors, flexible training, and concerns about undue reliance on overseas trained doctors.

Relevance to the New Zealand Medical Training Board

Many New Zealand workforce reports have failed because the urgency of the need to change the education of doctors, the workforce structure, and the delivery of health services has not been driven home to the community, the profession, or the politicians.

At present the Otago/Southland collaboration, the Central region initiatives, the Wanganui plans, the Wairarapa modernisation, and national cancer planning are organic regional germinations seeking light, and the chances are best when trusted clinicians combat the parochialism that so often thwarts attempts at change.

APPENDIX 2: SELF-SUFFICIENCY AND SUSTAINABILITY

New Zealand competes with other OECD countries for international medical graduates.

Sustainability ensures that sufficient numbers of doctors are educated and trained in New Zealand to meet future health care needs without a level of reliance on overseas trained doctors. Doctors trained overseas (who currently make up about 40 percent of the country's doctors) generally have greater mobility.

New Zealand's medical workforce has traditionally comprised a mix of locally and internationally educated and trained medical practitioners. The Medical Council's publication *The New Zealand Medical Workforce* in 2006 shows that the number of international medical graduates (IMGs) practising in New Zealand was 33 percent of the practising workforce in 1985, 34.5 percent in 2000 and 39.9 percent in 2006. During this time the number of practising medical practitioners rose from 4,881 in 1985 to 8,615 in 2000 and to 9,547 in 2006. This was the highest number ever recorded. Of the increase of 801 practitioners between 2005 and 2006, 530 were trained overseas.

The source of international medical graduates available to New Zealand may slow in the coming decades.

There has been a tradition of voluntary immigrants into New Zealand who become part of the medical workforce either by training in New Zealand or by arriving as qualified practitioners. Annual changes to the New Zealand population are volatile because of the contribution of immigration to population change. Because some two-thirds of new migrants initially settle in Auckland, the population change in Auckland each year is more volatile than in New Zealand as a whole. The training of New Zealand doctors could never respond to volatility on this scale.

Too many New Zealand-trained doctors are going overseas. Mechanisms are needed to make working in New Zealand more attractive.

Consequently, even were New Zealand's dependence on IMGs to decline over the next three decades, there would continue to be much variability in the year to year pattern around this declining trend. As international competition for IMGs rises, the short and long-run contributions of IMGs to the New Zealand doctor stock need to be separately considered, as they may involve separate labour markets.

The stock of doctors in New Zealand is very reliant on international medical graduates.

A recent OECD perspective of migration shows that New Zealand and Australia have the largest proportion of foreign-born doctors of all OECD countries, 46.9 percent in New Zealand and 42.9 percent in Australia.

The OECD recently reported that for every doctor trained in New Zealand who lives overseas, there were two doctors living in New Zealand who were trained overseas.

International pressures

New Zealand is not alone in facing huge challenges in balancing the demand and supply of medical doctors. The New Zealand medical labour market is closely aligned to that of the United Kingdom (including Scotland) and Australia, and both countries are under intense pressure to better manage the training of doctors. Both countries are large and more affluent than New Zealand. What they do generally adds to the uncertainty New Zealand faces and complicates implementing solutions here.

South Africa has been a source of migrant doctors to New Zealand since the 1990s, but in recent years fewer doctors have migrated to New Zealand since the peak years before 2000.

The Australian medical training system soon needs to place nearly twice as many medical graduates in vocational training. This may have spill over effects in New Zealand until this very large shift is bedded in over there.

Risks to New Zealand

New Zealand is more reliant on IMGs than other countries, and this raises a number of concerns:

- IMGs have enabled New Zealand to bring medical services across New Zealand, and although the mix of services available varies around New Zealand, it is clear that medical services would be under immense stress without IMGs. They have enabled the limitations in the leadership of those involved in planning the future medical work force to be significantly obscured. It may be that the overall high quality of IMGs in New Zealand has given too much apparent relief, and reduced the extent of challenge to the overall organisation of medical services. Many of the DHBs with a very high share of IMGs reached that position more than a decade ago.
- The source may diminish as other countries offer more attractive employment packages and living conditions. A recent OECD report shows that over the past 25 years the number and percentage of foreign-trained doctors has increased significantly in most OECD countries. Trends in immigration over the past five years show radical upward shifts in several OECD countries.

The ethnicity of doctors increasingly does not reflect the ethnic mix of New Zealand's population.

The often short-term contracts of international medical graduates can reduce the institutional knowledge, experience and capacity of the medical workforce in any DHB.

The Medical Training Board is of the view that more doctors should be trained in New Zealand and retained in New Zealand, so that the risks of relying on international medical graduates are reduced.

- New Zealand-trained doctors will in turn continue to leave for overseas, not only when they judge that they generally get better terms of employment, but also because of a well-established tradition of New Zealand's medical graduates receiving part of their vocational training in the United Kingdom or elsewhere. The Medical Council's 2006 Workforce survey shows that by the third year after graduation 75 percent of graduates are practising in New Zealand. This figure has been consistent for some years. However, there is a risk that it may change in the future as the impact of student debt and higher overseas salaries is felt.
- The medical workforce will increasingly not reflect New Zealand's ethnic mix and cultural diversity. The proportion of the medical workforce that was Maori dropped slightly to 2.5 percent in 2006 from 2.6 percent in 2005. The proportion that was Pacific increased slightly to 1.6 percent in 2006 from 1.5 percent in 2005. The 2006 census indicates that 14.6 percent of New Zealand residents identify as Maori and 6.9 percent as Pacific people.
- The higher turnover of IMGs results in an increasing share of senior medical posts being filled by clinicians on short-term contracts. In smaller hospital boards this can result in a highly diminished critical mass of experienced medical leaders with the capacity to bring cohesiveness to the medical service as a whole in the DHB. The higher share of posts for doctors-in-training held by IMGs generates a greater supervisory load for senior clinicians, without the longer term benefit to New Zealand of an increase in vocationally-trained specialists who are most likely to stay permanently in New Zealand.[10]

To ensure that New Zealand has a sustainable medical workforce, and to minimise the risks to New Zealand of a continued high proportion of doctors being IMGs, a greater number of doctors could be trained in New Zealand.

[10] J Morton, Y Williams, M Philpott. New Zealand's Christchurch Hospital at night: an audit of medical activity from 2230 to 0800 hours in *The New Zealand Medical Journal* 31 March 2006 Vol 119 No 1231.

The Medical Training Board's modelling indicates that if the rate at which New Zealand-trained doctors leave New Zealand is reduced by 20 percent, then the country could significantly reduce its reliance on international medical graduates.

The share of doctors in New Zealand who are international medical graduates could decline from 40 to 30 percent under these conditions.

A target might be set for the percentage of the medical workforce that is trained in New Zealand.

- Having an analytical basis for such a target would be difficult, given the high proportion of professional immigrants in many fields in New Zealand, and the very high non-New Zealand born population.
- Such a target would need to be accompanied by policies to retain medical graduates in New Zealand, or, given the propensity of doctors to travel overseas to gain experience, to attract them back to New Zealand.
- The appropriate level of such a target may be best assessed through concern for the turnover of clinicians, rather than their origins, and the regional disparities in doctor retention. In the forecasts presented in this paper, it is assumed that there will be a reduction of 20 percent in the rate of loss of doctors overseas.
- As a consequence of these assumptions, should the additional number of doctors trained in New Zealand approximate the estimated increase in demand for doctors, then the share of IMGs will continually fall from 40 percent now to approximately 30 percent by 2040.

APPENDIX 3: THE MEDICAL TRAINING BOARD'S FORECASTING MODEL AND ASSUMPTIONS

Forecasting approaches

The Training Board recognises that forecasting the demand for doctors based on the effects of demographic change alone will not be an adequate basis for forecasting the demand for the health workforce. It has found the needs-based analytical framework developed in Canada by Stephen Birch provides an alternative approach. It assumes that the requirement for human resources depends on four separate elements: demography, epidemiology, standards of care and provider productivity. The Training Board has followed this type of approach. Within this framework, the Training Board has drawn on existing work done in the Ministry of Health, The Treasury and District Health Boards New Zealand (DHBNZ), as well as the extensive work of the NZIER.

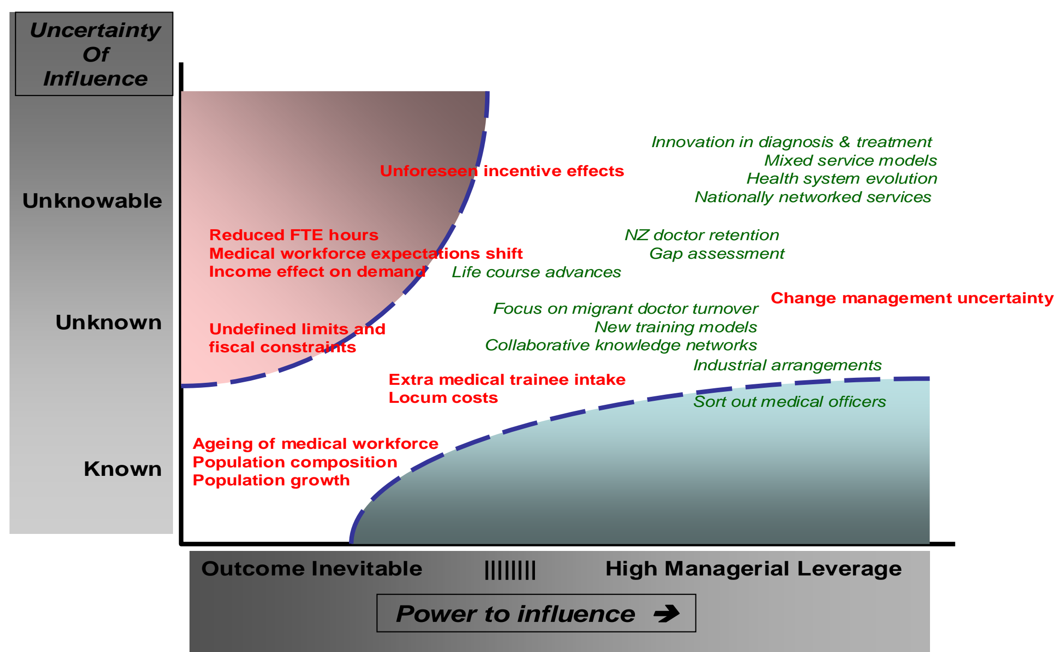
There is a need for insightful, expert and transparent assumptions of change and alternative thinking of what characteristics a future health service might have, in making long run forecasts of the medical workforce, and hence trainee numbers. In their absence, estimates for future need will of necessity continue to be dominated by extrapolations of existing service ratios applied rigidly to a larger and older population. Influences of an unknown scale may be of considerable significance, but risk not being taken into account, because the uncertainty associated with them cannot be managed.

The macro nature of the forecasts means that the Board has not been able to examine the implications for particular medical specialities. A detailed examination of the general practice workforce is seen by the Board as an immediate priority for future analysis. It expects that other priorities will emerge as a result of consultations with those in the health service, and recognise that psychiatry and diagnostic services, and services associated with diabetes will be among its early priorities.

Forecasting the demand for medical doctors in isolation from other health professionals may imply a rigidity in roles that the Board does not regard as either likely or desirable. Future forecasts by the Medical Training Board need to be developed in the context of other health professionals, and with a richer collective understanding of how all these roles will adapt in future years.

Workforce forecasts need to be founded on some understanding, however tested, of the nature of the services that will be provided. Demographic and economic models are most relevant for population and workforce information, including changing the trainee intake. The Medical Training Board has examined and adopted explicit (and alternative) assumptions about the unknown influences of new training models, industrial agreements, life course advances, shifting FTE ratios and changing expectations, the income effect on demand, collaborative knowledge networks, and managing migrant doctor turnover. The Board can only adopt crude assumptions for influences with unknowable effects, including innovation in diagnosis and treatment, evolution in the health system and more mixed models of service with differing roles for health care professionals and others, service based networks, unforeseen incentive effects, medical officer roles, and managing fiscal constraints. The breadth of known, unknown and unknowable influences are seen in the chart below.

Figure 7: Uncertainty and determinability of known influences on the medical workforce



Summary of the Medical Training Board approach

The Medical Training Board believes that a long term horizon is needed for forecasting the additional intake to the medical schools, even though the necessary responses may be incremental and staged. The forecasts will need to be repeated periodically. Depending on how many additional doctors the country plans to train, there would be a need to consider the number of medical schools needed in New Zealand.

The Board has separately analysed the medical workforce in three distinct components, and in this respect its estimates may ignore some of the interactions that a dynamic model would contain. These distinct components are:

1 The modelling of the existing medical workforce, applying assumptions about departures from the medical workforce based on current experiences, and the corresponding additions to the doctor population that result from the level of medical school graduates that applied from 1982 to 2004.

2. Modelling the demand for doctors from the key drivers of increased health services, as recognised in the long term strategic planning model of the Ministry of Health. The Board has made additional assumptions in adopting these forecasts that are outlined below.

3. Accumulating the separate influences on the additional stock of doctors, including those which increase the overall capacity of doctors to provide health services to the New Zealand population.

The Board's analysis of the need future increases in the medical school intake was made by comparing the measures of demand and supply, and looking not only at the accumulated differences, but the time path of the differences between supply and demand. The time taken to have an effect by each of the influences identified has influenced The Board's judgement on their relative importance over particular periods.

The Board's methodology cannot generate measures of confidence, as it is not a statistical process, but a variety of simple sensitivity tests have been carried out by varying the Board's assumptions. The statistical data sets will be made available.

The Board expects that its broad approach may well be valuable in other areas where workforce forecasts are needed, but the application of several of the non-demographic components of the model will benefit from improved information not yet available to it.

The context of long term forecasting of the medical workforce

The year to year volatility of population change in New Zealand makes the short-term forecasting needed to balance the supply and demand of doctors very difficult. Consequently, the health service has a degree of resilience which reflects the high uncertainty about the extent to which shifts in demand will endure. The recent record level of births is an example of this.

New Zealand rations the supply of New Zealand-trained doctors by limiting the number of funded medical places. Since 2004 the Government has twice raised the number of funded medical places (from 285 to 325 a year in 2004 and to 365 a year in 2007).[11] There will need to be further increases over the next two decades. Less certain is by how many. In forming a view on the number of doctors New Zealand should be training, a range of influences on future demand for health services needs to be considered.

Influences on demand

The Medical Training Board has based its assumptions of the long term future demand for health services in New Zealand on analyses done by the Ministry of Health in its long term strategic planning. Much of this has updated work done some five years ago.

Demography

Demographic changes, particularly in population size and composition, are the most readily measurable influences on the demand for medical services. Demographically-driven change in New Zealand over the next 30 years will average some 0.7 percent a year, and in addition to population growth averaging some 0.6-1.1 percent a year, average growth of some 0.5-0.8 percent per year will result from shifts in the age distribution of the population. This ageing contribution will continue even when population itself declines, which may occur in the decade after 2041.

People in New Zealand, in general, are living longer and, particularly in the older age groups, living better compared to earlier generations. This trend is seen in many other countries such as the UK, the United States and Australia. While medical advances can reduce the incidence of health events, and increase the chance of surviving, there can be a consequent increase in demand for some services such as disability support and palliative care. While medical advances can reduce the incidence of health events, and increase the chance of surviving, there may also be an increase in demand for some services (e.g. disability services. The concentration of costly care in the last months of life means that longevity increases need to be monitored and anticipated.

[11] Prior to this, the number of medical school places remained at 285 from 1982 to 2004, following a cut of more than 50 in 1982.

New Zealand's geographical features and population distribution mean that the distribution of health services at a regional level is important in considering the health system as a whole. The Auckland region has the largest population mass in New Zealand and is the most significant growth centre in New Zealand. It is the main region that is expected to see continued strong growth over each of the next three decades. Over the same period all other regions will have begun to decline, some quite significantly.

Past trends in population change can be extrapolated into the future with some certainty, because of the existing momentum in New Zealand's population structure and the country's rich knowledge of population dynamics. Even so, future fertility is subject to a high degree of uncertainty, and migration flows have a high degree of short and medium term volatility. New Zealand will experience fewer effects than OECD countries on average in its age structure, through ageing.

Epidemiology

A large shift in the share of medical services focused on prevention and treatment of chronic conditions is expected over the next three decades. The Primary Health Care Strategy has brought about better management of conditions (e.g. diabetes, heart disease and asthma) and health education to promote healthy lifestyles.

Epidemiological analyses points to windows of opportunity for the long-term management of health costs. The return on investment for actions that enable early diagnosis and treatment are well known (e.g. diabetes, early childhood hearing and vision screening). Without clarity in policy, the lengthy training period for increasing medical resources may delay policy shifts to increase preventative initiatives that involve high levels of screening.

As people live longer and generally better, there will be a great variety of epidemiological shifts in population health. The Board has good knowledge of many of these shifts, although long-term forecasts of the cumulative net effect of epidemiological change are highly dependent on assumptions that the Board has insufficient evidence to validate. The same estimates of the net impact of epidemiological change have been used by the Training Board as used in the recent Ministry of Health forecasts. Strong net epidemiological change is the third most significant influence on the future demand for doctors. The Board recognises that this estimate comes with a high degree of uncertainty, although we have very rich information about many specific diseases is known.

Impact of the rising wealth of New Zealanders

There has been a continual shift of resources into the health sector, which in New Zealand is observed in an increase in the volume of health services per capita of approximately one percent for every one percent increase in GDP.[12] The Training Board has only some understanding of the influences on this correlation, but note that some part of this increase will reflect shifts in the relative incomes of health professionals. Should this trend continue, it implies considerable continued investment in technology, research and human capital. This must give New Zealand confidence that on average the resources in the health sector will be extended in their reach by at least one percent a year. This will occur as the demand for doctors follows continued demographic, health and economic change in New Zealand. The Board has judged that a comparatively small share of income growth will be reflected in labour resources, and provisionally assumes that up to 10 percent of economic growth will influence the growth of the medical labour supply, adding to the influences of population growth and changing age composition.

[12] From 1950 to 2006, average annual real growth in vote health expenditure was 4.3%, while per capita real growth averaged 2.9% over this time.

Influences on ability to meet demand

Resources

Resources, including funding and the number and mix of staff, are vital influences on the health system's ability to meet demand. Strategies to increase the reach of the health service can have unpredictable impacts on the demand for health services. The Board finds it rarely possible to measure the level of unmet need at any time and it is constantly being redefined as new services evolve and expectations change. This is one reason why health as a share of GDP seems to increase relentlessly as national income increases.

Regional and socioeconomic distribution of health services

Equity of access is a fundamental principle of New Zealand's publicly-funded health system. The complex mix of rationing processes aimed at providing equity of access can often obscure the direct influences on the long-term efficiency of the health service. One of the most significant equity concerns is the tendency of general practitioners to prefer working in affluent city suburbs and away from rural, small town and poorer city suburbs.

The rise in significance of the prevention and treatment of chronic diseases in determining the right number and mix of specialists will test the health service's capacity to adapt. Key to meeting this emerging shift will be the selection and development of an appropriate number and mix of medical trainees. New Zealand will need a stronger emphasis on establishing systems that match the numbers who complete vocational training to the specialities that are most needed (e.g. general practitioners and geriatricians). A preferential admission scheme to encourage rural practice is already in place at both New Zealand's medical schools. It is difficult to quantify this.

Productivity, innovation, adaptability and quality

The Training Board has judged that annual productivity growth of between 0.5 percent and 1.5 percent is possible. This will have a significant impact on the number of doctors New Zealand needs to train. The Board cannot quantify any single influence on our assumptions, but recognises the influence of the wider mix discussed below. Change in the productivity of health services is difficult to measure, as quality change and equity of access are often significant drivers of change, yet they are not effectively encapsulated in measurement processes. New services are often separately recognised in measurement systems only after some delay. Recognising innovation is a fraught activity in all public services, none the less so in health. Productivity gains in one service do not easily translate into resources that can be transferred to other services, because of the critical mass needed to provide a service that meets and sustains standards of care.

The division of the New Zealand health service into 21 distinct economic entities (DHBs) adds rigidity to the way the New Zealand health system evolves in this regard. This has meant that policies that stimulate system-wide productivity have less consequence than improving individual DHB performance. Yet many innovations in health have the most benefit if the health system itself changes. Without system-wide leadership, the expansion of the health system will not necessarily bring about the significant improvements in health care expected when resources increase. One contribution to accelerating capital investment and associated downstream depreciation costs results from the duplication of investment in information-related technologies, because investment decisions are made at DHB level rather than for the health service as a whole. Not only is productivity reduced because the capital base of the health service is larger than necessary, but many of the costs and frustrations of exchanging staff, patient and diagnostic information among DHBs reflect such fragmented investments. System-wide innovation is difficult in the fragmented DHB system, particularly when it involves multiple services, without strong system-focused leadership.

In almost all fields of medicine, the capacity to both accurately diagnose and treat conditions has increased. Advances in technology and treatment have resulted in a continuing reduction in the length of stay in hospital. This, in turn, has led to an increasing acuity of hospital-based activity Furthermore, patient expectations and patient advocacy are increasing continually, bringing about a greater recognition for patients and carers to be well-informed, and offered choices that might not have been offered in the past.

System responsiveness

The structures, roles and systems within any health service affect its continued responsiveness and performance. These determine the degree of adaptability the system will have as it prepares for the huge uncertainties ahead. New Zealand's health system structures (including the hospital/DHB and general practice settings) were designed for a health service that emphasised local responsiveness rather than preparedness for the scale of change needed to fit the emerging characteristics of the New Zealand population, its location and health, and potential changes in treatment practice.

Roles and medical specialisation in health care

The rigidity with which the roles of doctors, specialists, nurses and other health professionals are delineated can slow the recognition of the changing capacity of teams and other support structures to complement what doctors do.

Continued medical specialisation has underpinned some of the efficiency gains and innovations in the health service. To fully realise the benefits of increased specialisation there need to be increasingly strong systems within hospitals and among DHBs that uplift the cohesiveness in the health service. The economic base of New Zealand is unlikely to ever afford the continued local availability of specialist services that may be viable in cities with a population base similar to that of New Zealand as a whole. The near nationwide availability of many medical services in New Zealand has been founded on the general competence of doctors, regardless of their degree of specialisation. The general nature of the foundation training received by medical practitioners has made the training system more capable of responding to shifts in the mix of demands on medical specialists. The way such a difficult balance is maintained needs to be determined by the health needs of the New Zealand population.

Limitations to forecasts

Although predicting medical student numbers to address the supply of doctors in 2030 is an inexact science, some influences (e.g. demographic change) can be reasonable accurately predicted. The impacts of other expected influences (e.g. treatment advances) are unknown or unknowable. There will always be considerable uncertainty about adequacy of the health resources available at any time to meet the demands of the population. Future success in meeting demand will be determined by how far the health system and medical training system are able to adapt to change and by the number and types of medical students New Zealand supports, in the face of very long training cycles. For example:

- we do not know how far changes in working hours will continue;
- we will never be able to know the full influence of changed industrial arrangements, developments in the health system and changed roles of health professionals; and
- because the Board'sour forecasts are conditional on changes being led at a system-wide level, they need to be revisited regularly.

The Training Board proposes that its forecasts be reviewed within the next three years because the Board expects to have available over that time a much richer mix of information about the medical workforce, and the operation of the health service.

Assumptions in the Medical Training Board forecasts

Retention and retirement of the existing stock of doctors: The forecast retirement path of the current stock of doctors is compared with the continuing flow of medical school graduates, at the level established from 1982 to 2004. The Board observes that in the next decade there will be significantly more additions than retirements, but that this will decline in the following decade, so that in the third decade the retirements will match additions.

***Working hours*:** The extended working hours that many doctors worked in the past are now much less feasible or desirable. The change in working hours of doctors results from a mix of regulatory and attitudinal factors. In all fields there is a decline in the measure of hours worked per week, and as the influences on this trend are understood, the level of certainty increases that there will be further declines in the average hours each week for which doctors are available. There are huge variations in individual working experiences which make it difficult to establish trends for doctors as a group that can be used with some reliability in forecasts. In these forecasts it is assumed that for the next 25 years, doctors who complete medical training will have a working week which is five percent shorter than the working week of those that retire. After 25 years, this shift will be embedded across the workforce, and will be reinforced by social trends not yet anticipated.

Productivity: The continuation of past tendencies for the volume of health services to grow by 1.5 percent for every one percent increase in GDP would make health one of the major sectors of continual investment in technology, human capital and research in New Zealand. It is unlikely that the reach of any particular stock of doctors would not increase. Where a long-run annual average increase of one percent is assumed, there would be an increase in the capacity of the medical workforce by some 1,700 doctor equivalents by 2025, and another 1,400 over the following ten years.

For this forecast to be achieved, the role of health professionals and the relevant service models would need to evolve more rapidly than at present, and the health system would be expected to bring about change to health centres, and stronger national services leadership. Public and commercial networked services will expand and bring continual change, and the full exploitation of these will need strong leadership of the health system overall. Inaction here will have continuing impacts on medical resources, and those of other health professionals. The absence of initiatives to increase the adaptability of the health service will be readily translated into additional training places.

Progress on health service change will need to be assessed whenever the forecasts are reviewed, and key assumptions such as these health service changes can be continuously monitored. Change through innovation will not occur at a constant rate throughout the period, and there will be huge variations across specialities, but there is no basis for anticipating how the demand for doctors will be affected in any particular period in order to generate the long-run average.

Reassessment of medical rosters: As noted earlier, the necessity of clinical training taking place in clinical settings creates a tension between training and service delivery. There are many determinants of the conditions under which doctors in training can be involved in the delivery of services in any week. Demands can change quickly, with little warning. The greater regional integration of clinical services, such as that outlined as possible in the Central Region DHBs regional clinical services plan, will have a longer-term impact. Doctors are allocated a variety of runs each year during training. The mix of senior medical specialists, registrars and

house officers who attend each run is specified in the industrial agreement, and approval of the trade union is required before a junior doctor can shift from the arrangement set at the beginning. Variations in the flow of patients rarely fit the allocations of medical staff to runs, and this is one of the influences on the need for locums for doctors in training. This misfit between meeting needs on the day, and the duty mix established long before, is not well measured, but it may involve perhaps 1/6 to 1/5 of all junior doctor runs, in any week. The health system needs to assess the impact on the allocation of duties for young doctors so that clinical training experiences are at the highest level possible for the training setting.

A recent study of the hospital at night in Christchurch[13] pinpointed several obvious opportunities for improvement that were later thwarted by the rigidity of this ongoing misfit. We have included this estimate in our potential increase in the supply of doctors in New Zealand, and note that it would be the most significant source of additional medical resources over the next five years. The Board's forecasts assume that a shift in the allocation of duties to junior doctors in service runs would be in addition to that resulting from a stronger leadership of the health service as a whole.

Training system changes: The proposed curriculum changes will have a significant impact on the duration of training, both from the point of entry into clinical training in the trainee intern year and the PGY1 and any later years until entry into a vocational programme. For most, the point of entry to vocational training can be earlier. More importantly, the improved oversight of clinical training before entry into a vocational training programme should, over time, result in more consistent recognition by colleges of prior learning. In the forecast, it is assumed that one half of the intake of the medical school will ultimately complete vocational training one year earlier than is the case now.

Change in Medical School intake: A number of scenarios for increasing the intake of doctors through medical school and vocational training have been evaluated. Were the medical school intake to be increased by 100, by 2012, then depending on the way that the increase was staged, there would be somewhat nearly 400 additional doctors by 2012, and over 1,700 by 2041.

Recognition of recent trainee intake changes: Since 2004 the Government has twice raised the number of funded medical places (from 285 to 325 a year in 2004 and to 365 a year in 2007).[14] These increases will result in some 680 additional doctors by 2021, and some 1,585 by 2041.

The data necessary for medical workforce development

As a result of the work that the Board is in the course of completing, it expects to begin to formulate a clearer view of the information needed for better workforce planning. The Board's work has been complicated this year because the existing sources are not cohesive, and there are many plans to improve the information base.

Data from all the medical college meetings, as well as from other sources are currently being analysed alongside work on impacts on demand (demographic change, epidemiology, productivity and resources) and their varying predictability. This work will help the Training Board come to a view on the number and mix of doctors New Zealand might reasonably anticipate needing and what can be done over the next few years to work towards meeting that need. The Board's initial work has not involved considering estimates of future need in individual specialities. It has worked first on general practice in the next year.

[13] Dr J Morton et al Christchurch Hospital at night.

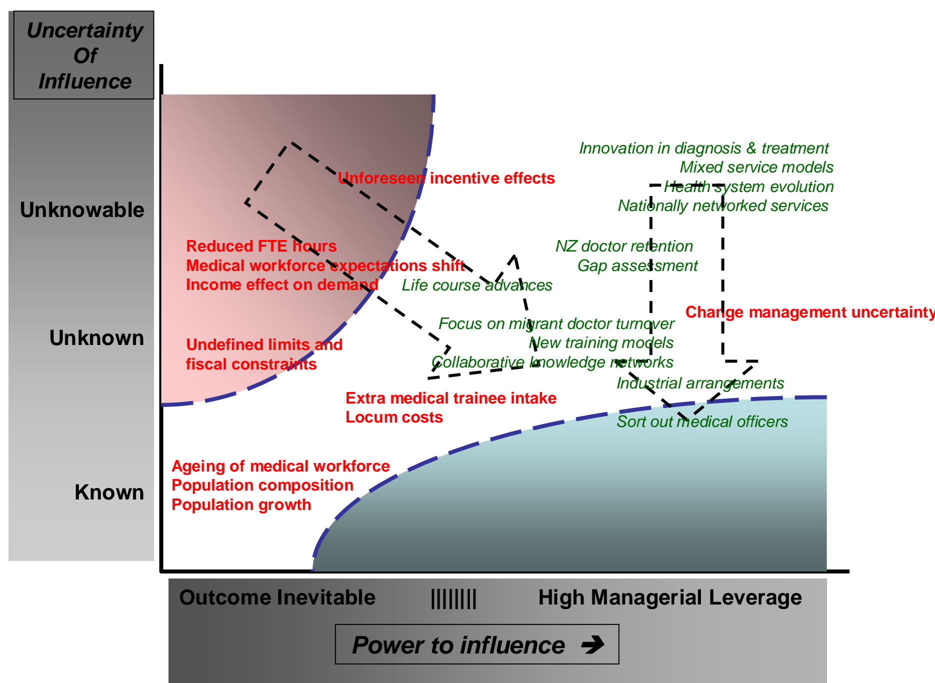
[14] Prior to this, the number of medical school places remained at 285 from 1982 to 2004, following a cut by over 50 in 1982.

There are several serious difficulties in using the existing data to facilitate medical workforce development:

- a range of different agencies that collect data, often in isolation from each other;
- the capacity of each medical college to collect workforce data on their own specialty varies;
- workforce data can vary considerably between different agencies (e.g. a medical college and the Ministry of Health or Medical Council);
- the analysis of the data that does exist is insufficient to facilitate good medical workforce development. Current data analysis often focuses on those influences that are more predictable (e.g. population changes) and does not take into account less predictable influences (e.g. productivity);
- there is a paucity of research and analytical studies on the operation of health services both in and beyond hospitals; and
- there is a lack of monitoring of employment records that tracking the progress of graduates through the training system, and this has led to a lack of information about trends in the supply and distribution of doctors in training.

The Training Board has offered to assist the medical colleges to collect workforce data and will explore this further, as well as other possible databases, such as longitudinal datasets of medical student outcomes, over the 2008/09 year. The Board sees the development of statistics and research as needed to have some focus, and suggests that its understanding of information gaps, as highlighted in the chart below, provides the early stages of a sector-wide information strategy for the health system itself.

Figure 8: A strategic focus for developing information on the known influences on the medical workforce



PART 2:

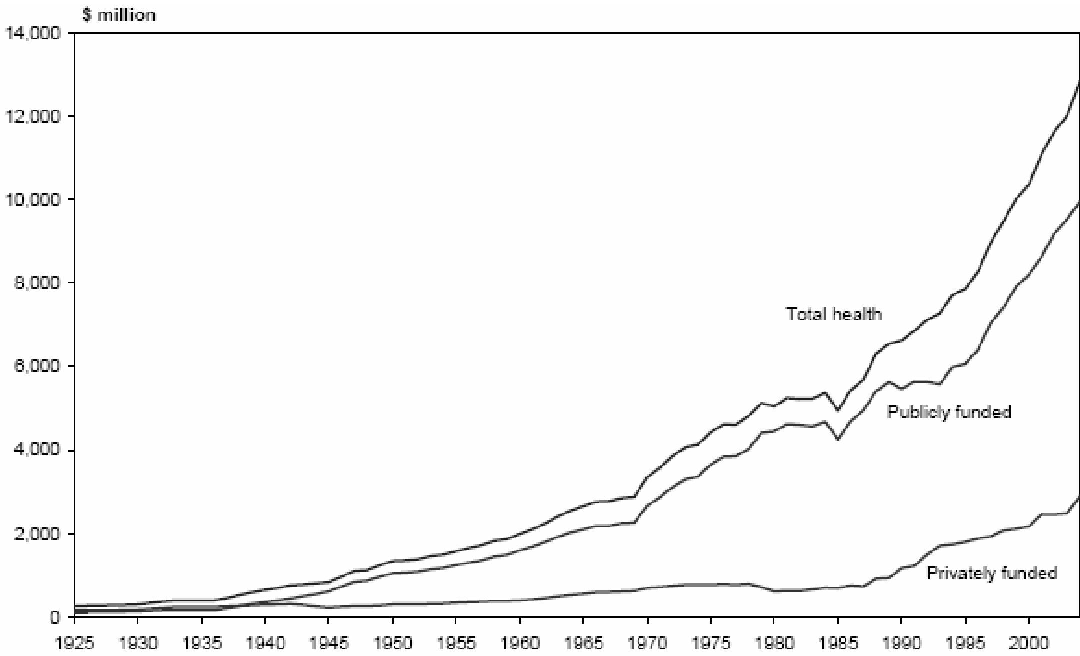
STATISTICS

STATISTICS: MEDICAL TRAINING BOARD

Figure 9: Percentage shares of New Zealand's total health funding 1995/96 and 2003/04

Source: Ministry of Health, Health Expenditure Trends in New Zealand 1994–2004.

Figure 10: Aggregate real ($ million 2003/04) health expenditure, 1925–2004



Source: Ministry of Health, Health Expenditure Trends in New Zealand 1994–2004.

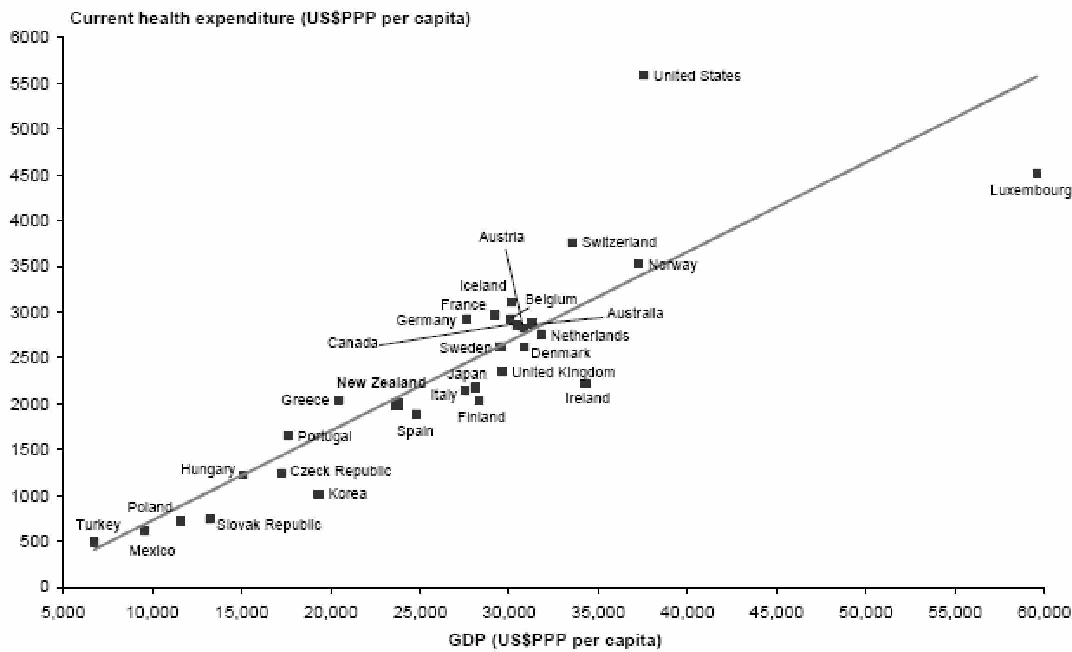
Table 1: Current health expenditure as a percentage of GDP, 1994–2004

Country	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Rank 2003	Rank 2004
Australia	7.4	7.5	7.7	7.7	7.8	7.9	8.3	8.5	8.8	9.2	n/a	12th	
Austria	7.4	9.2	9.1	8.9	9.1	9.1	8.9	9.0	9.1	9.2	9.2	11th	8th
Belgium	7.7	7.6	7.9	7.7	7.9	8.1	8.2	8.4	8.5	9.7	n/a	7th	
Canada	9.2	8.9	8.7	8.7	8.9	8.6	8.5	9.0	9.3	9.4	9.4	10th	7th
Czech Republic	6.0	6.2	6.2	6.2	6.1	6.4	6.4	6.7	6.9	7.2	7.1	25th	22nd
Denmark	8.2	7.9	8.0	7.9	8.1	8.3	8.1	8.4	8.6	8.5	8.5	15th	12th
Finland	7.5	7.2	7.4	7.0	6.6	6.7	6.5	6.7	6.9	7.2	7.3	24th	21st
France	9.0	9.2	9.2	9.0	8.9	9.0	9.0	9.1	9.8	10.1	10.2	5th	3rd
Germany	9.5	9.9	10.2	10.1	10.1	10.2	10.1	10.3	10.5	10.6	n/a	3rd	
Greece	9.3	9.3	9.3	9.0	9.0	9.2	9.4	9.9	9.8	10.0	9.6	6th	5th
Hungary	7.6	6.9	6.8	6.5	6.9	7.0	6.8	7.0	7.4	8.0	8.1	17th	16th
Iceland	8.0	8.2	8.1	8.1	8.4	8.8	9.0	9.1	9.8	10.3	10.0	4th	4th
Ireland	6.5	6.3	6.0	5.8	5.6	5.6	5.7	6.1	6.4	6.5	6.6	26th	23rd
Italy	7.2	6.8	7.0	7.2	7.1	7.2	7.5	7.6	7.8	7.8	8.0	19th	17th
Japan	6.4	6.4	6.6	6.5	6.8	7.1	7.3	7.5	7.7	7.7	n/a	20th	
Korea	4.1	4.0	4.2	4.2	4.2	4.4	4.5	5.1	5.0	5.2	5.3	30th	26th
Luxembourg	5.3	5.6	5.7	5.6	5.7	5.8	5.7	6.3	6.7	7.5	7.8	22nd	19th
Mexico	5.8	5.6	5.1	5.3	5.4	5.5	5.5	5.9	6.2	6.3	6.5	27th	24th
Netherlands	7.7	7.6	7.6	7.4	7.6	7.6	7.5	7.9	8.5	8.6	8.8	14th	10th
New Zealand	7.1	7.2	7.1	7.3	7.8	7.6	7.7	7.8	8.2	8.0	8.4	16th	13th
New Zealand restated	n/a	n/a	7.3	7.7	8.2	8.1	8.1	8.3	8.6	8.4	8.5	16th	12th
Norway	7.5	7.4	7.4	8.0	8.6	8.7	7.9	8.3	9.3	9.4	9.1	9th	9th
Poland	5.3	5.3	5.6	5.2	5.6	5.7	5.5	5.8	6.3	6.2	6.2	28th	25th
Portugal	7.1	8.0	8.1	8.2	8.1	8.4	9.0	8.9	9.2	9.4	9.6	8th	6th
Slovak Republic	n/a	n/a	n/a	5.8	5.7	5.7	5.4	5.4	5.6	5.6	n/a	29th	
Spain	7.1	7.2	7.3	7.1	7.1	7.1	7.0	6.9	7.0	7.6	7.9	21st	18th
Sweden	7.7	7.7	7.9	7.7	7.9	8.0	8.0	8.3	8.7	8.9	8.7	13th	11th
Switzerland	9.2	9.4	9.8	9.9	10.0	10.2	10.1	10.6	10.8	11.2	11.4	2nd	2nd
Turkey	3.6	3.4	3.9	4.2	4.8	6.1	6.3	7.2	7.0	7.3	7.4	23rd	20th
United Kingdom	6.6	6.6	6.6	6.8	6.9	7.1	7.3	7.5	7.7	7.9	8.3	18th	15th
United States	12.9	13.0	12.9	12.8	12.8	12.8	13.0	13.7	14.4	14.9	15.0	1st	1st
Unweighted mean	7.4	7.4	7.5	7.4	7.5	7.7	7.7	8.0	8.3	8.5	8.6		
Weighted mean	7.8	7.9	8.0	7.9	7.9	8.1	8.1	8.4	8.7	9.0	8.7		

Source: OECD (2006) *Health Data*. Paris: Organisation for Economic Co-operation and Development.

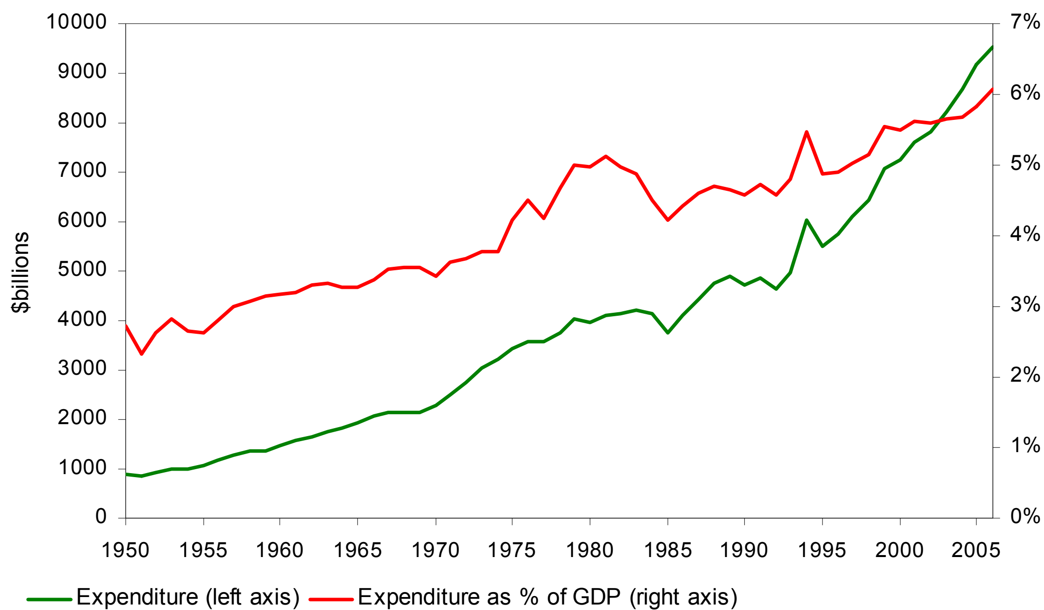
Note: Highlighted data do not report investment on medical facilities for this period. New Zealand 'restated' includes previously reported 'non-health' items now included in core health, primarily DSS funded by the Ministry.

Figure 11: Relationship between health expenditure and GDP in 30 OECD countries, 2003



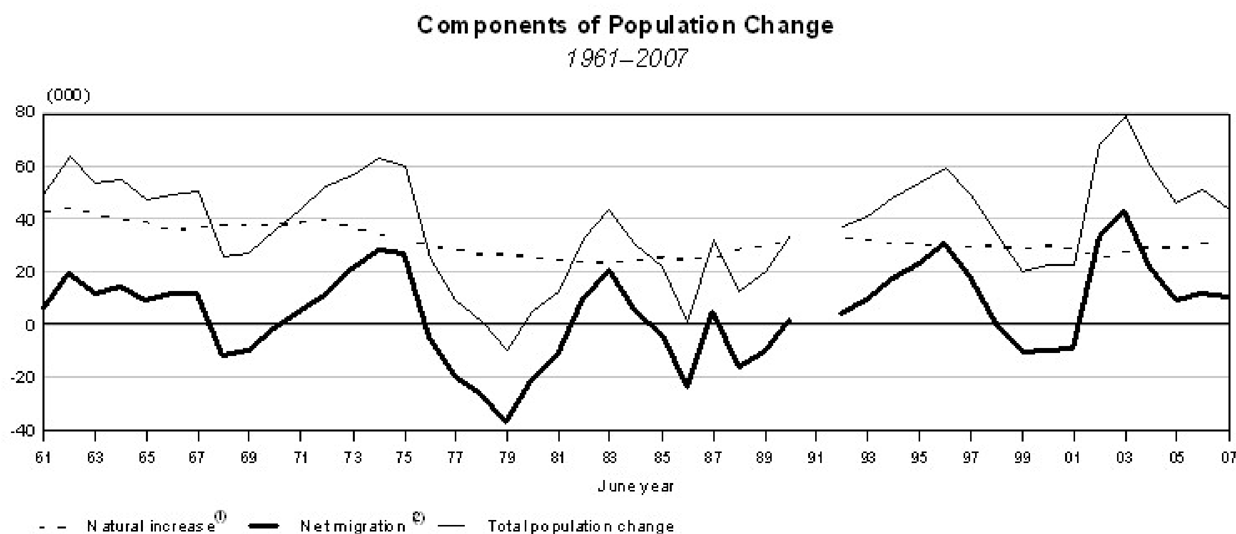
Source: Ministry of Health: Health Expenditure Trends in New Zealand 1994–2004.

Figure 12: 1950-2006 – Vote Health Expenditure ($2006), level and as a percentage of GDP



Source: Ministry of Health Public Health Intelligence (June 2008) Long Term Health Expenditure Modelling.

Figure 13: Components of population change in New Zealand



Note: Population change for 1961–90 refers to the de facto population, while population change from 1992 onwards refers to the resident population. Population change for the June 1991 year is not available, as resident population estimates have only been revised back to 31 March 1991.

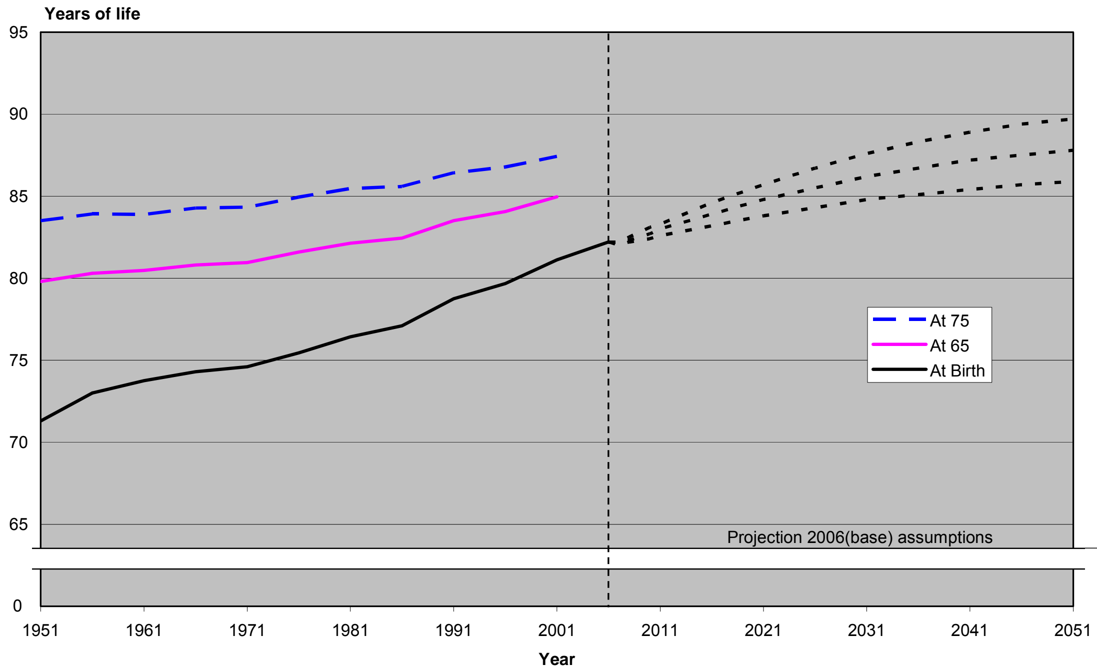
(1) Excess of births over deaths.

(2) Excess of arrivals over departures.

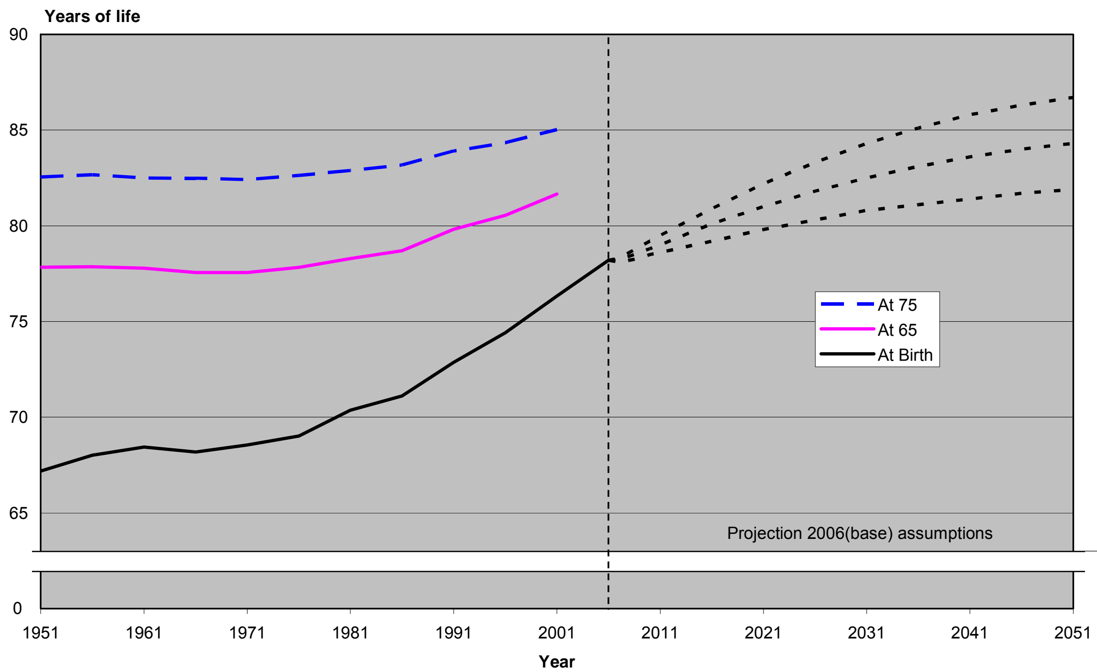
Source: Statistics New Zealand Figure 5.06, New Zealand Yearbook 2006 (1.01 of Demographic Trends 2007).

Figure 14: Long-term trends in mortality and morbidity in New Zealand

Female life expectancy at birth, age 65 and at 75 years, 1951–2051



Male life expectancy at birth, age 65 and at 75 years, 1951–2051



Source Statistics New Zealand.

Table 2: Population of District Health Boards 1996–2036

District Health Board	Population in 2006	Growth rate per annum		Population >75 years	
		1996–2006	2006–2036	In 2006	In 2036
Northland	152,660	0.82%	2.54%	9,370	16,320
Waitemata	504,680	2.11%	4.88%	25,120	45,950
Auckland	428,250	1.69%	4.48%	19,440	32,780
Counties Manukau	454,800	2.46%	5.64%	16,590	35,510
Waikato	350,230	0.86%	2.90%	19,760	32,610
Lakes	101,500	0.33%	1.50%	5,260	8,790
Bay of Plenty	200,820	1.83%	4.18%	14,710	23,750
Tairawhiti	45,920	-0.27%	1.45%	2,460	3,980
Taranaki	107,420	-0.17%	0.65%	7,670	11,120
Hawke's Bay	152,580	0.35%	1.52%	9,870	15,090
Whanganui	63,950	-0.83%	-0.25%	4,760	6,720
Midcentral	163,990	0.13%	2.36%	10,620	16,310
Hutt	140,920	0.32%	1.34%	7,350	11,780
Capital and Coast	277,940	1.34%	3.30%	13,340	21,770
Wairarapa	39,580	0.05%	0.70%	3,030	4,540
Nelson Marlborough	133,630	1.16%	2.67%	9,240	15,790
West Coast	32,090	-0.34%	0.29%	1,950	3,330
Canterbury	483,350	1.34%	3.34%	31,440	49,680
South Canterbury	55,090	-0.06%	0.41%	4,760	6,460
Otago	184,630	0.25%	1.92%	12,710	18,490
Southland	109,940	-0.01%	1.75%	6,440	10,410
Total	4,183,970	1.15%	3.39%	235,890	391,180

Source: Statistics New Zealand.

Table 3: Variation in doctor patient ratios around New Zealand: GP workforce by DHB locality of main work site

DHB locality	2006				2005	2004
	Number of GPs	FTEs for GPs at all work sites	DHB locality population	FTEs for GPs per 100,000 population	FTEs for GPs per 100,000 population	FTEs for GPs per 100,000 population
Northland	121	127	149,550	85	76	81
Waitemata	321	306	501,500	61	57	60
Auckland	422	395	430,700	92	83	91
Counties-Manukau	241	238	441,800	54	58	61
Waikato[1]	251	249	346,890	72	71	74
Bay of Plenty	155	149	198,720	75	70	70
Lakes	86	80	101,600	79	67	70
Tairawhiti	33	38	44,500	84	78	73
Hawkes Bay	105	108	150,580	72	67	68
Taranaki	78	76	105,160	72	67	65
Midcentral	89	99	155,450	64	58	69
Wanganui	41	44	57,550	76	82	66
Wairarapa	23	26	39,220	66	64	65
Hutt	88	83	138,400	60	54	67
Capital and Coast[2]	238	223	287,000	78	79	77
Nelson-Marlborough	107	101	136,800	74	72	75
West Coast	17	17	30,530	55	52	61
Canterbury	403	382	478,100	80	78	82
Otago	155	158	174,900	91	81	91
South Canterbury	37	43	53,600	81	81	76
Southland[3]	95	90	117,250	76	66	71
Total	3106	3030	4,139,800	73	70	73

1 Includes all TLA Ruapehu.

2 Includes all TLA Kapiti.

3 Includes all TLA Queenstown-Lakes.

4 Note: the calculation of GP FTE includes all hours recorded at site1, site 2 and site 3 where the work role was GP for that work site.

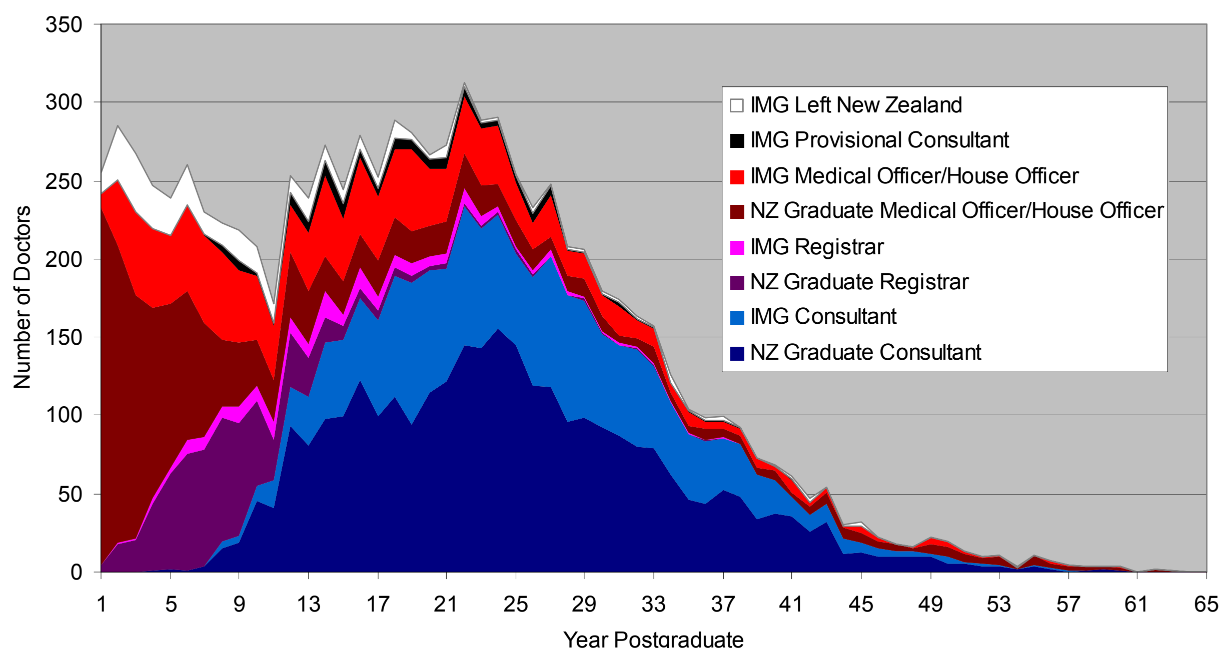
Source : New Zealand Medical Council New Zealand Medical Workforce in 2006.

Table 4: Territorial location of registered doctors, included international medical graduates: medical workforce by territorial authority of main work site

	Number of GPs	FTEs for GPs at all Work Sites	FTE GPs per 100 000	Average Hours for GPs	Number of All Doctors	Doctors per 100 000	IMG Doctors % of All Doctors	Territorial Authority Population
Cities								
North Shore City	166	152	71	37	516	240	36	215,300
Waitakere City	101	97	50	39	163	84	36	194,700
Auckland City	422	395	92	38	1,999	464	34	430,700
Manukau City	187	183	54	40	558	164	41	339,400
Hamilton City	118	113	84	39	598	447	47	133,700
Tauranga District	103	96	91	38	294	277	40	106,100
Napier City	48	48	86	42	115	203	47	56,600
Palmerston North City	59	64	81	44	287	363	48	79,000
Porirua City	28	28	55	40	54	107	44	50,700
Upper Hutt City	30	28	72	36	35	92	40	38,000
Lower Hutt City	58	55	55	38	201	200	42	100,400
Wellington City	174	159	84	37	783	415	29	188,500
Nelson City	45	42	92	39	153	330	36	46,400
Christchurch City	340	310	86	37	1,139	316	35	360,500
Dunedin City	118	117	95	40	495	403	35	122,900
Invercargill City	60	56	110	39	149	293	53	50,800
Districts								
Far North District	46	52	89	48	60	103	62	58,200
Whangarei District	63	62	85	43	211	288	49	73,300
Kaipara District	12	13	72	40	12	66	58	18,050
Rodney District	54	56	61	43	70	77	47	91,500
Papakura District	28	28	63	41	37	84	32	43,900
Franklin District	26	27	46	39	30	51	53	58,500
Thames Coromandel District	25	25	93	44	39	146	64	26,800
Hauraki District	11	10	63	45	11	66	64	16,650
Waikato District	19	21	48	46	26	61	58	42,800
Matamata-Piako District	18	19	64	40	23	76	48	30,300
Waipa District	33	33	77	41	37	87	54	42,700
Otorohanga District	6	8	82	45	8	85	38	9,450
South Waikato District	11	11	48	40	12	54	58	22,300
Waitomo District	5	4	42	50	9	94	67	9,540
Taupo District	25	23	68	39	30	88	47	34,100
Western BOP District	21	23	53	48	22	51	55	42,900
Rotorua District	61	57	84	39	180	267	44	67,500
Whakatane District	27	26	77	44	64	189	81	33,900
Kawerau District	*	*	40	38	*	47	100	6,420
Opotiki District	*	*	16	20	*	11	0	9,400
Gisborne District	33	38	84	45	76	171	53	44,500
Stratford District	8	9	107	53	8	95	63	8,460
South Taranaki District	17	18	66	46	21	77	86	27,100
Ruapehu District	5	6	51	64	9	71	56	12,650
Wairoa District	*	4	43	53	*	36	100	8,230
Hastings District	47	49	68	42	152	212	33	71,800
Cent. HB District	7	7	54	42	8	61	75	13,200
Wanganui District	33	35	80	45	99	229	71	43,200
Rangitikei District	8	9	63	45	10	70	50	14,350
Manawatu District	14	17	59	49	30	105	23	28,500
Tararua District	9	9	51	44	10	57	50	17,450
Horowhenua District	7	9	30	57	14	46	79	30,500
Kapiti Coast District	36	36	76	38	43	90	51	47,800
Masterton District	20	23	100	43	46	198	57	23,200
Carterton District	*	*	39	46	*	42	33	7,210
South Wairarapa District	0	0	0	-	0	0	0	8,810
Tasman District	31	28	59	39	38	81	47	47,200
Marlborough District	31	30	70	43	53	123	40	43,200
Kaikoura District	*	*	25	43	*	28	0	3,600
Buller District	6	6	65	44	7	73	71	9,570
Grey District	9	8	60	45	30	229	37	13,100
Westland District	*	*	32	49	*	25	50	7,860
Hurunui District	9	11	98	50	18	164	56	11,000
Waimakariri District	17	19	45	47	23	53	26	43,100
Selwyn District	21	22	67	35	22	67	50	32,700
Ashburton District	15	19	70	46	29	107	31	27,200
Timaru District	30	35	81	48	89	207	44	42,900
Mackenzie District	*	4	108	81	*	54	100	3,710
Waimate District	5	5	65	47	5	72	60	6,990
Waitaki District	14	15	76	45	19	96	58	19,700
Central Otago District	13	14	89	49	23	151	35	15,250
Clutha District	10	13	79	47	13	76	77	17,050
Southland District	11	11	38	38	12	41	75	29,400
Gore District	6	7	57	44	7	57	43	12,250
Total	3,106	3,030	73	37	9,547	231	40	4,139,800

Source : New Zealand Medical Council New Zealand Medical Workforce in 2006.

Figure 15: Components of the medical workforce in New Zealand in 2006



Source: Based on model analysis by the Medical Training Board of the Medical Council survey information for 2006 and adjacent years.

Table 5: The medical workforce in New Zealand

	1996	2001	2006
Health services industry (ANZSIC O86)			
22123 Medical Pathologist	72	45	48
22211 General Practitioner (GP)	2991	3372	3576
22212 Resident Medical Officer (RMO)	1761	2271	2865
22213 Surgeon	399	483	642
22214 Physician	717	1053	1323
22215 Gynaecologist and Obstetrician	81	96	81
22216 Radiologist, Radiation Oncologist	207	279	249
22217 Anaesthetist	276	300	408
RMO proportion	0.27	0.29	0.31
RMO proportion excluding GPs	0.50	0.50	0.51
All industries			
22123 Medical Pathologist	174	123	123
22211 General Practitioner (GP)	3480	3798	4014
22212 Resident Medical Officer (RMO)	2091	2619	3369
22213 Surgeon	468	558	696
22214 Physician	888	1293	1641
22215 Gynaecologist and Obstetrician	99	114	87
22216 Radiologist, Radiation Oncologist	240	303	267
22217 Anaesthetist	318	336	429
RMO proportion	0.27	0.29	0.32
RMO proportion excluding GPs	0.49	0.49	0.51

Source: Statistics New Zealand Censuses of Population 1996, 2001, 2006.

Table 6: Medical workforce by occupation

Occupation (ANZSCO)	FTEs	Headcount	Average FTE
253317 - Intensive Care Specialist	22.3	24	0.93
253322 - Renal Medicine Specialist	20.2	20	1.01
253518 - Urologist	18.48	27	0.68
252312 - Dentist	18	27	0.67
253325 - Respiratory Physician	16.91	18	0.94
253512 - Cardiothoracic Surgeon	15.78	16	0.99
253516 - Paediatric Surgeon	15.48	16	0.97
253128 - Medical Officer of Health (Public Health)	14.19	18	0.79
253513 - Neurosurgeon	13.79	14	0.99
253316 - Gastroenterologist	13.5	18	0.75
253521 - Vascular Surgeon	12.47	13	0.96
253517 - Plastic and Reconstructive Surgeon	9.92	13	0.76
253124 - Medical Officer - Emergency Department	9	9	1.00
253121 - Medical Officer - Anaesthetics	7.54	7	1.08
253911 - Dermatologist	7.04	15	0.47
253315 - Endocrinologist	6.29	8	0.79
253122 - Medical Officer - Community	5.78	10	0.58
253412 - Psychogeriatritian	5.57	6	0.93
253323 - Rheumatologist	5.44	8	0.68
253522 - Breast Surgeon	2.55	5	0.51
253123 - Medical Officer - Dental	1.8	5	0.36
253125 - Medical Officer - Orthopaedics	1	1	1.00
253127 - Medical Officer - Psychiatrist	0.8	1	0.80
253126 – Medical Officer - Paediatrics	0	0	0
Total	6,656.43	7,289	0.91

Source: Health Workforce Information June 2008 DHBNZ.

Based on a standard 2086 denominator, there were 6656 medical staff employed within DHBs on a non-casual basis as at 31 December 2007.

Table 7: Vocational training branch by gender

Vocational training area[1]	Women	Men	Total	Women as % of total training in area	Women training in area as % of all women training	Men training in area as % of all men training
Accident and medical practice	13	33	46	28	1	3
Anaesthesia	68	103	171	40	7	9
Breast medicine	*	0	*	100	0	0
Dermatology	*	*	*	40	0	0
Diagnostic radiology	23	34	57	40	2	3
Emergency medicine	49	68	117	42	5	6
Family planning and reproductive health	*	0	*	100	0	0
General practice	321	325	646	50	34	28
Intensive care medicine	*	14	17	18	0	1
Internal medicine	97	145	242	40	10	13
Medical administration	0	*	*	0	0	0
Musculo-skeletal medicine	0	*	*	0	0	0
Obstetrics and gynaecology	33	19	52	63	3	2
Occupational medicine	*	15	18	17	0	1
Ophthalmology	6	11	17	35	1	1
Paediatrics	76	30	106	72	8	3
Palliative medicine	5	*	*	63	1	0
Pathology	30	19	49	61	3	2
Psychiatry	90	93	183	49	9	8
Public health medicine	29	8	37	78	3	1
Radiation oncology	11	4	15	73	1	0
Rehabilitation medicine	*	4	*	43	0	0
Sexual health medicine	6	0	6	100	1	0
Sports medicine	*	*	*	50	0	0
Surgery: cardiothoracic	0	5	5	0	0	0
Surgery: general	36	87	123	29	4	8
Surgery: neurosurgery	0	5	5	0	0	0
Surgery: orthopaedic	5	49	54	9	1	4
Surgery: otolaryngology head and neck surgery	5	4	9	56	1	0
Surgery: paediatric	0	*	*	0	0	0
Surgery: plastic and reconstructive	6	8	14	43	1	1
Surgery: urology	0	5	5	0	0	0
Surgery: vascular	0	4	4	0	0	0
Other	26	35	61	43	3	3
Total	955	1143	2098	46	100	100

1 House officers excluded.

* To prevent identification of individuals, categories which contain fewer than four doctors are omitted. The data in the table have been replaced with an asterisk (*).

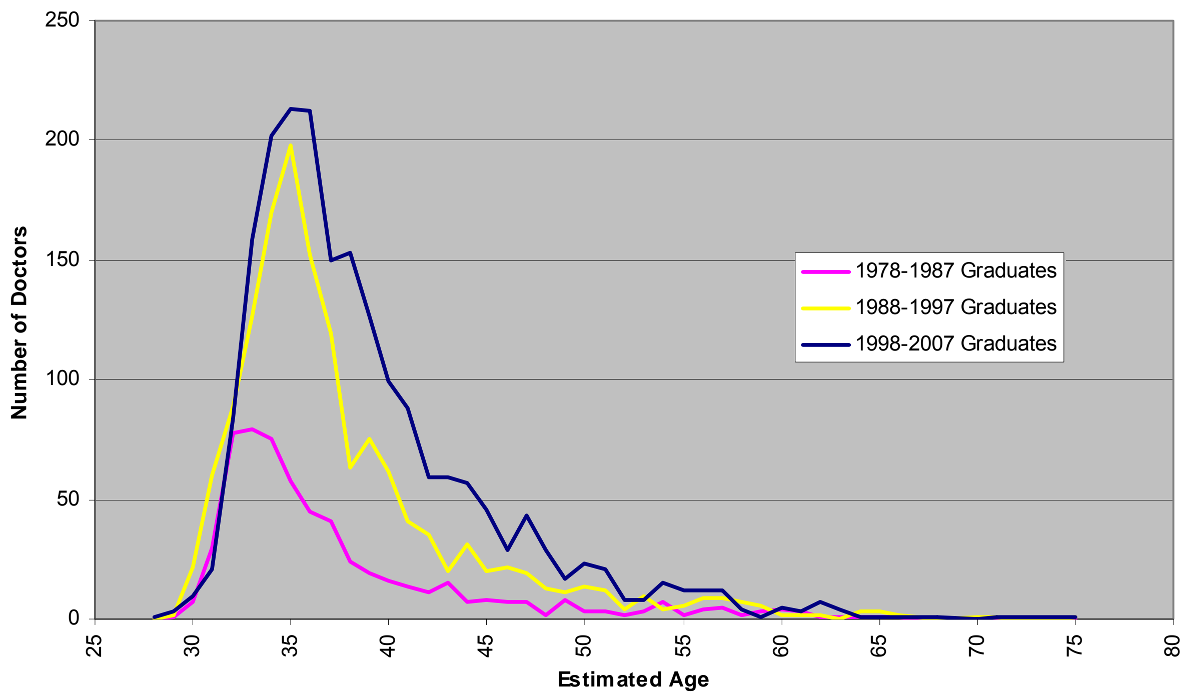
Source : New Zealand Medical Council New Zealand Medical Workforce in 2006.

Table 8: Vocational training posts funded by the Clinical Training Agency

	2002	2003	2004	2005	2006	2007
Total Non-Vocational	***742***	***751***	***749***	***725***	***690***	***654***
Surgery	195	198	209	213	221	228
Physician - Adult	185	194	180	195	194	198
General Practice	48	49	58	155	157	168
Psychiatry	128	136	123	157	158	142
Anaesthesia	111	110	115	117	119	117
Radiology	56	56	60	60	62	72
Emergency Medicine	57	55	56	62	64	67
Physician - Paediatric	62	65	58	60	59	59
Pathology	38	41	39	46	49	53
Obstetrics & Gynaecology	41	36	35	38	35	37
Public Health	32	32	35	35	33	33
Radiation Oncology	11	12	15	16	16	16
Ophthalmology	14	16	14	16	17	15
Total Vocational	***978***	***1000***	***997***	***1170***	***1184***	***1205***
Total Places	***1720***	***1751***	***1746***	***1895***	***1874***	***1859***

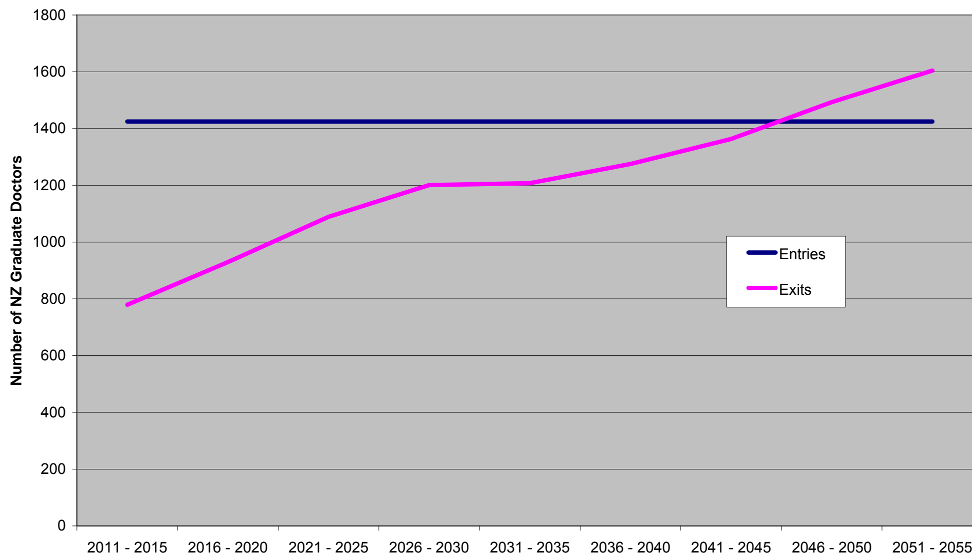
Source: Clinical Training Agency.

Figure 16: Vocational training completions and retirements



Source: Based on Medical Training Board analysis of medical registration information of the Medical Council.

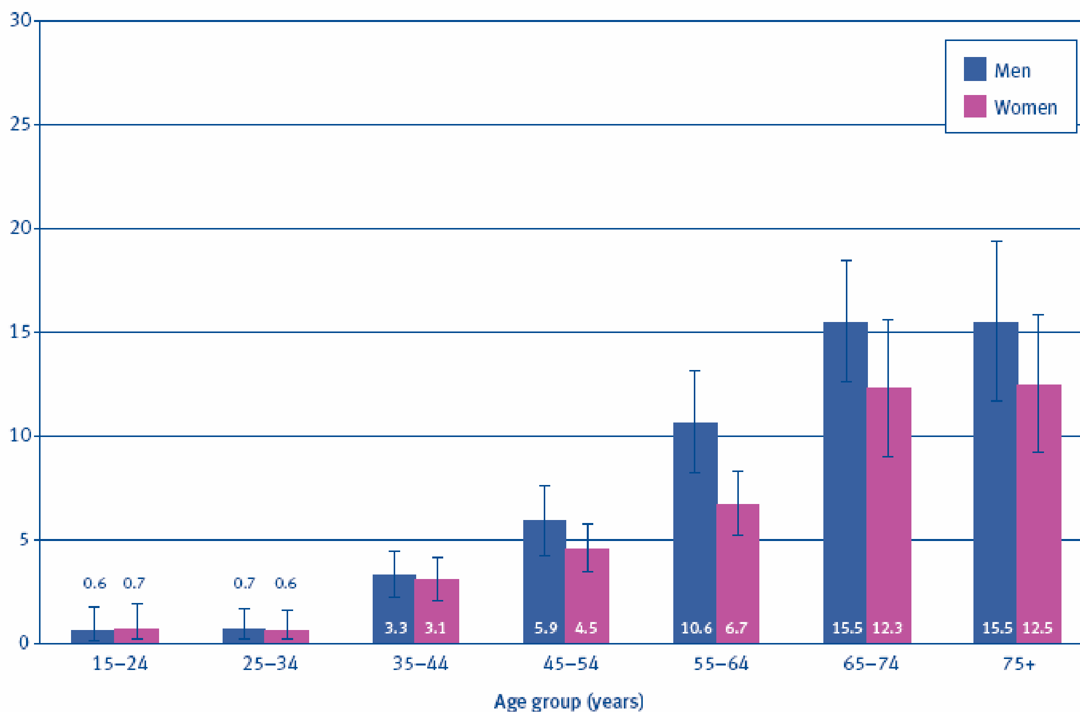
Figure 17: Comparison of additions to registered medical doctors, with retirements and other losses: replacement of current New Zealand graduate doctors



Source: Medical Training Board analysis of the medical registration information of the Medical Council, and history of medical school entrant numbers. These projections are based on 285 medical graduates per annum. Note that changes to the Medical School cap in recent years should eventually produce 365 graduates per annum.

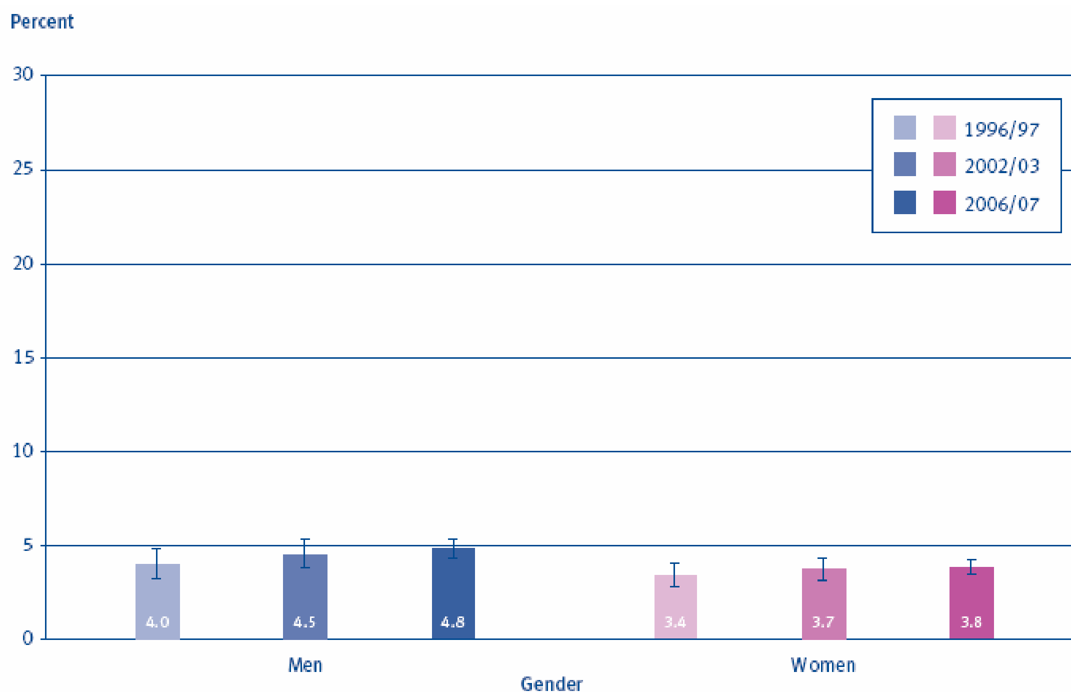
Figure 18: Summary measures of changes in the demand for health services in New Zealand

Diagnosed diabetes for adults, by gender, (unadjusted prevalence)



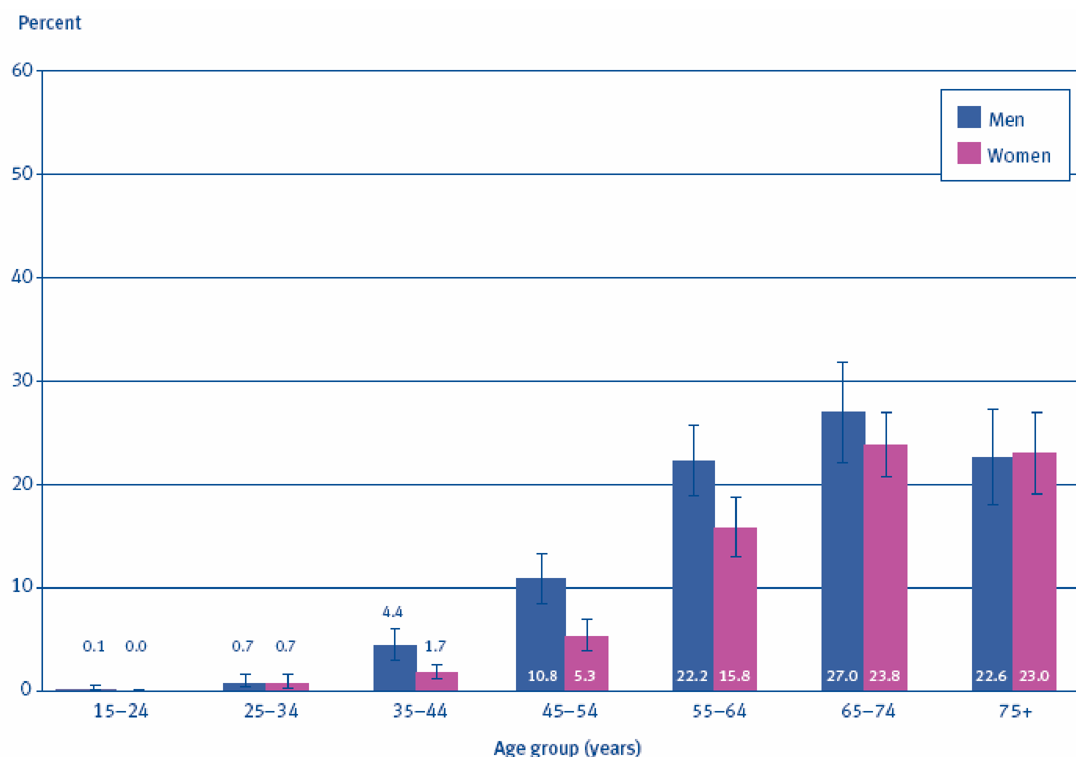
Source: A Portrait of Health: Key results of the 2006/07 New Zealand Health Survey.

Figure 19: Diagnosed diabetes for adults, by gender, 1996/97, 2002/03 and 2006/07 (age standardised prevalence)



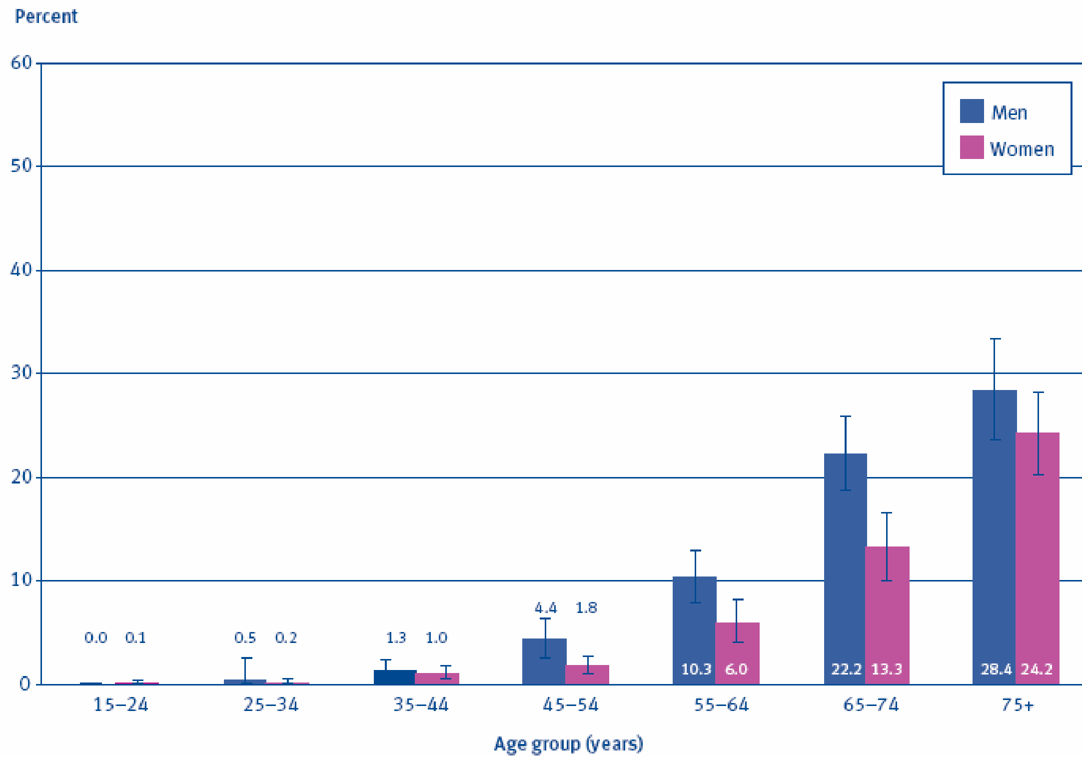
Source: A Portrait of Health: Key results of the 2006/07 New Zealand Health Survey.

Figure 20: Medicated high cholesterol for adults, by age group and gender (unadjusted prevalence)



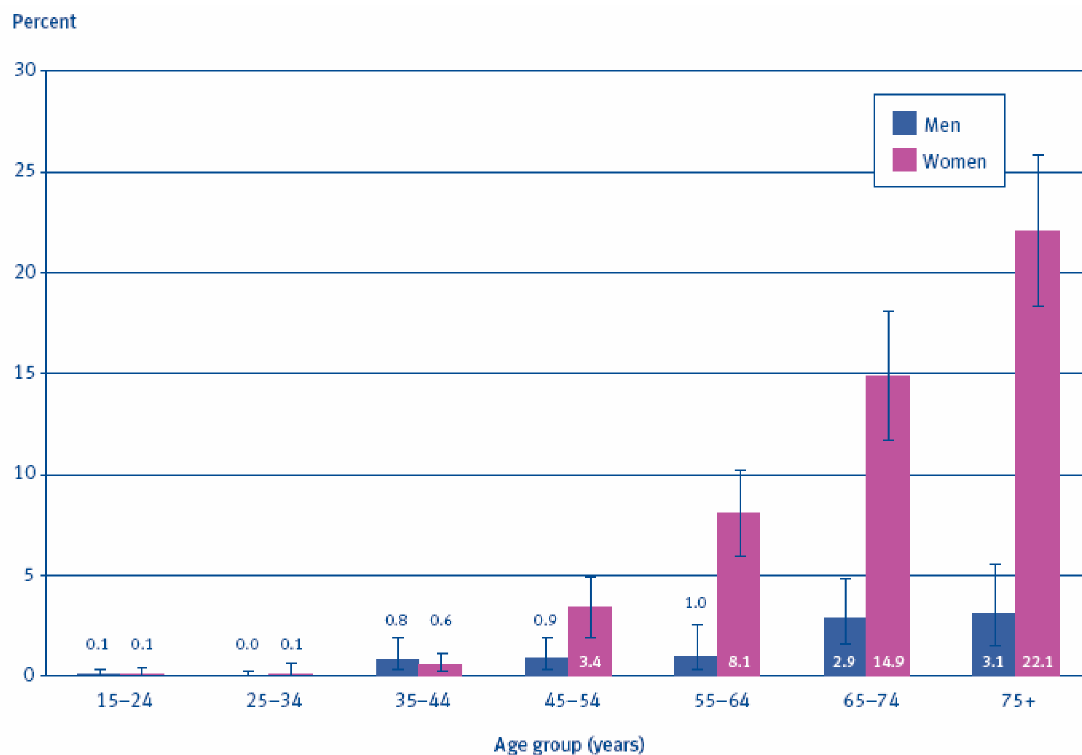
Source: A Portrait of Health: Key results of the 2006/07 New Zealand Health Survey.

Figure 21: Diagnosed IHD (angina or heart attack) for adults, by age group and gender (unadjusted prevalence)



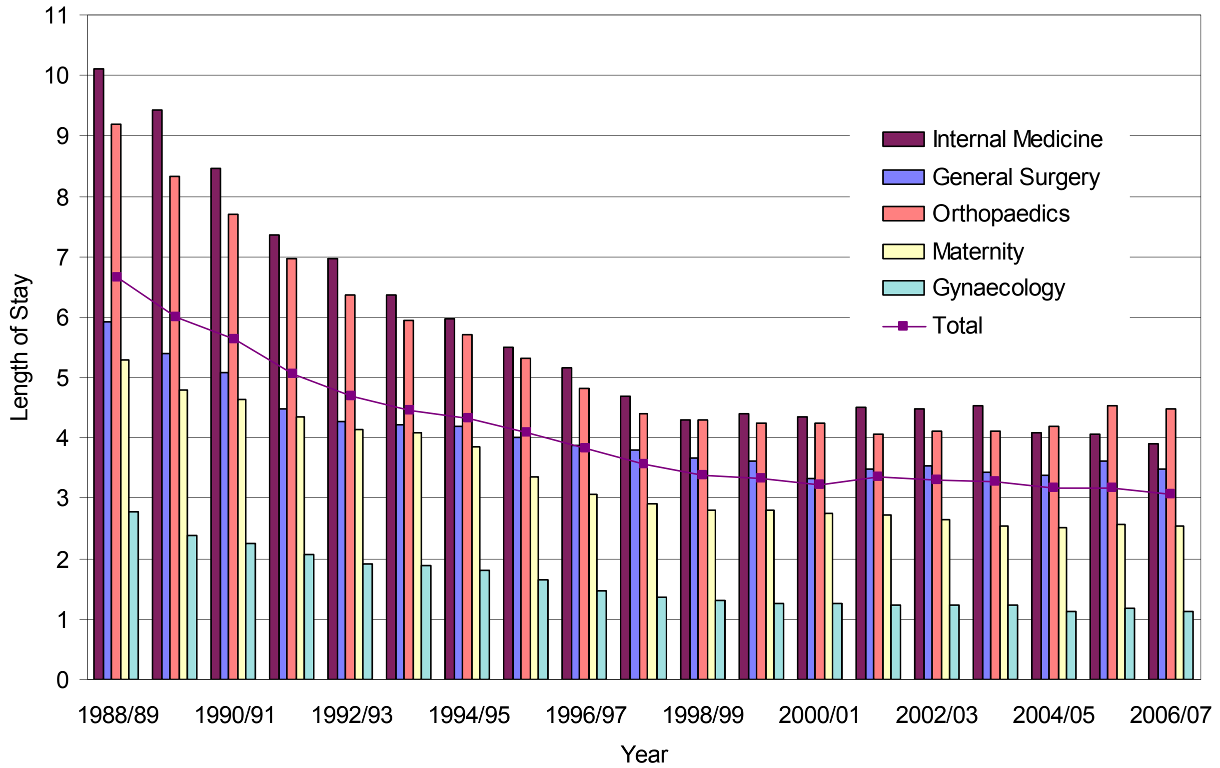
Source: A Portrait of Health: Key results of the 2006/07 New Zealand Health Survey.

Figure 22: Osteoporosis for adults, by age group and gender (unadjusted prevalence)



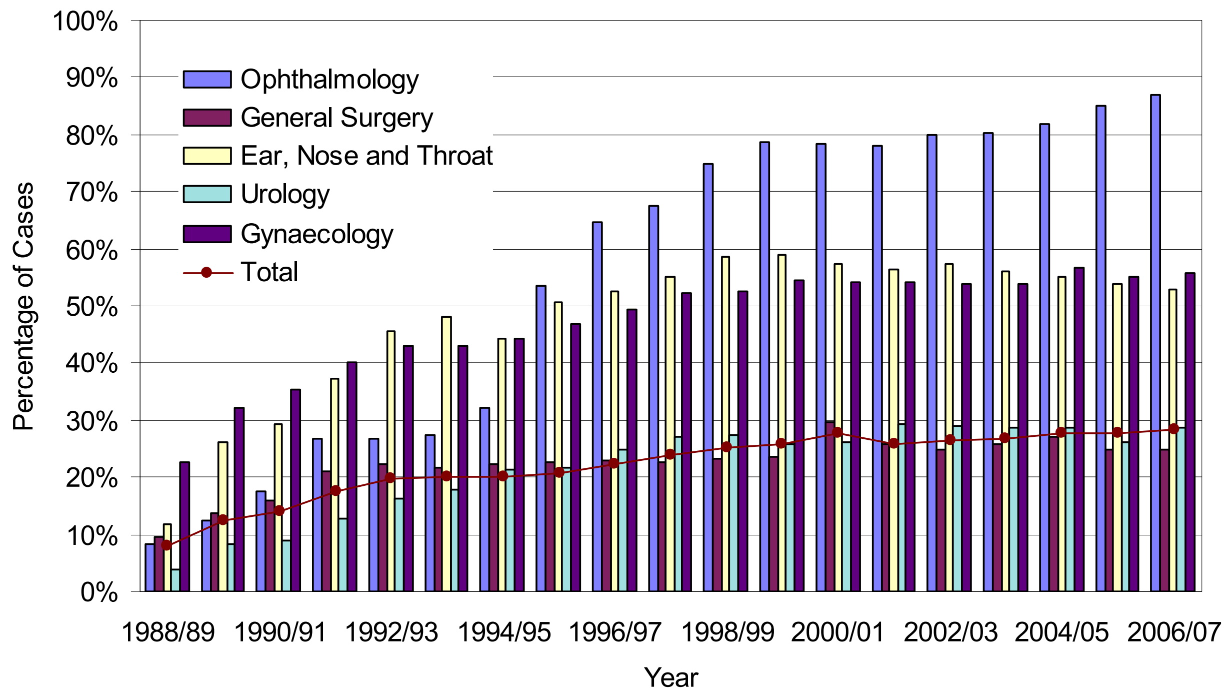
Source: A Portrait of Health: Key results of the 2006/07 New Zealand Health Survey.

Figure 23: Trends in the length of stay in public hospitals: average length of stay, 1988/89–2006/07



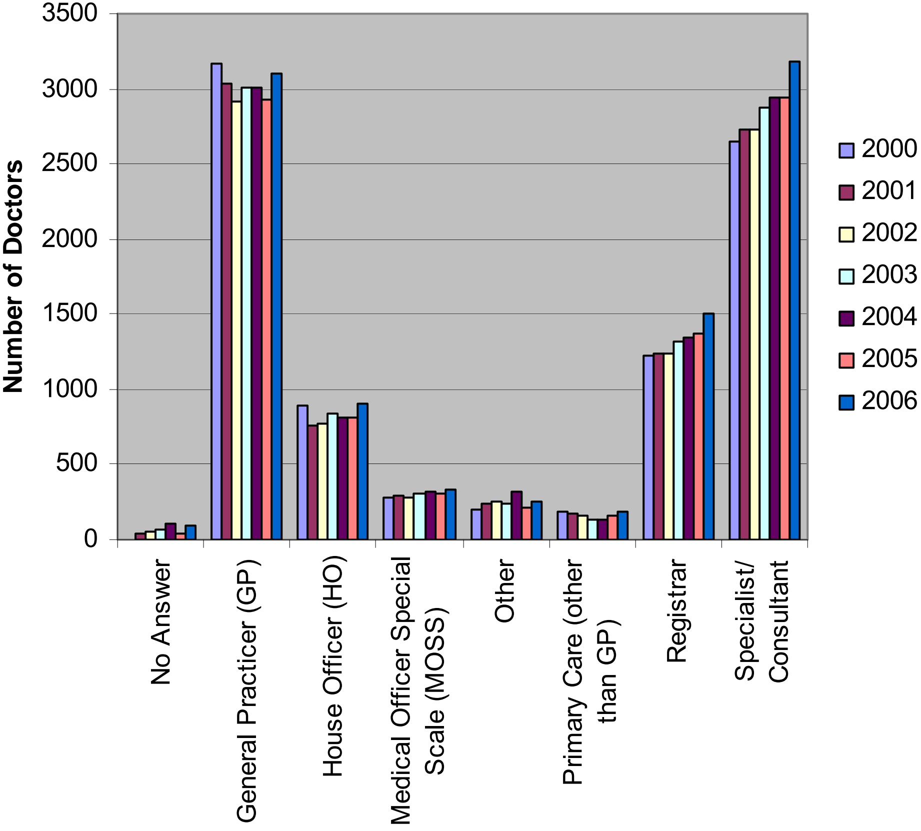
Source: Ministry of Health.

Figure 24: Trends in day case surgery rates for selected types of condition



Source: Ministry of Health.

Figure 25: Trends in doctors by Employment Capacity



Source: MCNZ Workforce Surveys 2000-2006.

Table 9: Comparison of District Health Board reliance on international medical graduates

District Health Board	International medical graduates		New Zealand graduates		Total doctors
	Number	As percent of total	Number	As percent of total	
Medical School DHBs					
Auckland	681	34	1318	66	1999
Capital and Coast	276	32	596	68	872
Otago	204	37	352	63	556
Canterbury	433	35	799	65	1232
Subtotal	1594	34	3065	66	4659
Other large DHBs					
Counties-Manukau	257	41	368	59	625
Waikato	380	49	389	51	769
Waitemata	277	37	472	63	749
Subtotal	914	43	1229	57	2143
Other DHBs					
Northland	147	52	136	48	283
Bay of Plenty	186	48	198	52	384
Lakes	93	44	117	56	210
Tairawhiti	40	53	36	47	76
Hawkes Bay	113	41	165	59	278
Taranaki	108	53	96	47	204
Wanganui	75	67	37	33	112
Midcentral	161	46	188	54	349
Wairarapa	27	55	22	45	49
Hutt	98	42	138	58	236
Nelson-Marlborough	94	39	150	61	244
West Coast	17	44	22	56	39
South Canterbury	44	46	52	54	96
Southland	102	55	83	45	185
Subtotal	1305	48	1440	52	2745
Total	3813	40	5734	60	9547

Source: Medical Training Board Analysis of 2006 MCNZ Workforce Survey.

Table 10: Retention of medical graduates in New Zealand medical practice, class years 1995 to 2006

Final class year[1]	Size of class[2]	Number registered	Percent of registered[3] graduates retained by postgraduate year[4]										
			1	2	3	4	5	6	7	8	9	10	11
1995	275	258	96	84	74	76	80	74	72	68	65	65	64
1996	275	264	97	88	78	80	78	77	75	67	63	60	
1997	284	266	97	86	73	68	72	72	65	68	57		
1998	288	251	96	80	69	77	77	71	70	62			
1999	305	270	99	79	75	77	76	72	67				
2000	323	286	94	82	74	79	78	74					
2001	297	271	95	79	75	81	76						
2002	308	285	94	79	75	75							
2003	329	302	93	80	75								
2004	342	284	101	82									
2005	318	297	99										

1 Final class year is used as Auckland and Otago identify graduate year differently.

2 Size of class is list of those in final class years as given by medical schools. Not all will necessarily be eligible for graduation.

3 Registered is defined as those from the class year who have been registered at some time.

4 Years give those who held one or more APC in the year April to March as a percent of the graduates from the class year who have registered in New Zealand.

Source: New Zealand Medical Council New Zealand Medical Workforce in 2006.

Table 11: Retention of international medical graduates 2000–2005

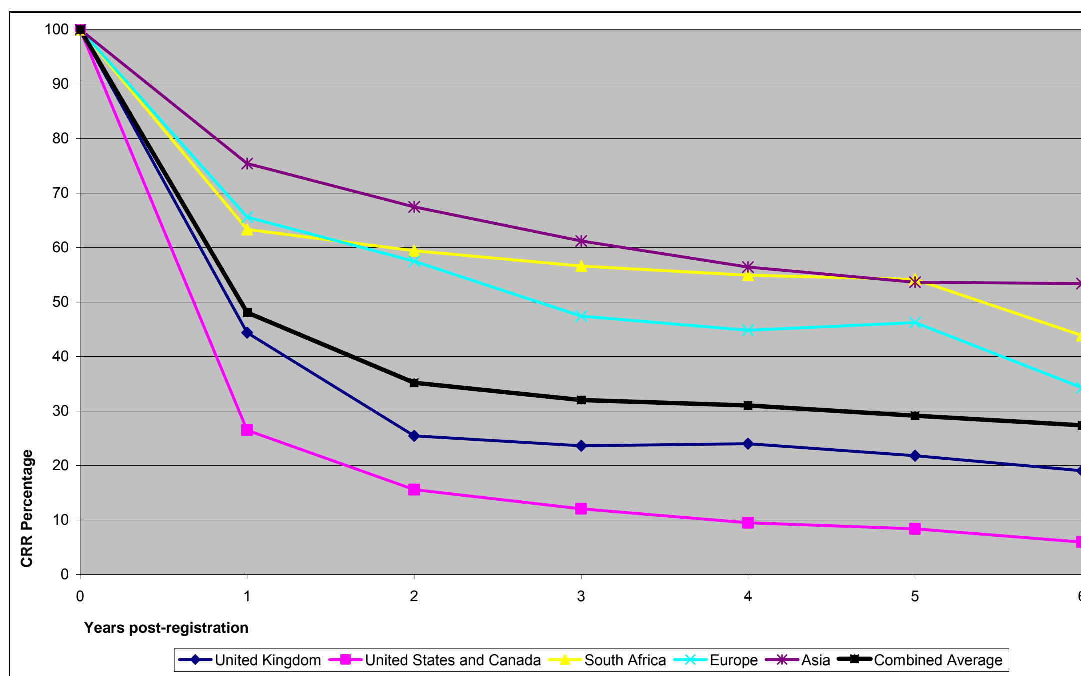
First year registered[1]	Number registered	Percentage of IMGs retained by post-registration year[2]					
		1	2	3	4	5	6
2000	917	47.0	37.8	34.1	30.9	28.4	27.4
2001	930	46.1	35.8	32.4	30.9	29.9	
2002	1078	48.2	36.9	32.1	31.3		
2003	1090	44.9	32.8	29.4			
2004	1017	48.2	32.5				
2005	1130	54.0					

1 IMGs are included in a cohort if they held a practising certificate in that year but not in the previous year. For example, for an international medical graduate to be included in the 2000 cohort, they must have held a practising certificate in 2000 and not held a practising certificate in 1999.

2 The cohort remainder rate is expressed as a percentage and equals the number of doctors from the cohort who held a practising certificate at some point in that year compared with the number of doctors originally in that cohort.

Source: New Zealand Medical Council New Zealand Medical Workforce in 2006.

Figure 26: Cohort retention rate for international medical graduates by country of graduation 2000–2005



Source : New Zealand Medical Council New Zealand Medical Workforce in 2006.

Table 12: Medical school entrant levels in selected countries from 1985 to 2005

Countries	Medical graduates per 100,000 population				
	1985	1990	1995	2000	2005
Australia	8.8	6.3	7.7	7.4	8.9
Canada	7.2	6.2	6.0	5.3	5.7
Ireland			12.9	14.2	14.5
New Zealand	7.7	8.6	7.3	8.3	7.6
United Kingdom		6.3	6.7	7.3	8.6
United States			6.7	6.4	6.2

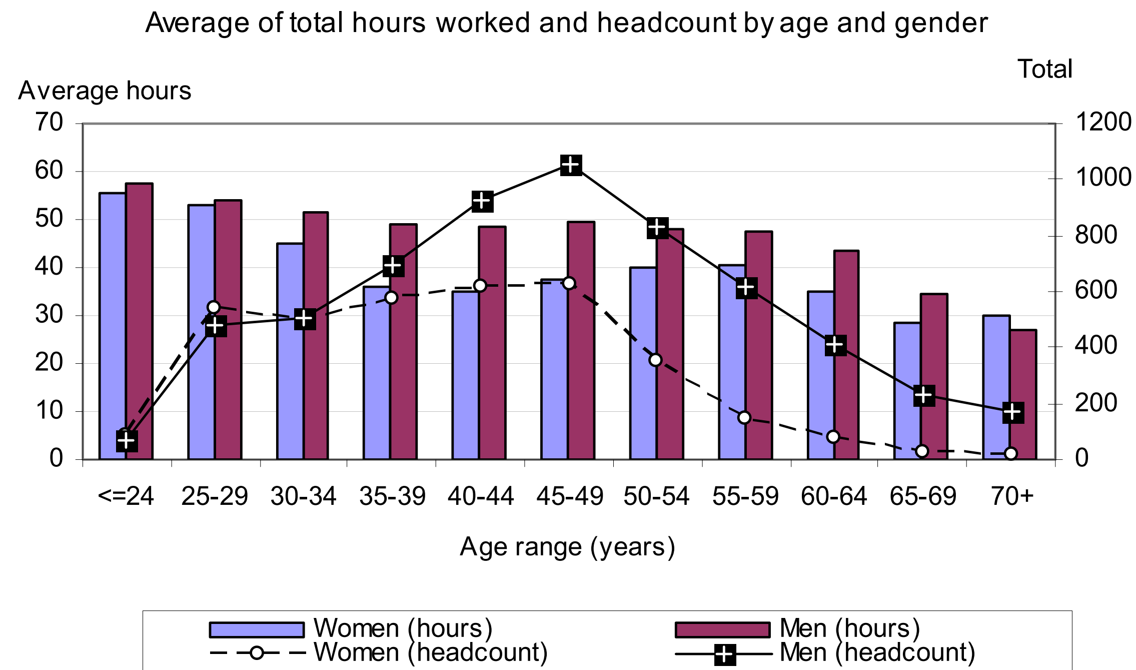
Source: OECD (2006) Health data.

Table 13: Comparison of sessions worked per week by surveyed Waikato general practitioners

	Number of GPs	Male GPs			Female GPs			All		
		Five or Less	Six -Seven	Eight or More	Five or Less	Six -Seven	Eight or More	Five or Less	Six -Seven	Eight or More
Kawerau PHO	5	0	0	4	1	0	0	1	0	4
		Numbers too small			Numbers too small			Numbers too small		
Lake Taupo PHO	22	0	0	14	5	1	2	5	1	16
		0%	0%	100%	63%	13%	25%	23%	5%	73%
Pinnacle Taranaki PHO	35	2	1	20	5	2	5	7	3	25
		9%	4%	87%	42%	17%	42%	20%	9%	71%
Turanganui PHO	20	1	0	13	2	1	3	3	1	16
		7%	0%	93%	33%	17%	50%	15%	5%	80%
Waikato Primary Health	207	5	7	131	23	16	25	28	23	156
		3%	5%	92%	36%	25%	39%	14%	11%	75%
The Network	289	8	8	182	36	20	35	44	28	217
		4%	4%	92%	40%	22%	38%	15%	10%	75%
Average Number of Sessions per week		8.9			6.4			8.1		

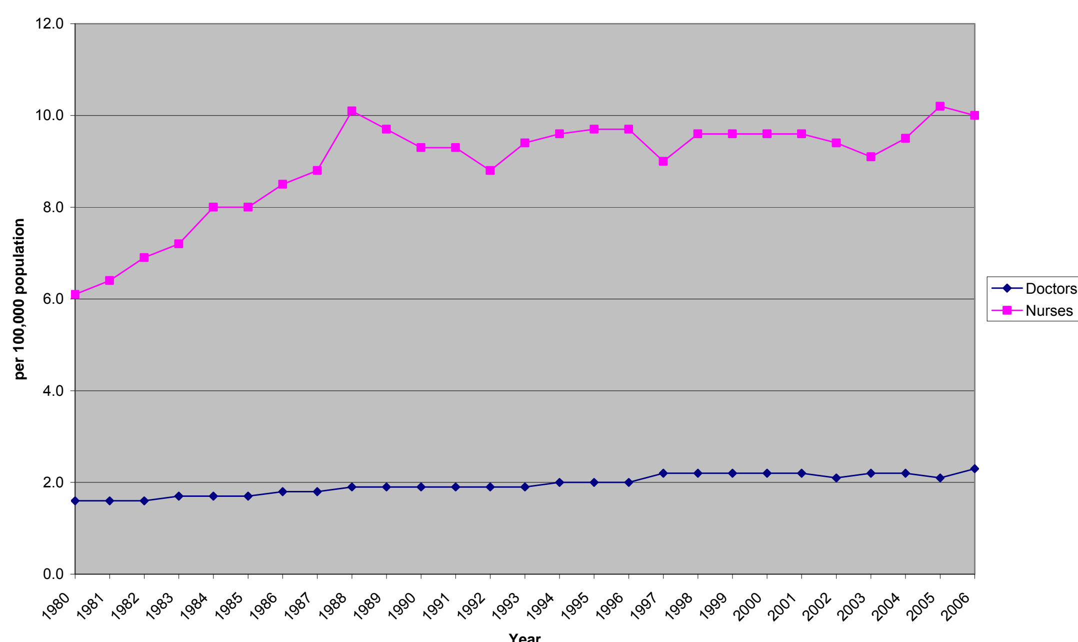
Source: Table 4.1 The General Practice Workforce in the Midland PHO Network 2006.

Figure 27: Average hours worked per week and headcount by gender



Source : New Zealand Medical Council New Zealand Medical Workforce in 2006.

Figure 28: Trends in population, nurses and doctors per 100,000 population



Source: OECD Health Division.

Table 14: Doctors registered for practice in New Zealand

	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005	2006
Growth per year:											
– measured by survey responses	-	-	-	4.9	0	-1.4	-1	4.6	2.2	-2.8	9.2
– measured by registration data	-	-	-	6.3	2.6	-2.5	7.6	2.9	4.2	2.9	6.1
Graduated from:											
– New Zealand	3,266	4,095	4,480	5,024	5,645	5,567	5,608	5,796	5,788	5,459	5,743
– overseas	1,615	1,461	1,859	2,506	2,970	2,924	2,795	2,994	3,203	3,287	3,813
Total workforce (survey response)	4,881	5,556	6,339	7,530	8,615	8,491	8,403	8,790	8,991	8,746	9,547
% IMGs	33	26	29	33	35	34	33	34	36	38	40
Total workforce (registration data)	-	-	-	-	9,779	9,770	10,605	10,857	11,253	11,578	12,283
Short-term registrants	-	-	165	129	421	646	789	758	731	287	119
Percent of workforce	-	-	3	2	4	7	7	7	7	3	1
Average age of workforce	-	-	42	41	43	43	43	43	44	44	44

1 Growth per year is the percentage change in total workforce numbers year to year.

2 Data are five-yearly up to 2000 then annually. Some earlier data are not available.

3 Short-term registrants are not asked to complete the workforce survey. In the years 2003 and prior, this number also represents doctors holding temporary registration under the MPA 1995. In the years 2004 and after, it represents a combination of doctors holding temporary registration under the MPA and doctors with a special purpose scope of practice under the HPCAA. Data are from the Medical Register.

The total workforce according to registration data is calculated by combining the number of survey forms sent out to doctors with New Zealand addresses during the workforce survey period and the number of short-term registrants on the register as at 31 March of the survey period.

Source: New Zealand Medical Council New Zealand Medical Workforce in 2006.

Figure 29: Trends in New Zealand graduates and international medical graduates

Source : New Zealand Medical Council New Zealand Medical Workforce in 2006.

Table 15: Changes in the medical workforce

Workforce Role[1]	Active Doctors 2000	Active Doctors 2001	Active Doctors 2002	Active Doctors 2003	Active Doctors 2004	Active Doctors 2005	Active Doctors 2006	Percentage Change 2005 to 2006
General Practice	3,166	3,037	2,917	3,006	3,013	2924	3106	6.2
House Officer	894	760	774	842	816	811	911	12.3
Medical Officer	277	289	277	303	315	307	329	7.2
Primary Care other than GP	190	171	166	138	138	157	181	15.3
Registrar	1,227	1,242	1,238	1,319	1,338	1365	1504	10.2
Specialist (not including GP)	2,653	2,725	2,723	2,873	2,946	2940	3175	8
Other	206	233	252	244	314	207	248	19.8
No Answer	2	34	56	65	111	35	93	165.7
Total	8,615	8,491	8,403	8,790	8991	8746	9547	9.2

Work at Main Site	Active Doctors 2000	Active Doctors 2001	Active Doctors 2002	Active Doctors 2003	Active Doctors 2004	Active Doctors 2005	Active Doctors 2006	Percentage Change 2005 to 2006
General Practice	2701	2553	2597	2715	2745	2737	2843	4
Primary Care other than GP	695	704	480	387	374	261	292	12
Total	3396	3257	3077	3102	3119	2998	3135	5

1 Head count.

Source: New Zealand Medical Council New Zealand Medical Workforce in 2006.

Table 16: Vocational groups of doctors registered for practice in New Zealand

Work Type at Main Work Site[1,2]	Number of Doctors in Main Work Site 2006	Number of Doctors in Main Work Site 2005	Percent Change 2005 to 2006	Average Hours Worked (All Sites)[3]	Number in Vocational Training[4]	Average Age 2006	Vocational Registration Current APC NZ Address
Accident and medical practice	121	106	12	38	39	41	33
Anaesthesia	603	572	5	49	164	43	377
Basic medical science	31	37	-19	49	0	51	13
Breast medicine	8	5	38	33	*	44	4
Clinical genetics	5	4	20	44	0	45	*
Dermatology	48	43	10	45	5	49	41
Diagnostic and interventional radiology	277	267	4	46	49	45	206
Emergency medicine	285	212	26	43	114	38	91
Family planning and reproductive health	26	28	-8	28	6	49	10
General practice	2843	2737	4	40	563	47	1731
Intensive care medicine	70	55	21	53	21	42	35
Internal medicine	899	806	10	50	245	43	454
Medical administration	42	40	5	43	*	52	24
Musculoskeletal medicine	13	8	38	45	*	54	11
Obstetrics and gynaecology	262	234	11	49	55	45	169
Occupational medicine	65	50	23	44	14	51	51
Ophthalmology	124	114	8	45	16	47	90
Paediatrics	323	304	6	48	101	42	160
Palliative medicine	38	38	0	37	6	51	23
Pathology	207	192	7	43	47	46	139
Primary care	292	261	11	38	51	51	158
Psychiatry	589	530	10	44	170	46	312
Public health medicine	183	176	4	40	34	46	112
Radiation oncology	48	41	15	52	16	43	28
Rehabilitation medicine	15	14	7	41	6	45	7
Sexual health medicine	29	26	10	30	5	46	13
Sports medicine	18	14	22	44	4	46	14
Surgery: cardiothoracic	34	25	26	57	*	45	19
Surgery: general	256	233	9	55	80	43	137
Surgery: neurosurgery	26	14	46	55	6	45	14
Surgery: orthopaedic	282	234	17	54	66	44	168
Surgery: other	44	29	34	51	*	44	30
Surgery: otolaryngology	90	85	6	47	13	47	62
Surgery: paediatric	22	22	0	55	*	44	13
Surgery: plastic	53	54	-2	54	15	44	29
Surgery: vascular	47	20	57	52	6	46	33
Urology	20	25	-25	57	4	43	14
Not answered	357	189	47	45	0	39	106
Other	88	65	26	40	0	50	50
Grand Total	8783	7655	13	45	1936	45	4828

1 Includes registrars, medical officers and others not on the vocational register

2 Based on vocational groups, except for categories “basic medical science”' “primary care other than GP” and “other surgical sub-specialties”

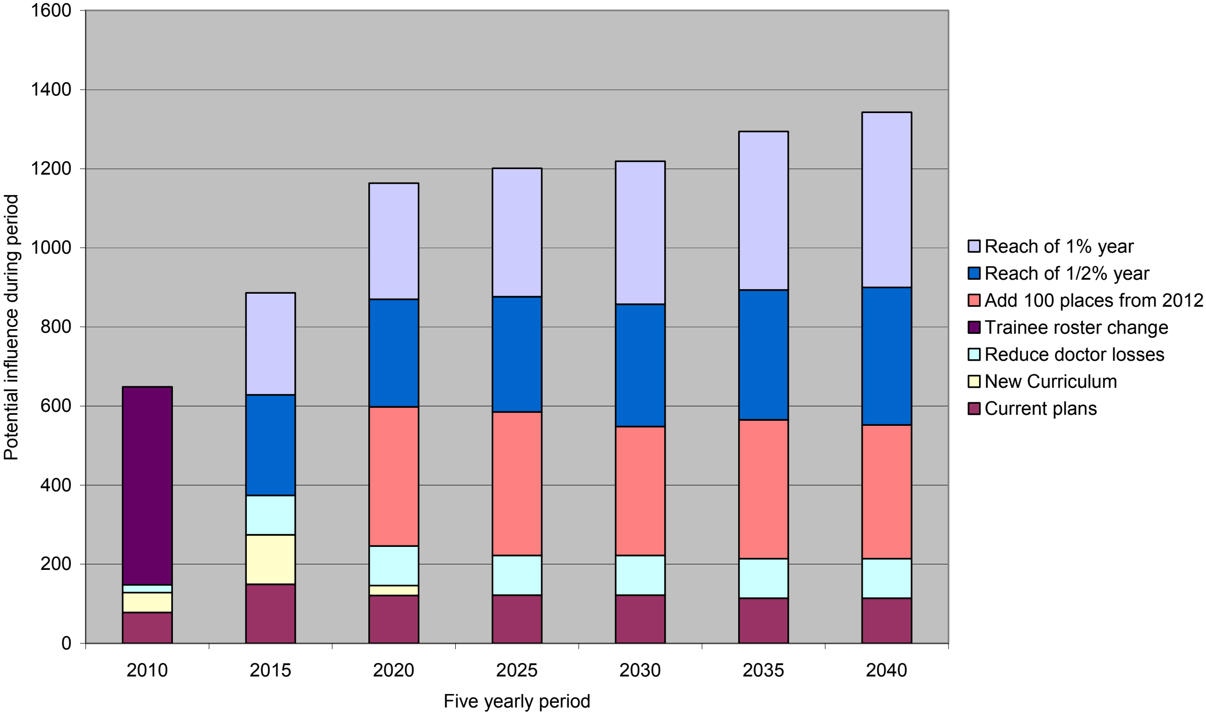
3 Totals exclude House Officer rotation

4 The vocational training work type may be different from the work type at the main work site

* To prevent identification of individuals, categories which contain fewer than four doctors are omitted. The data has been replaced in the table with an asterisk (*)

Source: New Zealand Medical Council New Zealand Medical Workforce in 2006.

Figure 30: Forecast changes to the stock of doctors in five-yearly periods



Source: Medical Training Board analysis.

BIBLIOGRAPHY

Birch S, Kephart G, Tomblin-Murphy G, O'Brien-Pallas L, Alder R, and MacKenzie A. January 2007. *Health Human Resources Planning and the Production of Health: Development of an Extended Analytical Framework for Needs-Based Health Human Resources Planning*; SEDAP Research Paper No. 168; A Program for Research on Social and Economic Dimensions of an Aging Population.

Central Region District Health Boards. May 2008. *Regional Clinical Services Plan*.

Cumming Dr J and Gribben Dr B. September 2007. *Evaluation of the Primary Health Care Strategy: Practice Data Analysis 2001–2005*; Health Services Research Centre.

District Health Boards New Zealand Health Workforce Information. June 2008.

Medical Council of New Zealand (no date). *The New Zealand Medical Workforce in 2006*.

Ministry of Health. June 2008. *A Portrait of Health: Key Results of the 2006/07 New Zealand Health Survey*.

Ministry of Health. October 2007. *Health and Independence Report 2007*.

Ministry of Health. December 2007. *Health Expenditure Trends in New Zealand 1994–2004*.

Ministry of Health (Public Health Intelligence). June 2008. *Long Term Health Expenditure Modelling*.

Ministry of Health. Draft 2008. *Long-term System Framework: Environmental Scan.*

Ministry of Health. December 2006. *Review of the Implementation of Care Plus, as at August 2006*.

Morton J, Williams Y, Philpott M. March 2006. New Zealand's Christchurch Hospital at night: an audit of medical activity from 2230 to 0800 hours. *The New Zealand Medical Journal* Vol. 119, No. 1231.

OECD. 2006. *Health Data*.

OECD. 2008. *Health Workforce and International Migration: Can New Zealand Compete?*

OECD. 2007. *Population Data*.

Statistics New Zealand. October 2006. *New Zealand Yearbook 2006 (1.01 of Demographic Trends 2007)*.

Statistics New Zealand. *Censuses of Population 1996, 2001, 2006*.