Technical Description of Bed Model Analysis for Grey Hospital

Final

10 April 2008

EXECUTIVE SUMMARY

This report describes the bed model developed by the Ministry of Health to determine future public inpatient, secondary care bed requirements for Grey Hospital. Projected bed numbers are provided for each of 2007/08, 2010/11, 2015/16, and 2020/21.

Bed numbers for Medical, Paediatric, Surgical, Pregnancy/Birth (Antenatal/Postnatal and delivery), Neonatal ICU, Critical Care, and AT&R services have been projected based upon the model developed for the Wellington area to determine secondary care inpatient bed requirements in 2005/06 and 2015/16. Models have also been developed for new or redeveloped hospitals in Waitemata, Southland, Christchurch Women's, Tauranga, Waikato, and Thames. The Ministry model forecasts changes in required bed numbers for all services, except AT&R, due to: efficiency adjustments; demographic change; changes in service volumes independent of demographic growth; and changes in day case treatment and average length of stay (ALOS).

For AT&R services, the 2001/02 national average of 2.3 beds per 1,000 population 65 and over, has been used, based on the projected 65+ populations of the West Coast region. This number of beds also assumes that all AT&R beds currently provided by other hospitals would in future be provided at Grey Hospital.

Table 1 below provides final bed numbers across all services to be provided by Grey Hospital. In summary:

- At present, there are 92[1] available beds at Grey Hospital for Medical, Paediatric, Surgical, Pregnancy/Birth, Neonatal ICU, Critical Care and AT&R inpatient and daypatient services. The average occupancy across all these beds is currently 42.2%. If 65% occupancy was set for Critical Care, 75% occupancy for Paediatric, Neonatal ICU and delivery beds, and 85% occupancy for all other beds, 59[1] beds would be required.
- Based on Ministry projections, Grey Hospital needs:
    1 58 beds for 2007/08;
    2 61 beds for 2010/11;
    3 65 beds for 2015/16;
    4 67 beds for 2020/21 and,
    5 72 beds for 2020/26.

[1] Derived from 2006/07 bed & occupancy rate data.

Due to the high uncertainty of long-term projections, the Ministry of Health would place an emphasis on the shorter-term bed projections. With both an ageing population and a levelling out in predicted changes in ALOS and day case treatment, the net effect is that the number of hospital beds is projected to decrease from that currently available. Grey Hospital are projected to require approximately a 36.9% decrease in beds from those currently available by 2007/08, and a 33.6% decrease by 2010/11.

Table 1: Total number of beds predicted by the Ministry of Health bed model in 2007/08, 2010/11, 2015/16, 2020/21 and 2025/26 for Grey Hospital

Service	Current Available	Current Utilised at 85% Occupancy*	Current after Efficiency and Base Adjustments	2008	2011	2016	2021	2026
Medical	17	16	16	16	17	19	21	23
Surgical - Long Stay- Orthopaedic - Grey	10	7	7	7	8	8	8	9
Surgical - Long Stay - General Surgery - Gr	13	9	9	9	9	10	11	11
Surgical - Short Stay - Grey	9	1	1	1	1	1	1	1
Dental - Grey	1	1	1	1	1	1	1	1
Surgical - Long Stay - Grey	1	1	1	1	1	1	1	1
Surgical - Gynaecology	3	2	2	2	2	2	2	2
Medical and Surgical Total	54	37	37	37	39	42	45	48
Paediatric Medical	7	2	2	2	2	2	2	2
Paediatric Surgical	7	1	1	1	1	1	1	1
Paediatrics Total	14	3	3	3	3	3	3	3
Deliveries/caesers - Grey	2	2	2	1	1	1	1	1
Ante/Postnatal with Caesar - Grey	2	2	2	2	2	2	1	1
Ante/Postnatal without Caesar - Grey	4	4	4	4	4	3	3	3
Pregnancy/Birth Total	8	8	8	7	7	6	5	5
Neonatal ICU	2	2	2	2	3	3	2	2
CCU	5	2	2	3	3	3	3	3
Critical Care Total	5	2	2	3	3	3	3	3
AT&R	9	8	8	7	7	9	10	12
Grand Total	**92**	**59**	**59**	**58**	**61**	**65**	**67**	**72**

* Critical Care beds at 65% occupancy. Paediatric, Neonatal ICU and Delivery beds at 75% occupancy.

Table 2 below shows the projected number of inpatient and daypatient beds by service at Grey Hospital, for 2007/08, 2010/11, 2015/16, 2020/21 and 2025/26.

	2008		2011		2016		2021		2026	
Service	**Inpatient**	**Daypatient**	**Inpatient**	**Daypatient**	**Inpatient**	**Daypatient**	**Inpatient**	**Daypatient**	**Inpatient**	**Daypatient**
Medical	16	0	17	0	19	0	21	0	22	1
Surgical - Long Stay- Orthopaedic - Grey	6	1	7	1	7	1	7	1	8	1
Surgical - Long Stay - General Surgery - Grey	8	1	8	1	8	2	9	2	9	2
Surgical - Short Stay - Grey	1	0	1	0	1	0	1	0	1	0
Dental - Grey	1	0	1	0	1	0	1	0	1	0
Surgical - Long Stay - Grey	1	0	1	0	1	0	1	0	1	0
Surgical - Gynaecology	2	0	2	0	2	0	2	0	2	0
Medical and Surgical Total	**35**	**2**	**37**	**2**	**39**	**3**	**42**	**3**	**44**	**4**
Paediatric Medical	2	0	2	0	2	0	2	0	2	0
Paediatric Surgical	1	0	1	0	1	0	1	0	1	0
Paediatrics Total	**3**	**0**	**3**	**0**	**3**	**0**	**3**	**0**	**3**	**0**
Deliveries/caesers - Grey	1	0	1	0	1	0	1	0	1	0
Ante/Postnatal with Caesar - Grey	2	0	2	0	2	0	1	0	1	0
Ante/Postnatal without Caesar - Grey	4	0	4	0	3	0	3	0	3	0
Pregnancy/Birth Total	**7**	**0**	**7**	**0**	**6**	**0**	**5**	**0**	**5**	**0**
Neonatal ICU	**2**	**0**	**3**	**0**	**3**	**0**	**2**	**0**	**2**	**0**
CCU	3	0	3	0	3	0	3	0	0	0
Critical Care Total	**3**	**0**	**3**	**0**	**3**	**0**	**3**	**0**	**0**	**0**
AT&R	7	0	7	0	9	0	10	0	12	0
Grand Total	**57**	**2**	**59**	**2**	**62**	**3**	**64**	**3**	**65**	**4**

Table 2a below compares the actual occupancy rate for the 206/07 year and the Ministry guidelines

	Physical Bed Numbers	**Actual Bed Days**	**Occupancy Rate**	**Ministry Guidelines**
AT&R	9	1,684	51.2	85.0
Medical	17	3,755	60.5	85.0
Neonatal ICU	2	509	69.7	75.0
Deliveries	8	1,137	38.9	75.0
Paediatric Medical	14	408	8.0	75.0
Surgical - Long Stay (ALL sur	28	5,355	52.4	85.0
Surgical - Short Stay	10	930	25.5	85.0
CCU	5	561	30.7	65.0
Total	**93**	**14,339**	**42.2**	

Introduction

This report describes the bed model developed by the Ministry of Health to determine future public inpatient, secondary care bed requirements for Grey Hospital. Projected bed numbers are provided for each of 2007/08, 2010/11, 2015/16, 2020/21 and 2025/26.

The Ministry of Health bed model analysis for Grey Hospital is based upon the model developed for the Wellington area to determine secondary care inpatient bed requirements in 2005/06 and 2015/16. Models have also been developed for new or redeveloped hospitals in Waitemata, Southland, Christchurch (Women's), Tauranga, Waikato, and Thames.

A sensitivity analysis has been undertaken to assess the impact of risk and uncertainty on decision situations modelled for Grey Hospital.

Method

Bed Types Modelled

The bed model developed in this report for Grey Hospital, covers the following service types:

- Acute and elective Medicine;
- Paediatrics (Medical & Surgical);
- Acute and elective Surgery;
- Pregnancy/Birth – Ante/Postnatal and Delivery beds.
- Neonatal ICU;
- Critical Care
- AT&R (Short and Long-stay geriatric) services.

The model covers only the number of beds which are required. No information is provided on the size of other facilities, for example treatment areas, patient rooms, showers etc. The model also excludes any information on ED and outpatient services.

Model Assumptions

Projected secondary inpatient and daypatient bed numbers required for Medical, Paediatric, Surgical, Pregnancy/Birth, Neonatal ICU, and Critical Care services have been modelled using a stepwise additive factor approach. AT&R cases are projected on a separate basis.

1. Bed number projections are made for each service in 2007/08, 2010/11, 2015/16, and 2020/21, 2025/26.
2. Bed requirements for each service are aggregated to estimate the total number of secondary care inpatient beds required at Grey Hospital.

The services modelled (with corresponding health specialties) are:

Medical**:**	**Events with a Medical health Specialty – excluding all events with a Purchase Unit of Endocrinology, Oncology, Rheumatology and excluding all children under 15**

Medical- Endocrinology	**Events with a Purchase Unit of Endocrinology excluding all children under 15**
Medical- Oncology	**Events with a Purchase Unit of Oncology excluding all children under 15**
Medical - Rheumatology	**Events with a Purchase Unit of Rheumatology excluding all children under 15**
Paediatric Medicine	**Paediatric Medicine, – excluding all events with a Purchase Unit of Specialist Paediatric Cardiac Services, Specialist Paediatric Haematology, Specialist Paediatric Neurology, Specialist Paediatric Oncology, and all children under 15 who were neither Neonatal ICU nor Pregnancy/Birth cases**
Specialist Paediatric Cardiac Services	**All events with a Purchase Unit of Specialist Paediatric Cardiac Services for children under 15 who were neither Neonatal ICU nor Pregnancy/Birth cases**
Specialist Paediatric Haematology Services	**All events with a Purchase Unit of Specialist Paediatric Haematology Services for children under 15 who were neither Neonatal ICU nor Pregnancy/Birth cases**
Specialist Paediatric Neurology Services	**All events with a Purchase Unit of Specialist Paediatric Neurology Services for children under 15 who were neither Neonatal ICU nor Pregnancy/Birth cases**
Specialist Paediatric Oncology Services	**All events with a Purchase Unit of Specialist Paediatric Oncology Services for children under 15 who were neither Neonatal ICU nor Pregnancy/Birth cases**
Paediatric Surgery	**Paediatric Surgery, and all children under 15 who were neither Neonatal ICU nor Pregnancy/Birth cases**
Dental	**Events with a Health Specialty of Inpatient Dental Services**
Surgical - Long Stay General Surgery**:**	**Events with a Health Specialty of General Surgery - excluding all children under 15**
Surgical - Long Stay Orthopedic Surgery**:**	**Events with a Health Specialty of Orthopedic Surgery - excluding all children under 15**
Surgical - Long Stay**:**	**Events with a Health Specialty of Neurosurgery, Vascular, Urology - excluding all children under 15**
Surgical - Short Stay Plastic**:**	**Events with a Health Specialty of Plastic**

	Surgery - excluding all children under 15
Surgical - Short Stay**:**	**Events with a Health Specialty of ENT, and Ophthalmology - excluding all children under 15**
Surgical - Gynaecology**:**	**Events with a Health Specialty of Gynaecology - excluding all children under 15**
Antenatal/Postnatal with Caser:	**Antenatal/Postnatal events that include a Caesarean Procedure**
Antenatal/Postnatal without Caser:	**Antenatal/Postnatal events that do not include a Caesarean Procedure**
Deliveries	**Delivery events**
Neonatal ICU	**Neonatal Intensive care events**
Critical Care and Intensive Care	**Events that occur in a Critical Care or Intensive Care environment**
AT&R	**AT&R (Short and Long-stay geriatric) services**

Model Specification

The numbers of hospital beds required for each service is modelled using a stepwise additive factor approach. The key stages in this process are outlined below.

Stage 0: *Base Model*

The starting point for all projections is 2006/07 actual public hospital discharges for Grey Hospital.[2]

Inpatient bed days used for each inpatient are determined by the total length of stay (i.e. number of nights) that each patient spends in hospital, excluding all leave days.[3] Each day case was assigned one bed day.[4] All publicly funded inpatient and day patient events are included in the model.

Stage 1: *Efficiency Adjustments*

The base was further refined by an occupancy adjustment, and benchmarking of both average length of stay (ALOS) and the percentage of treatment carried out on a day case basis.

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[2] Source: National Minimum Dataset, covering the period July 1 2006 to 30 June 2007. The data has been filtered to exclude Mental Health records, non-inpatient/daypatients, duplicates, error records and non-treated patients (See *Appendix B* for a full description of the cases removed).

[3] Maximum length of stay set to 365 days.

[4] Implies extra capacity as in some instances, more than one day case could be treated in the same "bed" on the same day.

A. Occupancy Levels

The model assumes a benchmark-based standard occupancy rate of 85% for all beds except Paediatric, Neonatal ICU, Critical Care, and delivery beds.

The Ministry believes that 85% occupancy for most services is both clinically acceptable and financially viable. In a study to quantify the daily risk of bed shortages of emergency admissions, Bagust *et al* (1999) note that "[t]he risks [of hospital bed shortages] are minimal so long as the mean bed occupancy remains below 85%. Above this level the risks become substantial (at 85%, a hospital can expect to be short of beds for admission on four days in a year)."[5]

Due to the complexity of Neonatal ICU and Critical Care cases, the potentially high fluctuations in demand throughout a year, and the uniqueness of these services, a 65% occupancy level is used Critical Care, and 75% occupancy for Paediatric, Neonatal ICU and delivery beds.

B. Benchmarking

Hospitals and the services they provide can be characterised as either being Secondary or Tertiary. At present the following hospitals have been determined by the sector to be providers of Tertiary services:

- Auckland City Hospital
- Middlemore
- Waikato
- Palmerston North
- Hutt
- Wellington
- Christchurch
- Christchurch Women's
- Burwood
- Dunedin

Appendix A provides a table of the services provided by the above Hospitals with an indication of whether the service provided is Tertiary[6].

Inpatient ALOS for Grey Hospital patients are benchmarked against the average ALOS for the services listed in the previous section on the basis of whether the service delivered is determined to be secondary or tertiary. Where a service is determined to be secondary it will be benchmarked against other providers of secondary services, similarly, where a service is determined to be tertiary it is benchmarked against other providers of tertiary services.

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[5] Bagust, A., Place, M., and Posnen, J.W. (1999) Dynamics of bed use in accommodating emergency admissions: stochastic simulation model, BMJ: 319, pp 155-158.

[6] The analysis is taken from the allocation of the Tertiary Adjuster for the 2006/07 financial year

Benchmarking is carried out using case-mix adjusted ALOS. This allows for a fair comparison of ALOS between providers in the same peer group. ALOS is case-mix adjusted using a number of different factors including:

- the principal diagnosis;
- the presence of any complications[7] and/or co-morbidities;
- age;
- socio-economic and demographic factors.[8]

The case-mix adjusted ALOS for Grey Hospital patients for each service is compared with the national average of providers of the same service. Secondary services will be benchmarked against other providers of secondary services and Tertiary services will be benchmarked against other providers of Tertiary services. If the ALOS is found to be significantly longer than the national average (using 99% confidence intervals), then ALOS is reduced by the percentage that the current ALOS is longer than the national average. Where the ALOS was found to be either no different from, or shorter than the national average, no change is made to the current ALOS.

The same basic approach, outlined above for ALOS, was also used to project changes in the percentage of day-case treatments. For each service, the day-case percentage is reduced by the percentage that the current day-case rate is below the national average for all non-tertiary hospitals, for the corresponding service, after case-mix adjustment. Where the day-case percentage is found to be either no different from, or above the national average, no change is made to the current percentage of day cases.

Stage 2: *Demographic Change*

Expected Number of Total Discharges in year x = sum of the products of the age/gender/ethnic specific rates by service and region in 2006/07, multiplied by the projected region age/gender/ethnic populations in each of 2007/08, 2010/11, 2015/16, 2020/21 and 2025/26.[9] The regions used are: West Coast, Canterbury; Otago; South Canterbury DHBs regions and other New Zealand DHBs combined [10][11].

[7] Excludes all iatrogenic complications.

[8] To make a valid comparison between regions the above four factors are controlled by an adjustment for a patient's status on admission.

[9] Assuming medium birth and mortality rates, and medium net migration flows, and based on the 2006 Census.

[10] In 2006/07, 5.2% of discharges from Grey Hospital were for people outside the West Coast DHB region

[11] ethnic groups in the model are Maori, Pacific and Other as defined by Statistics New Zealand

The model includes an adjustment for change in projections resulting from the shift between the 2001 and 2006 census. Appendix D analyses the change in Demographic projections resulting in the shift between the 2001 and 2006 census.

Stage 3: *Changes in Service Volumes based on trend analysis*

This stage involves a trend-based projection for changes in service volumes (either positive or negative). This trend is independent of that related to demographic changes. Projected numbers of cases in year *x* are found by carrying out a regression analysis of the number of discharges for Grey Hospital between 1997/98 and 2006/07, if such analysis is deemed appropriate, and the *R squared* from the model is at least 67%. If a regression analysis is deemed inappropriate, or the *R squared* from the model is less than 67%, no change in service volumes (based on trend analysis) is assumed.

Stage 4*: Changes in ALOS and % Day Case (based on trend analysis)*[12]

A. ALOS

Having benchmarked ALOS, the projected ALOS for inpatients in year *x* is found by carrying out a regression analysis of ALOS from 1997/98 to 2006/07. The analyses are calculated on the same basis as that for the benchmarking of performance in the 2006/07 year. The analysis takes into account the service delivered and the facilities that provide the service. Essentially New Zealand Hospitals and services were combined into peer groups on the basis of the services they delivered using the allocation in the 2006/07 Tertiary Adjuster allocation.

Subsequently, these national trends are applied to the Grey Hospital data, if such analysis is deemed appropriate, and the *R-squared* from the model is at least 67%. Using the regression equation, a projection is made for ALOS in year *x*. For example, in the case of Paediatrics, if the regression analysis projects a 2.7% reduction in ALOS nationally between 2006/2007 and 2007/2008, then the benchmarked ALOS for Paediatrics cases at Auckland DHB Hospital's would be reduced by 2.7%. If a regression analysis is deemed inappropriate (or the *R-squared* from the model is less than 67%) then the ALOS in year *x* is set to the ALOS for 2006/2007.

B. % Day Case

Having benchmarked percent day case, the projected percentage of day cases in year *x* is found by carrying out a logistic analysis of the percentage of day cases (using national data) from 1997/98 to 2006/07. The analyses are calculated on the same basis as that for the benchmarking of performance in the 2006/07 year. The analysis takes into account the service delivered and the facilities that provide the service. Essentially New Zealand Hospitals and services were combined into peer groups on the basis of the services they delivered using the allocation in the 2006/07 Tertiary Adjuster allocation.

[12] Not carried out for deliveries.

These trends are applied to the Grey Hospital data, given that the analysis is deemed appropriate, and the logistic estimate for time is significant at the 5% level of significance, thereby projecting the percentage of day cases in year *x*. If a logistic analysis is deemed inappropriate, or the logistic estimate for time is not significant, then the percentage of day cases in year *x* is set to the percentage of day cases from 2006/07.

The Final Equation

Final inpatient numbers and bed days for each service, along with final day-case numbers and bed days (after making the occupancy adjustments detailed above) are aggregated to determine the final total numbers and bed days for Grey Hospital.

The number of hospital beds required is calculated as the total number of predicted bed days for year *x*, as above, divided by the product of the number of days in a year and the occupancy adjustment.

The projected number of beds required for each service are aggregated to calculate the total number of hospital beds required by Grey Hospital.

Number of beds required = Number of bed days/(365.25*occupancy level)

For Critical Care beds 65% occupancy is used. For Paediatric, Neonatal ICU and delivery beds, the occupancy level is set at 75%, while an 85% occupancy level is used for all other beds.

Uncertainty of the Estimates

The estimates presented above are subject to a number of uncertainties. Firstly, there are uncertainties due to errors around the assumptions used (forecasting errors). Secondly, there are a number of unforeseen or unknown factors which cause uncertainty around the estimates.

1. Forecasting Errors

Forecast changes in demographics, service volumes, ALOS and day case percentages may not occur. As with any forecast, estimates of such parameters are subject to a degree of uncertainty. Inaccuracies in the forecasts of individual parameters, which 'drive' the bed model, will result in inaccuracies in the final bed number estimates.

2. Unforeseen Factors

No explicit allowance has been made in the model for unforeseen 'external' factors, which might influence the need for beds at Grey Hospital. Such factors may act either to increase or to decrease bed requirements relative to the levels forecast. The development of new technologies that allow current hospital-based procedures to be performed outside a hospital and the emergence of new pharmaceutical products that could reduce overall levels of ill-health and thus demand for hospital services, are factors that might be expected to reduce future bed requirements. Conversely, the introduction of new hospital-based treatments for currently 'incurable' conditions, and the emergence of new diseases and increased incidence of existing diseases that require admission to hospital are all examples of unforeseen factors that might increase future bed requirements.

The uncertainties discussed above cannot, by their very nature, be built into the bed model. In an attempt to recognise their possible impacts, sensitivity analysis is run for the projected bed numbers for Grey Hospital using current and recent years' trend utilisation data.

Sensitivity Analysis is a method used to assess the impacts of risk and uncertainty on decision situations. The principal objective of sensitivity analysis is to aid the decision-maker in selecting a course of action based on the knowledge of the possible outcomes that could occur resulting from those decisions.

Sensitivity analysis has been carried out by examining the impact of random variations in each of the four key parameters that 'drive' the model (i.e. demographics, service volumes, ALOS, and day case percentages). The cumulative effect of such variations is to generate confidence intervals around the bed number projections for 2007/08, 2010/11, 2015/16, 2020/21 and 2025/26.

What the Final Model Does Not Include

The following factors that are not explicitly included in the final bed models are:

- benchmarking against any international ALOS and percentage day case rates;
- any shifts to the private sector;
- any changes in admission practices, such as integrated care and possible moves towards more treatment being provided in a primary care setting;
- any changes in the current patterns of service provision for Medical, Paediatric, Surgical, Pregnancy/Birth, Neonatal ICU and Critical Care services, within the Auckland DHB region.

Using international data for comparisons is problematic for several reasons, including: coding differences, different admission/discharge practises, different funding pressures, different public/private mix etc.

There may be potential for reductions in hospital activity due to factors, such as integrated care and an emphasis on primary care, greater than that reflected in the trend over the last decade or so. However, these factors would be most likely to affect only short-stay cases. An example of such activity is ambulatory sensitive hospitalisations, which result from diseases and conditions sensitive to prophylactic or therapeutic interventions delivered through primary care and are therefore avoidable.

AT&R Services

For AT&R services, the 2001/02 national average of 2.3 beds per 1,000 population 65 and over, has been used, based on the projected 65+ populations of the Auckland DHB region. This number of beds also assumes that all AT&R beds currently provided by other hospitals would in future be provided at Grey Hospital.

Mental Health Services

The Mental Health Commission (1998) recommended 15 beds per 100,000 population in the 'Blueprint for Mental Health Services in New Zealand'. The Blueprint guidelines are meant to operate over large populations not fractions of 100,000s. They assume that people have access to treatment at the larger DHBs. The Mental Health Directorate of the Ministry of Health believes that there should not be any modelling of Mental Health beds without first looking at what constitutes the best long term configuration of Mental Health services in the West Coast DHB region.

Summary of Results

Table 3 (below) provides a summary of the results for 2007/08 (with either a 65%, 75% or 85% occupancy rate) showing bed numbers after each stage of the process.

Table 3: Total number of beds predicted by the Ministry of Health bed model in 2007/08, for Grey Hospital

	Base	(1) Efficiency Adjustment		2008	
Service	Current Available	Current Utilised at 85% Occupancy*	After Bench-marking and Adjustments to Base	(2) - (1) plus Demo-graphic	Final - (2) plus ALOS & % Day Case
Medical	17	16	16	17	16
Surgical - Long Stay- Orthopaedic - Grey	10	7	7	8	7
Surgical - Long Stay - General Surgery - Grey	13	9	9	10	9
Surgical - Short Stay - Grey	9	1	1	2	1
Dental - Grey	1	1	1	1	1
Surgical - Long Stay - Grey	1	1	1	2	1
Surgical - Gynaecology	3	2	2	2	2
Medical and Surgical Total	**54**	**37**	**37**	**42**	**37**
Paediatric Medical	7	2	2	3	2
Paediatric Surgical	7	1	1	2	1
Paediatrics Total	**14**	**3**	**3**	**5**	**3**
Deliveries/caesers - Grey	2	2	2	2	1
Ante/Postnatal with Caesar - Grey	2	2	2	2	2
Ante/Postnatal without Caesar - Grey	4	4	4	4	4
Pregnancy/Birth Total	**8**	**8**	**8**	**8**	**7**
Neonatal ICU	**2**	**2**	**2**	**2**	**2**
CCU	5	2	2	3	3
Critical Care Total	**5**	**2**	**2**	**3**	**3**
AT&R	9	8	8	9	7
Grand Total	**92**	**59**	**59**	**67**	**58**

* Critical Care beds at 65% occupancy. Paediatric, Neonatal ICU and Delivery beds at 75% occupancy.

At present there are 92 available beds at Grey Hospital for Medical, Paediatric, Surgical, Pregnancy/Birth, Neonatal ICU, Critical Care and AT&R inpatient and daypatient services. The average occupancy across all these beds is currently 42.2%. If 65% occupancy was set for Critical Care, 75% occupancy for Paediatric, Neonatal ICU and delivery beds, and 85% occupancy for all other beds, 59 beds would be required. Benchmarking leaves the number of beds at 59 (starting point).

1. Assuming demographic change only, it is predicted that 67 beds would be needed (**13.6%** increase from the starting point);
2. projecting changes in service volumes does not change bed numbers;
3. projecting changes in ALOS and percent day case reduces bed numbers by **13.4%** (9) to 58 (final model).

After efficiency adjustments, this represents an annual decrease of 34 beds per annum from current utilised bed numbers.

Table 4: Total number of beds predicted by the Ministry of Health bed model in 2010/11, 2015/2016, 2020/21 and 2025/26 for Grey Hospital

	2011		2016		2021		2026	
Service	(2) - (1) plus Demo-graphic	Final - (2) plus ALOS & % Day Case	(2) - (1) plus Demo-graphic	Final - (2) plus ALOS & % Day Case	(2) - (1) plus Demo-graphic	Final - (2) plus ALOS & % Day Case	(2) - (1) plus Demo-graphic	Final - (2) plus ALOS & % Day Case
Medical	18	17	20	19	22	21	25	23
Surgical - Long Stay- Orthopaedic - Grey	8	8	8	8	8	8	9	9
Surgical - Long Stay - General Surgery - Grey	10	9	11	10	11	11	12	11
Surgical - Short Stay - Grey	2	1	2	1	2	1	2	1
Dental - Grey	2	1	2	1	1	1	1	1
Surgical - Long Stay - Grey	2	1	2	1	2	1	2	1
Surgical - Gynaecology	3	2	2	2	2	2	2	2
Medical and Surgical Total	**45**	**39**	**47**	**42**	**48**	**45**	**53**	**48**
Paediatric Medical	3	2	3	2	2	2	2	2
Paediatric Surgical	2	1	2	1	1	1	1	1
Paediatrics Total	**5**	**3**	**5**	**3**	**3**	**3**	**3**	**3**
Deliveries/caesers - Grey	1	1	1	1	1	1	1	1
Ante/Postnatal with Caesar - Grey	2	2	2	2	2	1	2	1
Ante/Postnatal without Caesar - Grey	4	4	4	3	4	3	4	3
Pregnancy/Birth Total	**7**	**7**	**7**	**6**	**7**	**5**	**7**	**5**
Neonatal ICU	**2**	**3**	**2**	**3**	**2**	**2**	**2**	**2**
CCU	3	3	3	3	3	3	3	3
Critical Care Total	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
AT&R	9	7	11	9	13	10	15	12
Grand Total	**69**	**61**	**73**	**65**	**75**	**67**	**82**	**72**

* Critical Care beds at 65% occupancy. Paediatric, Neonatal ICU and Delivery beds at 75% occupancy.

In 2010/11, it is projected that 61 Medical, Paediatric, Surgical, Pregnancy/Birth, Neonatal ICU, Critical Care and AT&R inpatient and daypatient beds will be required by Grey Hospital. In 2015/16, the projected number of beds is 65, with 67 beds projected for 2020/21 and 72 beds for 20250/26. The highest level of growth in bed numbers to 2025/26 is predicted for AT&R services (50% increase from current utilised bed numbers). This growth is the result of a 78.2% increase in the 65+ population in the West Coast DHB region, projected from 2007 to 2026, compared with a 16.8% decrease in the population aged 65 and under over the corresponding period.

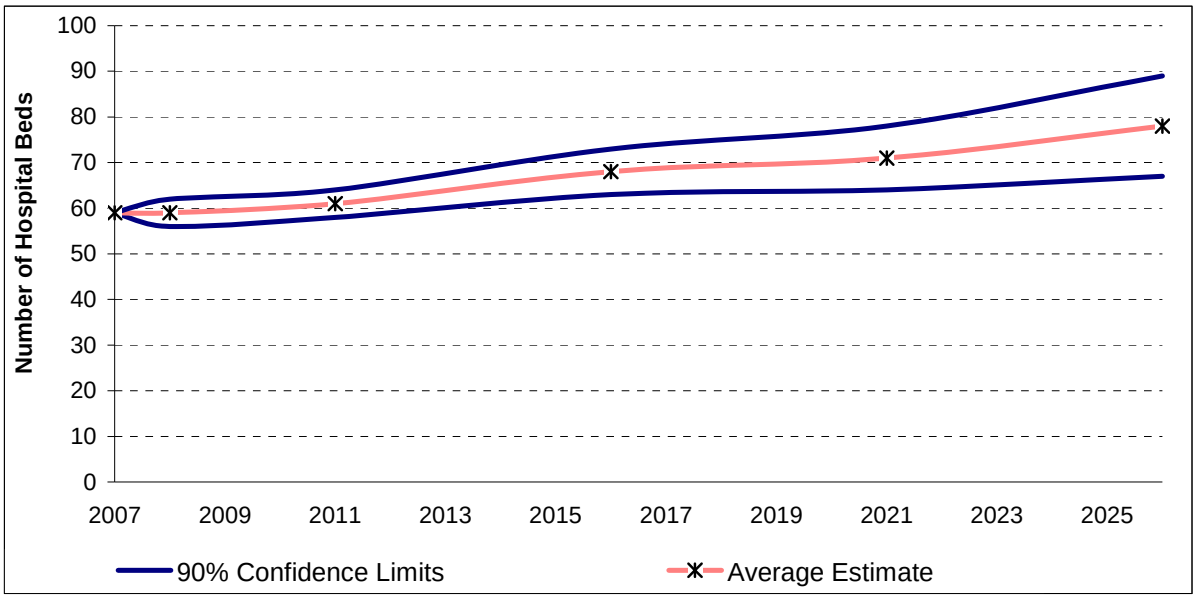
Due to the high uncertainty of long-term projections, the Ministry of Health would place an emphasis on the shorter-term bed projections. With an ageing population and a levelling out in predicted changes in ALOS and day case treatment, the net effect is that the number of hospital beds is projected to increase from that currently available Grey Hospital. It is projected that the required number of beds will decrease approximately by 36.9% decrease from those currently available by 2007/08, and a 33.6% decrease is projected for 2010/11.

Sensitivity Analysis

The effects of including uncertainty are illustrated in *Figure 1* below, which shows the projected number of hospital beds for each year, based on the Ministry of Health bed model, together with 90% confidence limits. The graph shows the obvious effect of increasing variability over time.

Figure 1: Number of beds predicted by the Ministry of Health bed model over time, with 90% confidence limits for Grey Hospital

Note: Critical Care beds at 65% occupancy. Paediatric, Neonatal ICU and Delivery beds at 75% occupancy



Based on the assumptions included in the model, there is a 90% probability that bed requirements will lie between the figures shown for the lower limit and the upper limit.

The key findings from the sensitivity analysis, with either 75% or 85% occupancy, are:

- For 2007/08, with 90% confidence, the model predicts that the required number of hospital beds will fall between 56 and 62, a range of 6 beds.
- In 2010/11, it is predicted with 90% confidence that total bed requirements will rise to between 58 and 64 beds. For 2015/16, the predicted range of beds is 63 to 73, 2020/21 the predicted range is from 64 to 78 beds, while for 2025/26 the predicted range is from 67 to 89 beds.

Final Bed Numbers

In summary

- At present, there are 92 available beds at Grey Hospital for Medical, Paediatric, Surgical, Pregnancy/Birth, Neonatal ICU, Critical Care and AT&R inpatient and daypatient services. The average occupancy across all these beds is currently 42.2%. If 65% occupancy was set for Critical Care, 75% occupancy for Paediatric, Neonatal ICU and delivery beds, and 85% occupancy for all other beds, 59 beds would be required.
- Based on Ministry projections, Grey Hospital needs:
    1. 58 beds for 2007/08;
    2. 61 beds for 2010/11;
    3. 65 beds for 2015/16;
    4. 67 beds for 2020/21 and,
    5. 72 beds for 2020/26.

APPENDICES

Appendix A: Tertiary Specialties by Facility

Appendix B: Projected Resource Requirements for Cases Excluded from Grey Hospital Bed Model

Appendix C: Filtering of Grey Hospital Discharge Data

Appendix D: Analysis of Demographic Projections for West Caost DHB Region from the 2001 and 2006 Census

Appendix A: Tertiary Specialities by Facility13

Health Specialty/Purchase Unit Name	Major Service Group	Auckland City Hospital	Middlemore	Waikato	Palmerston North	Hutt	Wellington	Christchurch	Christchurch Women's	Burwood	Dunedin
Inpatient Dental treatment	**Surgical**	**Y**	**Y**	**Y**			**Y**	**Y**			**Y**
General Internal Medical Services - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Cardiology - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Specialist Paediatric Cardiac - Inpatient Services (DRGs)	**Medical**	**Y**									
Dermatology - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Endocrinology & Diabetic - Inpatient Services (DRGs)	**Medical**	**Y**	**Y**	**Y**			**Y**	**Y**			**Y**
Gastroenterology - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Haematology - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Specialist Paediatric Haematology	**Medical**	**Y**					**Y**	**Y**			
Infectious Diseases (incl Venereology) - Inpatient Ser (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**

[13] Y indicates that the service has been determined to be Tertiary in the allocation of the Tertiary Adjuster allocation for the 2006/7 financial year.

Appendix A: Tertiary Specialities by Facility Contd14

Health Specialty/Purchase Unit Name	Major Service Group	Auckland City Hospital	Middlemore	Waikato	Palmerston North	Hutt	Wellington	Christchurch	Christchurch Women's	Burwood	Dunedin
Neurology - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Specialist Paediatric Neurology	**Medical**	**Y**					**Y**	**Y**			
Oncology - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**	**Y**		**Y**	**Y**			**Y**
Specialist Paediatric Oncology	**Medical**	**Y**					**Y**	**Y**			
Paediatric Medical Service (Inpatient)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Renal Medicine - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Respiratory - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**			**Y**	**Y**			**Y**
Rheumatology (incl Immunology) - Inpatient Services (DRGs)	**Medical**	**Y**		**Y**		**Y**	**Y**	**Y**			**Y**
Palliative Medical Services - Inpatient Services (DRGs)	**Medical**										
General Surgery - Inpatient Services (DRGs)	**Surgical**	**Y**	**Y**	**Y**			**Y**	**Y**			**Y**
Cardiothoracic - Inpatient Services (DRGs)	**Surgical**	**Y**		**Y**			**Y**	**Y**			**Y**
Ear- Nose and Throat - Inpatient Services (DRGs)	**Surgical**	**Y**		**Y**			**Y**	**Y**			**Y**

[14] Y indicates that the service has been determined to be Tertiary in the allocation of the Tertiary Adjuster allocation for the 2006/7 financial year.

Appendix A: Tertiary Specialities by Facility Contd[15]

Health Specialty/Purchase Unit Name	Major Service Group	Auckland City Hospital	Middlemore	Waikato	Palmerston North	Hutt	Wellington	Christchurch	Christchurch Women's	Burwood	Dunedin
Gynaecology - Inpatient Services (DRGs)	**Surgical**	**Y**		**Y**			**Y**		**Y**		**Y**
Neurosurgery - Inpatient Services (DRGs)	**Surgical**	**Y**					**Y**	**Y**			**Y**
Ophthalmology - Inpatient Services (DRGs)	**Surgical**	**Y**		**Y**			**Y**	**Y**			**Y**
Orthopaedics - Inpatient Services (DRGs)	**Surgical**	**Y**	**Y**	**Y**			**Y**	**Y**		**Y**	**Y**
Paediatric Surgical Services	**Surgical**	**Y**	**Y**	**Y**			**Y**	**Y**			**Y**
Plastic & Burns - Inpatient Services (DRGs)	**Surgical**		**Y**	**Y**		**Y**		**Y**			
Urology - Inpatient Services (DRGs)	**Surgical**	**Y**		**Y**			**Y**	**Y**			**Y**
Vascular Surgery - Inpatient Services (DRGs)	**Surgical**	**Y**		**Y**			**Y**	**Y**			**Y**
Specialist neonates	**Maternity and Neonatal**	**Y**	**Y**	**Y**			**Y**		**Y**		**Y**

[15] Y indicates that the service has been determined to be Tertiary in the allocation of the Tertiary Adjuster allocation for the 2006/7 financial year.

Appendix B: Projected Resource Requirements for Cases Excluded from Grey Hospital Bed Model

This appendix summarises the projected number of cases and resource requirements ("beds") for cases excluded from the Grey Hospital bed model analysis.

The projected number of non-inpatient specialist treatment and diagnostic procedure cases, as well as other cases excluded from the Grey Hospital bed model analysis, for each outyear and by type, is calculated on the projected demographic change of the population currently using each of these services. [16]

> The expected number of total cases in year x = sum of the products of the age/gender/ethnic specific rates by service and region in 2006/07, multiplied by the projected region age/gender/ethnic populations in 2007/08.[17]

Low and high projections, using low and high series projections, have also been calculated for sensitivity analysis.

No change in demand above demographic change has been assumed for any of these services, nor is any change in ALOS over time modelled for services involving overnight stays.

For non-inpatient specialist treatment and diagnostic procedure cases, the model assumes:

- 85% occupancy;
- services operate Monday to Friday, 48 weeks of the year; and,
- average of 1.5 case treated on a day.

Calculation for the projected number of "beds" in each outyear is

"Bed" Number = Projected cases/(240*0.85*1.5)

For other cases excluded from the Grey Hospital bed model analysis, assume 85% occupancy and services operate throughout the year.

Calculation for the projected number of "beds" in each outyear is

"Bed" Number = (Projected overnight bed days + day cases)/(365.25*0.85)

Table B1 provides the projected number of cases and "beds" for non-inpatient specialist treatment and diagnostic procedure patients in each outyear. *Table B2* provides the corresponding information for other cases excluded from the Grey Hospital bed model analysis.

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16 Medium series projections - assuming medium birth and mortality rates, and medium net migration flows, and based on the 2006 Census.

17 The areas used are the Auckland, Counties Manukau, Waitemata DHBs and the Rest of New Zealand combined.

Table B3 shows all cases excluded from the Grey Hospital bed model analysis, from *2001/02 to 2006/07*.

Table A1: *Number of non-inpatient specialist treatment and diagnostic procedure cases and hospital "beds" estimated by the Ministry of Health, for Grey Hospital*

	Number of Cases						Number of "Beds"				
Treatment/Procedure	**2006/07**	**2007/08**	**2010/11**	**2015/16**	**2020/21**	**2025/26**	**2007/08**	**2010/11**	**2015/16**	**2020/21**	**2025/26**
Blood transfusion	11	11	12	14	14	14	<1	<1	<1	<1	<1
Colonoscopy	310	315	329	355	374	389	2	2	2	2	2
Colposcopy	29	29	28	29	27	23	<1	<1	<1	<1	<1
Cystoscopy	3	3	3	4	4	5	<1	<1	<1	<1	<1
ERCP	1	1	1	1	1	1	<1	<1	<1	<1	<1
Gastroscopy	117	119	126	136	144	147	<1	<1	<1	<1	<1
Lithotripsy	9	9	9	9	9	9	<1	<1	<1	<1	<1
Total	**480**	**487**	**509**	**547**	**573**	**588**	**2**	**2**	**2**	**2**	**2**

Note: All "beds" assumed to be at 85% occupancy.

Table B2: Number of other cases and hospital "beds" for cases excluded from Grey Hospital bed model analysis, estimated by the Ministry of Health, for Grey Hospital

	Number of Cases						Number of "Beds"				
Type	2006/07	2007/08	2010/11	2015/16	2020/21	2025/26	2007/08	2010/11	2015/16	2020/21	2025/26
Cancelled operation	47	47	49	50	49	50	1	1	1	1	1
Chemotherapy	12	12	13	16	16	19	1	1	1	1	1
Mental Health	144	140	143	144	146	147	7	7	7	7	7
Well baby	261	263	260	240	228	217	3	3	3	3	3

Note: All "beds" assumed to be at 85% occupancy.

Table B3: Number of cases excluded from Grey Hospital bed model analysis 2001/02 to 2006/07

	Number of Cases						Percentage Change	
Type	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2001/02 to 2004/05	2005/06 to 2006/07
Blood transfusion	9	10	10	16	14	11	55.6	-21.4
Bronchoscopy	3	5	4	0	0	0	0.0	0.0
Colonoscopy	164	179	212	223	225	310	37.2	37.8
Colposcopy	19	15	21	15	31	29	63.2	-6.5
Cystoscopy	30	7	14	8	6	3	-80.0	-50.0
ERCP	0	0	0	0	1	1	0.0	0.0
Gastroscopy	92	101	120	107	107	117	16.3	9.3
Lithotripsy	7	7	5	10	9	9	28.6	0.0
Boarder	1	0	0	0	0	0	0.0	0.0
Cancelled operation	45	60	37	70	52	47	0.0	0.0
Chemotherapy	21	25	0	0	5	12	-76.2	140.0
Mental Health	220	239	209	215	158	144	-28.2	-8.9
Sleep Apnoea	1	0	1	0	1	0	0.0	0.0
Well baby	252	219	265	267	299	261	18.7	-12.7

Appendix C: Filtering of Grey Hospital Discharge Data

The following section lists the tests that identify whether or not a particular event is to be excluded from the National Minimum Dataset (NMDS) data extract to be used for the Ministry of Health's West Coast DHB Hospitals Bed Model Analysis. The objective of the filtering routine is to exclude all non-inpatient/daypatient records on the NMDS, which are not either medical, surgical, maternity, neonatal; or DSS cases, as well as removing any error records. For this reason, the NMDS data has been filtered in the 17 steps detailed below.

1 Non-Treated Patients

Events where no treatment is provided are excluded. These include Boarders who may be admitted or admitted patients whose procedure is subsequently cancelled.

Boarders are tested for by checking that the principal diagnosis code is in the range: (Z763, Z764).

Cancelled Operations are tested for by checking that:
The primary operation/procedure code is blank
AND
That the event is non-acute (ie Admission Type not "AC")
AND
Length of Stay is less than 2 days
AND
That one or more of the first six diagnosis codes contain the ICD-10-AM 3rd Edition codes for *Persons encountering health services for specific procedures, not carried out*, i.e. one (or more) of diagnosis 1-6 is in the range Z530 – Z539:
Z530 *Procedure not carried out because of contraindication*,
Z531 *Procedure not carried out because of patient's decision for reasons of belief or group pressure,*
Z532 *Procedure not carried out because of patient's decision for other and unspecified reasons*,
Z538 *Procedure not carried out for other reasons*,
Z539 *Procedure not carried out, unspecified reason.*

2 Error DRGs

Events coded to an Error AR-DRG are excluded. Events that contain clinically atypical or invalid information are assigned to one of six Error DRG's in AR-DRG v5.0. There are three error DRGs that occur because the principal diagnosis does not relate to the principal procedure. These are not excluded from casemix.
The Error AR-DRGs in v5.0 that are excluded from casemix are 960Z, 961Z, and 963Z.

3 Renal Dialysis

The NZdrg50 for Renal Dialysis, L61Z, and Peritoneal Dialysis (principal diagnosis of Z49.2 *Other dialysis)*, L61Y, are excluded from casemix purchasing.

4 Same day Chemotherapy & Radiotherapy

Some sameday cases for Chemotherapy and Radiotherapy are excluded from casemix purchasing.
Sameday cases for chemotherapy are tested by checking:

That the Admission date is the same as the Discharge date
AND
That diag01 or diag02 is either ICD-10-AM 3rd Edition Z511 *Chemotherapy session for neoplasm* or Z512 *Other chemotherapy*:

Same day cases for radiotherapy are tested by checking:
That the Admission date is the same as the Discharge date
AND
That diag01 or diag02 is ICD-10-AM 3rd Edition Z510 *Radiotherapy session*

5 Sleep Apnoea

Some Sleep Apnoea events where there are overnight stays for investigations such as polysomnography, are excluded from casemix purchasing. These events are tested for by checking:
That the integer difference in days between the Discharge and Admission dates is less than 2
AND
That the AR-DRG v5.0 is E63Z *Sleep Apnoea*.

Note on Anaesthesia coding

Anaesthesia coding in ICD-10-AM 3rd edition includes a large number of codes that are in the block 1910. The following codes are included in each of the exclusions 5.2.20 to 5.2.26. We will refer to these as *block 1910 codes*.

9251410, 9251419, 9251420, 9251429, 9251430, 9251439, 9251440, 9251449, 9251450, 9251459, 9251460, 9251469, 9251490, 9251499, 9251510, 9251519, 9251520, 9251529, 9251530, 9251539, 9251540, 9251549, 9251550, 9251559, 9251560, 9251569, 9251590, 9251599, all [1910].

6 Lithotripsy

Some sameday Lithotripsy events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same
AND
That the event is non-acute (ie Admission Type not in “AC”)
AND
That the first procedure code is in the range:
(9095600, 9095700 [962], 3654600 [1126], 9219900 [1880]).
AND
That the second procedure code is in the range:
(9095600, 9095700 [962], 3654600 [1126], 9219900 [1880], block 1910 codes, blank).
AND
That the third procedure code is in the range: (9095600, 9095700 [962], 9219900 [1880], 3654600 [1126], block 1910 codes, blank).

7 Colposcopies

Some sameday Colposcopy events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same

AND
The patient's age is greater than 15 years old
AND
That the event is non-acute (i.e. Admission Type not in "AC")
AND
That the first procedure code is in the range:
(3562000 [1264], 3553902, 3560800, 3560801, 3564600, 3564700 [1275], 3560802, 3561100, 3561800, 3561801 [1276], 3561803 [1278], 3553904, 3561400 [1279], 3553903 [1282], 3561500 [1291])
AND
That the second procedure code is in the range:
(3562000 [1264], 3553902, 3560800, 3560801, 3564600, 3564700, , [1275], 3560802, 3561100, 3561800, 3561801 [1276], 3561803 [1278], 3553904 [1279], 3561400 [1279], 3553903 [1282], 3561500 [1291], block 1910 codes, blank)
AND
That the third procedure code is in the range: (block 1910 codes, blank).

8 Cystoscopies

Some sameday Cystoscopies events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same
AND
That the event is non-acute (i.e. Admission Type not in "AC")
AND
The patient's age is greater than 15 years old
AND
That the primary procedure code is either any code from blocks [1065], [1066], [1067], and [1068], or is in the range: (3680601 [1074], 3680301 [1086], 3681200, 3681201 [1089], 3683902, 3684502, 3684503 [1096], 3683900, 3684500, 3684501 [1097], 3683600 [1098], 3682700 [1108], 3683904, 3684504, 3684505 [1100], 3731500 [1112], 3681501, 3731801 [1116].)
AND
That the second procedure code is either any code from blocks [1065], [1066], [1067] and [1068], or is in the range:
(3680601 [1074], 3680301 [1086], 3681200, 3681201 [1089], 3683902, 3684502, 3684503, [1096], 3683900, 3684500, 3684501 [1097], 3683600 [1098], 3682700 [1108], 3683904, 3684504, 3684505 [1100], 3731500 [1112], 3681501, 3731801 [1116], block 1910 codes, blank).
AND
That the third procedure code is in the range: (block 1910 codes, blank).

9 ERCPs

Some sameday ERCP, ERC and ERP events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same
AND
That the event is non-acute (i.e. Admission Type not in "AC")
AND
The patient's age is greater than 15 years old
AND
That the primary procedure code is in the range:

(3044200, 3048400, 3048401 [957], 3045201, 3049100, 3049101 [958], 3045202 [959], 3045101, 3045102, 3045103 [960], 3048500, 3048501 [963], 3045200, 3049400 [971], 3048402 [974]).
AND
That the second procedure code is in the range:
(gastro block, block 1910 codes, blank).
AND
That the third procedure code is in the range: (block 1910 codes, blank).

10 Colonoscopies

Some sameday Colonoscopies events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same
AND
That the event is non-acute (ie Admission Type not in “AC”)
AND
The patient’s age is greater than 15 years old
AND
That the first procedure code is in the range:
(3207500 [904], 3208400, 3209000 [905], 9030800 [908], 3207501, 3207800, 3208100 [910], 3208401, 3208700, 3209001, 3209300 [911], 3209400 [917], 9031200, 9031201 [931], 3209900, 3210500, 3210800, 9034100 [933]).
AND
That the second procedure code is in the range:
(gastro block, block 1910 codes, blank).
AND
That the third procedure code is in the range (block 1910 codes, blank).

11 Gastroscopies

Some sameday Gastroscopies events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same
AND
That the event is non-acute (i.e. Admission Type not in “AC”)
AND
The patient’s age is greater than 15 years old
AND
That the primary procedure code is in the range:
(3047303, 4181600 [850], 3047600, 3047601, 3047806, 3047809 [851], 3047810, 4182500 [852], 3047602, 3047811, 3047812, 3047900 [856], 3047304, 3047813, 4182200 [861], 3047807 [870], 3047603 [874], 3047500, 3047501 [882], 3209500 [891], 3047300, 3047305 [1005], 3047801, 3047802, 3047803, 3047815, 3047816, 3047817 [1007], 3047301, 3047306, 3047804, 3047818 [1008]).
AND
That the second procedure code is in the range:
(gastro block, block 1910 codes, blank).
AND
That the third procedure code is in the range (block 1910 codes, blank).

12 Bronchoscopies

Some sameday Bronchoscopies events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same
AND
That the event is non-acute (i.e. Admission Type not in “AC”)
AND
The patient’s age is greater than 15 years old
AND
That the primary procedure code is in the range: (4176403, 4184900, 4185500 [520], 4176404 [532],4188900, 4188901, 4189800 [543], 4189200, 4189500, 4189801 [544]).
AND
That the second procedure code is in the range:
4176403, 4184900, 4185500 [520], 4176404 [532], 4188900, 4188901, 4189800 [543], 4189200, 4189500, 4189801 [544], block 1910 codes, blank)
AND
That the third procedure code is in the range: (block 1910 codes, blank).

13 Day Case Blood Transfusions

Some sameday Blood Transfusion events are excluded from casemix purchasing. These events are tested for by checking:
That the Admission and Discharge dates are the same
AND
That the event is non-acute (i.e. Admission Type not in “AC”)
AND
{That the principal diagnosis is Z51.3 *Blood transfusion without reported diagnosis*
OR
(the first procedure code is in the range:(1370601, 1370602, 1370603, 9206000 [1893])
AND
the second procedure is in the range: (1370601, 1370602, 1370603, 9206000 [1893], blank).
AND
the third procedure is blank}.

14 Inconsistent Stays

The data contains one record for each period of hospitalisation (hospital event) of a person - that is the time from admission to the time of discharge. Therefore, there should not be two records for the same person for the same period or part of a period unless it is the day of discharge or admission (that is, a person can be discharged from a stay in hospital and admitted for a second stay on the same day. This most often happens with daypatients).

This step identifies pairs of records where the dates of hospitalisation conflict. This is probably due to simple coding errors or errors in updating records. However, it is difficult to determine what are the correct data, so the second (later) hospital event is deleted.

15 Well Babies

The quality of data for well babies and completeness of their recording has historically varied among hospitals. For well babies, some hospitals admitted the newborn baby as well as recording the birth on the mother's record, while other hospitals only recorded the

birth on the mother's record. The practice of recording well babies has generally increased in line with national requirements.

Well babies are tested for by checking if the primary diagnosis falls in the following range
ICD9: V30-V39 inclusive.
ICD10: Z38
ICD10V3: Z38

16 Mental Health Cases

Mental Health events are excluded if they have:
EITHER
A Mental Health Service Specialty code, i.e. first character is 'Y',
OR
(A Mental Health AN-DRG
AND
There was no operating room procedure performed)

Mental Health AN-DRGs are in the range:
ICD9: 841-848
ICD10: U40Z-U68Z
ICD10V3: U40Z-U68Z

17 A&E Day Cases

Over the last few years, a number of providers have been including A&E events as day cases if the total treatment time was greater than three hours. Audits by NZHIS have revealed that some of those providers have erroneously been using the three-hour rule so that treatment time includes waiting time. In order to maintain consistency between providers, any day case recorded with an A&E specialty code ('M05'-'M08') has been excluded. This is tested for by checking:

That the Admission and Discharge dates are the same
AND
The patient was not discharged dead (i.e. Discharge Type not in 'DD')
AND
Health specialty code in ('M05', 'M06', 'M07', 'M08')

Appendix D: Analysis of Demographic Projections for the West Coast DHB Region from the 2001 and 2006 Census

Table D1 Demographic Projections by Age Group for All Ethnic Groups using the 2006 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**410**	**400**	**370**	**350**	**330**	**310**	**410**	**400**
01-04	**1,565**	**1,600**	**1,610**	**1,450**	**1,390**	**1,330**	**1,565**	**1,600**
05-09	**2,015**	**1,970**	**1,940**	**1,950**	**1,770**	**1,700**	**2,015**	**1,970**
10-14	**2,360**	**2,290**	**2,000**	**1,870**	**1,900**	**1,720**	**2,360**	**2,290**
15-19	**2,140**	**2,150**	**2,115**	**1,635**	**1,505**	**1,530**	**2,140**	**2,150**
20-24	**1,505**	**1,530**	**1,685**	**1,745**	**1,265**	**1,125**	**1,505**	**1,530**
25-29	**1,585**	**1,560**	**1,510**	**1,715**	**1,785**	**1,305**	**1,585**	**1,560**
30-34	**1,835**	**1,755**	**1,685**	**1,570**	**1,775**	**1,845**	**1,835**	**1,755**
35-39	**2,315**	**2,230**	**1,995**	**1,710**	**1,620**	**1,825**	**2,315**	**2,230**
40-44	**2,560**	**2,510**	**2,310**	**2,005**	**1,735**	**1,630**	**2,560**	**2,510**
45-49	**2,775**	**2,815**	**2,650**	**2,300**	**2,015**	**1,745**	**2,775**	**2,815**
50-54	**2,450**	**2,450**	**2,700**	**2,640**	**2,300**	**2,015**	**2,450**	**2,450**
55-59	**2,175**	**2,175**	**2,330**	**2,640**	**2,590**	**2,260**	**2,175**	**2,175**
60-64	**1,805**	**1,945**	**2,185**	**2,270**	**2,580**	**2,530**	**1,805**	**1,945**
65-69	**1,540**	**1,590**	**1,640**	**2,075**	**2,170**	**2,480**	**1,540**	**1,590**
70-74	**1,100**	**1,100**	**1,300**	**1,515**	**1,905**	**2,010**	**1,100**	**1,100**
75-79	**900**	**940**	**900**	**1,130**	**1,315**	**1,685**	**900**	**940**
80-84	**600**	**610**	**640**	**710**	**890**	**1,065**	**600**	**610**
85+	**470**	**490**	**580**	**670**	**775**	**975**	**470**	**490**
Grand Total	32,105	32,110	32,145	31,950	31,615	31,085	32,105	32,110

Table D2 Demographic Projections by Age Group for All Ethnic Groups using the 2001 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**330**	**310**	**290**	**270**	**270**	**260**	**330**	**310**
01-04	**1,450**	**1,425**	**1,315**	**1,185**	**1,175**	**1,140**	**1,450**	**1,425**
05-09	**1,935**	**1,905**	**1,825**	**1,595**	**1,475**	**1,435**	**1,935**	**1,905**
10-14	**2,245**	**2,155**	**1,910**	**1,775**	**1,545**	**1,405**	**2,245**	**2,155**
15-19	**2,185**	**2,215**	**2,090**	**1,590**	**1,450**	**1,230**	**2,185**	**2,215**
20-24	**1,555**	**1,630**	**1,775**	**1,735**	**1,300**	**1,145**	**1,555**	**1,630**
25-29	**1,225**	**1,215**	**1,355**	**1,665**	**1,635**	**1,180**	**1,225**	**1,215**
30-34	**1,525**	**1,445**	**1,285**	**1,365**	**1,650**	**1,635**	**1,525**	**1,445**
35-39	**2,070**	**2,020**	**1,690**	**1,305**	**1,375**	**1,690**	**2,070**	**2,020**
40-44	**2,400**	**2,310**	**2,120**	**1,670**	**1,285**	**1,365**	**2,400**	**2,310**
45-49	**2,650**	**2,660**	**2,460**	**2,105**	**1,670**	**1,305**	**2,650**	**2,660**
50-54	**2,330**	**2,360**	**2,590**	**2,470**	**2,120**	**1,680**	**2,330**	**2,360**
55-59	**2,125**	**2,115**	**2,210**	**2,530**	**2,420**	**2,075**	**2,125**	**2,115**
60-64	**1,740**	**1,865**	**2,105**	**2,160**	**2,480**	**2,370**	**1,740**	**1,865**
65-69	**1,525**	**1,555**	**1,610**	**1,985**	**2,070**	**2,370**	**1,525**	**1,555**
70-74	**1,130**	**1,145**	**1,295**	**1,480**	**1,835**	**1,910**	**1,130**	**1,145**
75-79	**940**	**960**	**940**	**1,120**	**1,300**	**1,625**	**940**	**960**
80-84	**640**	**640**	**690**	**740**	**900**	**1,040**	**640**	**640**
85+	**490**	**490**	**590**	**700**	**825**	**1,010**	**490**	**490**
Grand Total	30,490	30,420	30,145	29,445	28,780	27,870	30,490	30,420

Table D3 Percentage Change in Demographic Projections by Age Group for All Ethnic Groups between the 2006 & 2001 Census based estimates

Age	2007	2008	2009	2010	2011	2016	2021	2026

Group								
00	**24.2**	**29.0**	**27.6**	**29.6**	**22.2**	**19.2**	**24.2**	**29.0**
01-04	**7.9**	**12.3**	**22.4**	**22.4**	**18.3**	**16.7**	**7.9**	**12.3**
05-09	**4.1**	**3.4**	**6.3**	**22.3**	**20.0**	**18.5**	**4.1**	**3.4**
10-14	**5.1**	**6.3**	**4.7**	**5.4**	**23.0**	**22.4**	**5.1**	**6.3**
15-19	**-2.1**	**-2.9**	**1.2**	**2.8**	**3.8**	**24.4**	**-2.1**	**-2.9**
20-24	**-3.2**	**-6.1**	**-5.1**	**0.6**	**-2.7**	**-1.7**	**-3.2**	**-6.1**
25-29	**29.4**	**28.4**	**11.4**	**3.0**	**9.2**	**10.6**	**29.4**	**28.4**
30-34	**20.3**	**21.5**	**31.1**	**15.0**	**7.6**	**12.8**	**20.3**	**21.5**
35-39	**11.8**	**10.4**	**18.0**	**31.0**	**17.8**	**8.0**	**11.8**	**10.4**
40-44	**6.7**	**8.7**	**9.0**	**20.1**	**35.0**	**19.4**	**6.7**	**8.7**
45-49	**4.7**	**5.8**	**7.7**	**9.3**	**20.7**	**33.7**	**4.7**	**5.8**
50-54	**5.2**	**3.8**	**4.2**	**6.9**	**8.5**	**19.9**	**5.2**	**3.8**
55-59	**2.4**	**2.8**	**5.4**	**4.3**	**7.0**	**8.9**	**2.4**	**2.8**
60-64	**3.7**	**4.3**	**3.8**	**5.1**	**4.0**	**6.8**	**3.7**	**4.3**
65-69	**1.0**	**2.3**	**1.9**	**4.5**	**4.8**	**4.6**	**1.0**	**2.3**
70-74	**-2.7**	**-3.9**	**0.4**	**2.4**	**3.8**	**5.2**	**-2.7**	**-3.9**
75-79	**-4.3**	**-2.1**	**-4.3**	**0.9**	**1.2**	**3.7**	**-4.3**	**-2.1**
80-84	**-6.3**	**-4.7**	**-7.2**	**-4.1**	**-1.1**	**2.4**	**-6.3**	**-4.7**
85+	**-4.1**	**0.0**	**-1.7**	**-4.3**	**-6.1**	**-3.5**	**-4.1**	**0.0**
Grand Total	5.3	5.6	6.6	8.5	9.9	11.5	5.3	5.6

Table D4 Demographic Projections by Age Group for the Maori Ethnic Group using the 2006 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**80**	**80**	**80**	**80**	**80**	**80**	**80**	**80**
01-04	**270**	**270**	**290**	**290**	**310**	**310**	**270**	**270**
05-09	**370**	**360**	**320**	**350**	**350**	**370**	**370**	**360**
10-14	**400**	**390**	**350**	**300**	**330**	**330**	**400**	**390**
15-19	**370**	**380**	**390**	**310**	**260**	**290**	**370**	**380**
20-24	**200**	**210**	**280**	**350**	**270**	**220**	**200**	**210**
25-29	**200**	**190**	**170**	**250**	**320**	**240**	**200**	**190**
30-34	**170**	**160**	**190**	**150**	**230**	**300**	**170**	**160**
35-39	**210**	**200**	**160**	**170**	**150**	**220**	**210**	**200**
40-44	**220**	**210**	**200**	**150**	**160**	**130**	**220**	**210**
45-49	**210**	**220**	**230**	**180**	**140**	**150**	**210**	**220**
50-54	**140**	**140**	**160**	**210**	**170**	**130**	**140**	**140**
55-59	**110**	**110**	**120**	**140**	**190**	**150**	**110**	**110**
60-64	**90**	**100**	**110**	**100**	**120**	**170**	**90**	**100**
65-69	**70**	**70**	**70**	**90**	**90**	**110**	**70**	**70**
70-74	**40**	**40**	**40**	**60**	**70**	**70**	**40**	**40**
75-79	**20**	**20**	**20**	**30**	**40**	**60**	**20**	**20**
80-84	**10**	**20**	**10**	**20**	**20**	**30**	**10**	**20**
85+	**0**	**0**	**0**	**0**	**20**	**10**	**0**	**0**
Grand Total	3,180	3,170	3,190	3,230	3,320	3,370	3,180	3,170

Table D5 Demographic Projections by Age Group for the Maori Ethnic Group using the 2001 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
01-04	**250**	**250**	**250**	**250**	**270**	**260**	**250**	**250**
05-09	**320**	**320**	**290**	**290**	**310**	**310**	**320**	**320**

10-14	**340**	**340**	**310**	**290**	**280**	**290**	**340**	**340**
15-19	**350**	**360**	**340**	**270**	**250**	**240**	**350**	**360**
20-24	**230**	**240**	**280**	**300**	**230**	**190**	**230**	**240**
25-29	**140**	**160**	**190**	**250**	**280**	**200**	**140**	**160**
30-34	**150**	**130**	**140**	**180**	**230**	**260**	**150**	**130**
35-39	**150**	**170**	**150**	**120**	**160**	**220**	**150**	**170**
40-44	**200**	**170**	**160**	**140**	**110**	**150**	**200**	**170**
45-49	**190**	**210**	**200**	**140**	**120**	**100**	**190**	**210**
50-54	**120**	**120**	**150**	**180**	**120**	**100**	**120**	**120**
55-59	**90**	**90**	**100**	**130**	**160**	**110**	**90**	**90**
60-64	**70**	**70**	**90**	**80**	**120**	**140**	**70**	**70**
65-69	**60**	**60**	**60**	**70**	**80**	**100**	**60**	**60**
70-74	**40**	**40**	**40**	**40**	**60**	**60**	**40**	**40**
75-79	**20**	**20**	**20**	**30**	**40**	**50**	**20**	**20**
80-84	**10**	**0**	**10**	**20**	**20**	**20**	**10**	**0**
85+	**0**	**0**	**0**	**0**	**10**	**10**	**0**	**0**
Grand Total	2,790	2,810	2,840	2,840	2,910	2,870	2,790	2,810

Table D6 Percentage Change in Demographic Projections by Age Group for the Maori Ethnic Group between the 2006 & 2001 Census based estimates

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**33.3**	**33.3**	**33.3**	**33.3**	**33.3**	**33.3**	**33.3**	**33.3**
01-04	**8.0**	**8.0**	**16.0**	**16.0**	**14.8**	**19.2**	**8.0**	**8.0**
05-09	**15.6**	**12.5**	**10.3**	**20.7**	**12.9**	**19.4**	**15.6**	**12.5**
10-14	**17.6**	**14.7**	**12.9**	**3.4**	**17.9**	**13.8**	**17.6**	**14.7**
15-19	**5.7**	**5.6**	**14.7**	**14.8**	**4.0**	**20.8**	**5.7**	**5.6**
20-24	**-13.0**	**-12.5**	**0.0**	**16.7**	**17.4**	**15.8**	**-13.0**	**-12.5**
25-29	**42.9**	**18.8**	**-10.5**	**0.0**	**14.3**	**20.0**	**42.9**	**18.8**
30-34	**13.3**	**23.1**	**35.7**	**-16.7**	**0.0**	**15.4**	**13.3**	**23.1**
35-39	**40.0**	**17.6**	**6.7**	**41.7**	**-6.3**	**0.0**	**40.0**	**17.6**
40-44	**10.0**	**23.5**	**25.0**	**7.1**	**45.5**	**-13.3**	**10.0**	**23.5**
45-49	**10.5**	**4.8**	**15.0**	**28.6**	**16.7**	**50.0**	**10.5**	**4.8**
50-54	**16.7**	**16.7**	**6.7**	**16.7**	**41.7**	**30.0**	**16.7**	**16.7**
55-59	**22.2**	**22.2**	**20.0**	**7.7**	**18.8**	**36.4**	**22.2**	**22.2**
60-64	**28.6**	**42.9**	**22.2**	**25.0**	**0.0**	**21.4**	**28.6**	**42.9**
65-69	**16.7**	**16.7**	**16.7**	**28.6**	**12.5**	**10.0**	**16.7**	**16.7**
70-74	**0.0**	**0.0**	**0.0**	**50.0**	**16.7**	**16.7**	**0.0**	**0.0**
75-79	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**20.0**	**0.0**	**0.0**
80-84	**0.0**	_	**0.0**	**0.0**	**0.0**	**50.0**	**0.0**	_
85+	**0.0**	_	_	_	**100.0**	**0.0**	**0.0**	_
Grand Total	14.0	12.8	12.3	13.7	14.1	17.4	14.0	12.8

Table D7 Demographic Projections by Age Group for the Other Ethnic Group using the 2006 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**330**	**320**	**290**	**270**	**250**	**230**	**330**	**320**
01-04	**1,280**	**1,320**	**1,310**	**1,150**	**1,070**	**1,010**	**1,280**	**1,320**
05-09	**1,630**	**1,590**	**1,600**	**1,590**	**1,410**	**1,320**	**1,630**	**1,590**
10-14	**1,930**	**1,870**	**1,630**	**1,550**	**1,560**	**1,380**	**1,930**	**1,870**
15-19	**1,740**	**1,740**	**1,700**	**1,300**	**1,230**	**1,230**	**1,740**	**1,740**

20-24	**1,290**	**1,300**	**1,380**	**1,370**	**970**	**890**	**1,290**	**1,300**
25-29	**1,360**	**1,350**	**1,320**	**1,440**	**1,440**	**1,040**	**1,360**	**1,350**
30-34	**1,640**	**1,570**	**1,470**	**1,400**	**1,520**	**1,520**	**1,640**	**1,570**
35-39	**2,070**	**2,000**	**1,810**	**1,520**	**1,450**	**1,580**	**2,070**	**2,000**
40-44	**2,330**	**2,280**	**2,080**	**1,830**	**1,550**	**1,480**	**2,330**	**2,280**
45-49	**2,560**	**2,590**	**2,410**	**2,090**	**1,850**	**1,570**	**2,560**	**2,590**
50-54	**2,300**	**2,300**	**2,530**	**2,420**	**2,100**	**1,860**	**2,300**	**2,300**
55-59	**2,060**	**2,060**	**2,200**	**2,490**	**2,390**	**2,080**	**2,060**	**2,060**
60-64	**1,710**	**1,840**	**2,070**	**2,160**	**2,450**	**2,350**	**1,710**	**1,840**
65-69	**1,470**	**1,520**	**1,570**	**1,980**	**2,070**	**2,360**	**1,470**	**1,520**
70-74	**1,060**	**1,060**	**1,260**	**1,450**	**1,830**	**1,930**	**1,060**	**1,060**
75-79	**880**	**920**	**880**	**1,100**	**1,270**	**1,620**	**880**	**920**
80-84	**590**	**590**	**630**	**690**	**870**	**1,030**	**590**	**590**
85+	**470**	**490**	**580**	**670**	**750**	**960**	**470**	**490**
Grand Total	28,700	28,710	28,720	28,470	28,030	27,440	28,700	28,710

Table D8 Demographic Projections by Age Group for the Other Ethnic Group using the 2001 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**270**	**250**	**230**	**210**	**210**	**200**	**270**	**250**
01-04	**1,200**	**1,170**	**1,060**	**930**	**900**	**880**	**1,200**	**1,170**
05-09	**1,610**	**1,580**	**1,530**	**1,300**	**1,160**	**1,120**	**1,610**	**1,580**
10-14	**1,890**	**1,800**	**1,590**	**1,480**	**1,260**	**1,110**	**1,890**	**1,800**
15-19	**1,820**	**1,840**	**1,740**	**1,310**	**1,200**	**990**	**1,820**	**1,840**
20-24	**1,310**	**1,370**	**1,470**	**1,420**	**1,060**	**950**	**1,310**	**1,370**
25-29	**1,070**	**1,040**	**1,150**	**1,390**	**1,340**	**970**	**1,070**	**1,040**
30-34	**1,370**	**1,310**	**1,130**	**1,170**	**1,400**	**1,360**	**1,370**	**1,310**
35-39	**1,900**	**1,830**	**1,530**	**1,170**	**1,200**	**1,450**	**1,900**	**1,830**
40-44	**2,190**	**2,120**	**1,940**	**1,520**	**1,160**	**1,200**	**2,190**	**2,120**
45-49	**2,450**	**2,440**	**2,250**	**1,950**	**1,540**	**1,190**	**2,450**	**2,440**
50-54	**2,200**	**2,230**	**2,430**	**2,280**	**1,980**	**1,570**	**2,200**	**2,230**
55-59	**2,030**	**2,020**	**2,100**	**2,390**	**2,250**	**1,950**	**2,030**	**2,020**
60-64	**1,670**	**1,790**	**2,010**	**2,070**	**2,350**	**2,220**	**1,670**	**1,790**
65-69	**1,460**	**1,490**	**1,550**	**1,910**	**1,980**	**2,260**	**1,460**	**1,490**
70-74	**1,090**	**1,100**	**1,250**	**1,430**	**1,770**	**1,840**	**1,090**	**1,100**
75-79	**920**	**940**	**920**	**1,080**	**1,250**	**1,570**	**920**	**940**
80-84	**630**	**640**	**680**	**720**	**870**	**1,010**	**630**	**640**
85+	**490**	**490**	**590**	**700**	**810**	**990**	**490**	**490**
Grand Total	27,570	27,450	27,150	26,430	25,690	24,830	27,570	27,450

Table D9 Percentage Change in Demographic Projections by Age Group for the Other Ethnic Group between the 2006 & 2001 Census based estimates

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**22.2**	**28.0**	**26.1**	**28.6**	**19.0**	**15.0**	**22.2**	**28.0**
01-04	**6.7**	**12.8**	**23.6**	**23.7**	**18.9**	**14.8**	**6.7**	**12.8**
05-09	**1.2**	**0.6**	**4.6**	**22.3**	**21.6**	**17.9**	**1.2**	**0.6**
10-14	**2.1**	**3.9**	**2.5**	**4.7**	**23.8**	**24.3**	**2.1**	**3.9**
15-19	**-4.4**	**-5.4**	**-2.3**	**-0.8**	**2.5**	**24.2**	**-4.4**	**-5.4**
20-24	**-1.5**	**-5.1**	**-6.1**	**-3.5**	**-8.5**	**-6.3**	**-1.5**	**-5.1**

25-29	**27.1**	**29.8**	**14.8**	**3.6**	**7.5**	**7.2**	**27.1**	**29.8**
30-34	**19.7**	**19.8**	**30.1**	**19.7**	**8.6**	**11.8**	**19.7**	**19.8**
35-39	**8.9**	**9.3**	**18.3**	**29.9**	**20.8**	**9.0**	**8.9**	**9.3**
40-44	**6.4**	**7.5**	**7.2**	**20.4**	**33.6**	**23.3**	**6.4**	**7.5**
45-49	**4.5**	**6.1**	**7.1**	**7.2**	**20.1**	**31.9**	**4.5**	**6.1**
50-54	**4.5**	**3.1**	**4.1**	**6.1**	**6.1**	**18.5**	**4.5**	**3.1**
55-59	**1.5**	**2.0**	**4.8**	**4.2**	**6.2**	**6.7**	**1.5**	**2.0**
60-64	**2.4**	**2.8**	**3.0**	**4.3**	**4.3**	**5.9**	**2.4**	**2.8**
65-69	**0.7**	**2.0**	**1.3**	**3.7**	**4.5**	**4.4**	**0.7**	**2.0**
70-74	**-2.8**	**-3.6**	**0.8**	**1.4**	**3.4**	**4.9**	**-2.8**	**-3.6**
75-79	**-4.3**	**-2.1**	**-4.3**	**1.9**	**1.6**	**3.2**	**-4.3**	**-2.1**
80-84	**-6.3**	**-7.8**	**-7.4**	**-4.2**	**0.0**	**2.0**	**-6.3**	**-7.8**
85+	**-4.1**	**0.0**	**-1.7**	**-4.3**	**-7.4**	**-3.0**	**-4.1**	**0.0**
Grand Total	4.1	4.6	5.8	7.7	9.1	10.5	4.1	4.6

Table D10 Demographic Projections by Age Group for the Pacific Ethnic Group using the 2006 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
01-04	**15**	**10**	**10**	**10**	**10**	**10**	**15**	**10**
05-09	**15**	**20**	**20**	**10**	**10**	**10**	**15**	**20**
10-14	**30**	**30**	**20**	**20**	**10**	**10**	**30**	**30**
15-19	**30**	**30**	**25**	**25**	**15**	**10**	**30**	**30**
20-24	**15**	**20**	**25**	**25**	**25**	**15**	**15**	**20**
25-29	**25**	**20**	**20**	**25**	**25**	**25**	**25**	**20**
30-34	**25**	**25**	**25**	**20**	**25**	**25**	**25**	**25**
35-39	**35**	**30**	**25**	**20**	**20**	**25**	**35**	**30**
40-44	**10**	**20**	**30**	**25**	**25**	**20**	**10**	**20**
45-49	**5**	**5**	**10**	**30**	**25**	**25**	**5**	**5**
50-54	**10**	**10**	**10**	**10**	**30**	**25**	**10**	**10**
55-59	**5**	**5**	**10**	**10**	**10**	**30**	**5**	**5**
60-64	**5**	**5**	**5**	**10**	**10**	**10**	**5**	**5**
65-69	**0**	**0**	**0**	**5**	**10**	**10**	**0**	**0**
70-74	**0**	**0**	**0**	**5**	**5**	**10**	**0**	**0**
75-79	**0**	**0**	**0**	**0**	**5**	**5**	**0**	**0**
80-84	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**
85+	**0**	**0**	**0**	**0**	**5**	**5**	**0**	**0**
Grand Total	225	230	235	250	265	275	225	230

Table D11 Demographic Projections by Age Group for the Pacific Ethnic Group using the 2001 Census as a base

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
01-04	**0**	**5**	**5**	**5**	**5**	**0**	**0**	**5**
05-09	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
10-14	**15**	**15**	**10**	**5**	**5**	**5**	**15**	**15**
15-19	**15**	**15**	**10**	**10**	**0**	**0**	**15**	**15**
20-24	**15**	**20**	**25**	**15**	**10**	**5**	**15**	**20**
25-29	**15**	**15**	**15**	**25**	**15**	**10**	**15**	**15**
30-34	**5**	**5**	**15**	**15**	**20**	**15**	**5**	**5**
35-39	**20**	**20**	**10**	**15**	**15**	**20**	**20**	**20**
40-44	**10**	**20**	**20**	**10**	**15**	**15**	**10**	**20**

45-49	**10**	**10**	**10**	**15**	**10**	**15**	**10**	**10**
50-54	**10**	**10**	**10**	**10**	**20**	**10**	**10**	**10**
55-59	**5**	**5**	**10**	**10**	**10**	**15**	**5**	**5**
60-64	**0**	**5**	**5**	**10**	**10**	**10**	**0**	**5**
65-69	**5**	**5**	**0**	**5**	**10**	**10**	**5**	**5**
70-74	**0**	**5**	**5**	**10**	**5**	**10**	**0**	**5**
75-79	**0**	**0**	**0**	**10**	**10**	**5**	**0**	**0**
80-84	**0**	**0**	**0**	**0**	**10**	**10**	**0**	**0**
85+	**0**	**0**	**0**	**0**	**5**	**10**	**0**	**0**
Grand Total	130	160	155	175	180	170	130	160

Table D12 Percentage Change in Demographic Projections by Age Group for the Pacific Ethnic Group between the 2006 & 2001 Census based estimates

Age Group	2007	2008	2009	2010	2011	2016	2021	2026
00	_	_	_	_	_	_	_	_
01-04	_	**100.0**	**100.0**	**100.0**	**100.0**	_	_	**100.0**
05-09	**200.0**	**300.0**	**300.0**	**100.0**	**100.0**	**100.0**	**200.0**	**300.0**
10-14	**100.0**	**100.0**	**100.0**	**300.0**	**100.0**	**100.0**	**100.0**	**100.0**
15-19	**100.0**	**100.0**	**150.0**	**150.0**	_	_	**100.0**	**100.0**
20-24	**0.0**	**0.0**	**0.0**	**66.7**	**150.0**	**200.0**	**0.0**	**0.0**
25-29	**66.7**	**33.3**	**33.3**	**0.0**	**66.7**	**150.0**	**66.7**	**33.3**
30-34	**400.0**	**400.0**	**66.7**	**33.3**	**25.0**	**66.7**	**400.0**	**400.0**
35-39	**75.0**	**50.0**	**150.0**	**33.3**	**33.3**	**25.0**	**75.0**	**50.0**
40-44	**0.0**	**0.0**	**50.0**	**150.0**	**66.7**	**33.3**	**0.0**	**0.0**
45-49	**-50.0**	**-50.0**	**0.0**	**100.0**	**150.0**	**66.7**	**-50.0**	**-50.0**
50-54	**0.0**	**0.0**	**0.0**	**0.0**	**50.0**	**150.0**	**0.0**	**0.0**
55-59	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**100.0**	**0.0**	**0.0**
60-64	_	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	_	**0.0**
65-69	**-100.0**	**-100.0**	_	**0.0**	**0.0**	**0.0**	**-100.0**	**-100.0**
70-74	_	**-100.0**	**-100.0**	**-50.0**	**0.0**	**0.0**	_	**-100.0**
75-79	_	_	_	**-100.0**	**-50.0**	**0.0**	_	_
80-84	_	_	_	_	**-100.0**	**-50.0**	_	_
85+	_	_	_	_	**0.0**	**-50.0**	_	_
Grand Total	73.1	43.8	51.6	42.9	47.2	61.8	73.1	43.8

Appendix Eight Ageing Workforce

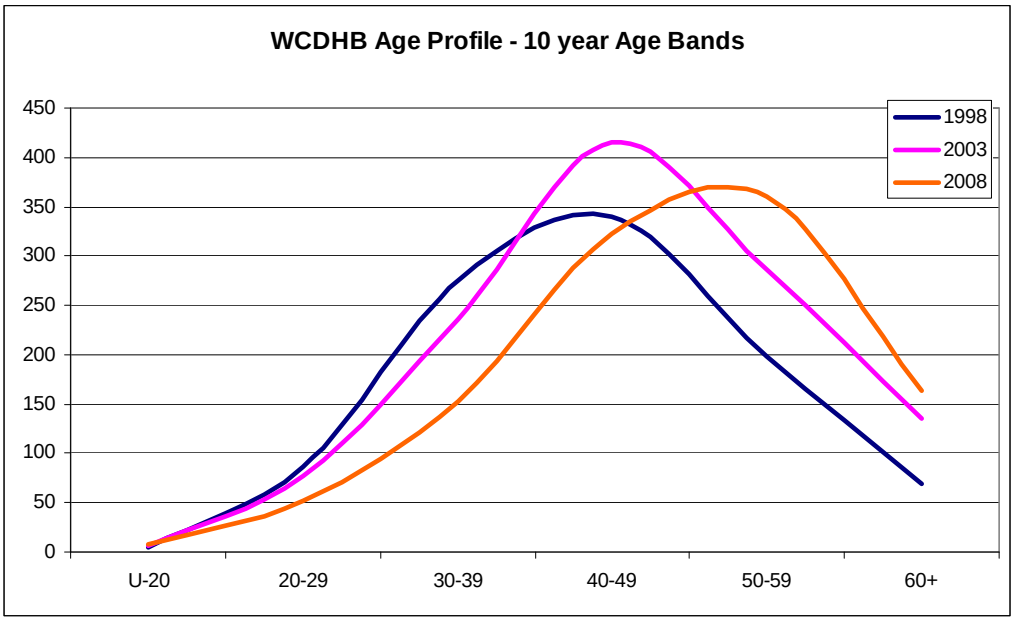
The Ageing DHB Workforce – a snapshot from West Coast

Background

A data extract and initial analysis was provided by Ruth Punnett at WCDHB detailing 3 workforce snapshots, notably their current workforce (June 2008) and the historic workforce snapshots from 1998 and 2003.
Data was provided at an individual employee level, with unique employee ID number, start date and date of birth being the key fields of interest.
Questions were raised around the age profiles at WCDHB in these 3 years and whether HWIP had got, or could get, supporting data from other DHBs to provide analysis and comparisons.

Findings

The data was analysed to give the age of each employee at the relevant year and this was then broken down into 5 year and 10 year age bands. Whilst the bell curves were pretty much as expected shape-wise, it is the movement of the curves that is interesting:



It is immediately apparent that the curves have shifted to the right, indicating that the workforce is ageing. In 1998, the highest number of workers was in the 40-49 age band and this held true in 2003 also, although the quantum of workers was higher. However, in 2008, the peak of the curve is now in the 50-59 age band. Furthermore, the number of workers above 50 is the highest in 2008, whilst there are noticeably fewer workers in all the under 50 age bands for 2008.

Appendix Nine References

Anderson, D.W. et. al. Colorectal Disease; 9(6): 509-14. "Mobile colonoscopic surveillance provides quality care for hereditary nonpolyposis colorectal carcinoma families in South Africa." July 2007.

Canadian Health Services Research Foundation website; 'Evidence Boost': "Incorporate lay health workers to promote health and prevent disease". Sept. 2007

Chow Hill. Review of Site Master Planning. April 2008

Greer, K. New Zealand Doctor; 'Letters' section, pp 18-19: "After hours funding a muddle". 4/6/08. Health Waikato. Neurology Services Changing the Model of Care Framework. 2000

Hewlett-Packard New Zealand. Central Region Clinical Services Plan - Horizon Scan - Short to Medium Term. Final Draft. January 2008

Hewlett-Packard New Zealand. MidCentral Health Clinical Services Plan. August 2007

Hewlett-Packard Zealand. West Coast District Health Board: Independent Review of the CSP. April 2008

LECG. West Coast DHB Models of Care Discovery Final Report. February 2008

McAleer, B. and Varma, M.P. Irish Journal of Medical Science; 175 (4): 14-19. "Feasibility and long term outcome of home vs hospital initiated thrombolysis." Oct'-Dec' 2006.

Maislos, M., Weisman, D. and Sherf, M. Acta Diabetologica; 39 (1): 49-53. "Western Negev Mobile Diabetes Care Program: a model for interdisciplinary diabetes care in a semi-rural setting". April 2002.

Majumdar, S.R. et.al. Diabetes Care; 26 (11): 3061-6. "Controlled trial of a multifaceted intervention for improving quality of care for rural Patients with type 2 diabetes." Nov' 2006.

National Health Service, UK. Health for London. Consulting the Capital - Consultation Document. 2000

Reda, E. et.al. New Zealand Medical Journal; 116 (1180): U562. "Screening for diabetic retinopathy using the mobile retinal camera: the Waikato experience". August 22nd, 2003.

Rosenthal, E. Lee. National Community Health Advisor Study. University of Arizona. June 1998

Roberts, E. and Mays, N. Health Policy; 44(3); 191-214: "Can primary care and community-based models of emergency care substitute for the hospital accident and emergency (A&E) department?" June 1998. Queensland Health. Changing Models of Care Framework. 2000

Sibbald, B; McDonald, R; Roland, M. Shifting care from hospitals to the community: a review of the evidence on quality and efficiency. Journal Health Services Research Policy. Vol 12, no 2, April 2007

Smith, A.C. et.al. Journal of Telemedicine and Telecare; 11 Supplement 2: S81-5. "Wireless telemedicine for the delivery of specialist paediatric services to the bedside". 2005.

South Island Shared Services Agency Limited. South Island Regional Mental Health Strategic Plan 2005 to 2008. 2005

Victorian Government Department of Human Services, Melbourne Victoria. Rural Birthing Services. A Capability Based Planning Framework. December 2004

West Coast DHB. District Strategic Plan 2005 – 2015. 2005

West Coast DHB. Māori Health Plan 2007-2011. 2007

West Coast DHB. District After Hours Plan. 2007

West Coast DHB. Child Health Plan. 2006

West Coast DHB. Chronic Conditions Management Plan. 2006

West Coast DHB. Disability Action Plan. 2004

West Coast DHB. Primary Care Plan 2006 – 2011. 2006

West Coast DHB. Primary Mental Health Plan. 2005.

West Coast DHB. Secondary Care Plan. 2007.

West Coast DHB. WISE (West Coast Improving Services for the Elderly) Plan. 2006.

West Coast DHB. Youth Health Plan. 2006.

West Coast DHB. Cancer Control Plan. 2006.

West Coast Integrated Diabetes Service Plan. 2005.

Wilson, H. New Zealand Medical Journal; 118 (1221): "Co-locating primary care facilities within emergency departments: brilliant innovation or unwelcome intervention into clinical care?" August 2005.

Appendix Ten Workforce Implications from Model of Care

WEST COAST DHB SUSTAINABILITY PROJECT
WORKFORCE Work Stream Project

BACKGROUND

The primary function of the West Coast Sustainability Project Work Streams is to consider options, data and other information to make recommendations to the Reference Group on a variety of topics related to the sustainability project. These include but are not limited to:

- Service delivery options
- Models of care
- Workforce considerations
- Financial considerations
- Facilities planning
- Workstream work and recommendations
- Other related components

The workforce work stream project aims to undertake a detailed analysis of the current workforce situation, map this to known good practice and develop a workforce strategy that will support the development of model of care options. This will include linking with other work stream groups analysing workforce implications.

Key Assumptions

- There will be co-operation and collaboration between DHBs regionally
- Some services will be provided off the Coast
- Services would be adequately funded
- There will be rural generalists but supported by specialist services
- Allied health services would be community based and work seamlessly across the services
- There would be a blur between primary and secondary services and a change in the emphasis to be close to the patients home
- There would need to be an increase in training and development of existing staff and the provision of additional training to ensure adequate supply for new roles.
- There would be an increasing role for more highly skilled nursing staff
- There would need to be more support staff enabling clinical staff to focus on their higher skills.
- There will be a growing Maori workforce
- There will be a growing Pacific workforce
- Ageing workforce will impact on recruitment/retention at WCDHB
- Ongoing requirement to meet MoH changing requirements in the services e.g. in Mental Health – “Let’s get real”; “talking therapies”; “restraint minimization” etc
- Change to model of care = increased training needs
- Changing the skill mix from current configurations is acceptable

STRATEGIC OBJECTIVES

The workforce development objectives underpinning the West Coast District Health Board Workforce Strategy are informed by:

The Health Workforce Advisory Committee's (HWAC):

- Recommendations for future workforce directions of the New Zealand Health Workforce made to the Minister of Health in 2003[18].
- Strategic Principles for Workforce Development in New Zealand 2005[19]
- The National Guidelines for the Promotion of Health Working Environments: A Framework for the Health and Disability Support Sector 2006[20]
- Fit for Purpose and for Practice: Advice to the Minister of Health on the Issues Concerning Medical Workforce in New Zealand[21]
- DHBNZ - Future Workforce Strategy and Plans[22]
- Mid Central Workforce Strategy[23]
- Mental Health Workforce Development Programme (HRC 2005)
- Tauawhitia te Wero – Embracing the Challenge: National Mental Health and Addiction Workforce Development Plan 2006-2009

Also informed by the West Coast District Health Board's (WCDHB):

- WISE Plan - 2006
- Child Health Plan - 2006
- Youth Health Plan - 2006
- Chronic Conditions Strategy - 2006
- Primary Health Care plan - 2006
- Secondary Care Plan - 2007
- Health Information Strategy -
- Maori Workforce Development Plan - 2005
- Maori Health Strategy - 2007
- Mental Health Strategy 2007

In addition to this a range of literature and reports and the South Island Shared Services Regional Clinical Plan.

The following strategic objectives are designed to inform and contribute to workforce development that will support the model of care developed as a result of the sustainability project:

1. Increase the capacity and capability of the WCDHB health workforce
    a. Explore and develop new roles or change/redefine roles and/or scopes
    b. Re-evaluate existing roles to enable integration and flexibility
    c. Develop the Maori and Pacific workforce
    d. Explore innovative options for remuneration
    e. Succession planning in the context of an ageing workforce and changing service mix

2. Advance opportunities within rural health where WCDHB is the rural centre of excellence

[18] Available at: http://www.hwac.govt.nz/mediareleases-speeches/27aug03.htm

[19] Available at: http://www.hwac.govt.nz/publications/workforce-strategic-framework.htm

[20] Available at: http://www.hwac.govt.nz/publications/default.htm#nationalguidelines

[21] Available at: http://www.hwac.govt.nz/publications/fit-for-purpose-practice.htm

[22] Available at: http://www.dhbnz.org.nz/Site/Future_Workforce/Default.aspx

[23]

a. Career options for school leavers and tertiary students
b. Promote rural health within existing educational programmes:
    i. Undergraduate
    ii. Postgraduate
    iii. Research
c. Develop opportunities and programmes that support recruitment of overseas applicants
d. Cadetship and scholarships
e. Marketing and branding for the centre of rural excellence
f. Explore opportunities for a rural health vocational scope of practice

3. Strengthen District Health Board collaboration between South Island DHBs and between primary and secondary care and local providers
    a. Joint appointments and secondments
    b. Networked rosters
    c. Supervision from other DHBs
    d. Providing opportunities for staff to maintain, strengthen and change skill sets. For example, General Practitioners with special interest, rotation through different clinical areas.
    e. Develop rural MECA/CEA's or additional agreements that enable a safe and healthy workplace
    f. Explore agreements between DHB's for training and development purposes

4. Support workforce recruitment and retention
    a. Develop a strategic approach to recruitment and retention
    b. Career advancement opportunities for existing employees
    c. Promote a healthy workplace environment
    d. Educate in teamwork, multidisciplinary and interdisciplinary ways of working
    e. Evaluation of factors that contribute to staff churn
    f. Leadership development strategy
    g. Develop existing processes to leverage retention opportunities eg Exit

5. Work with MoH and Councils and registration bodies (recognizing that we have little influence over those bodies but a significant role with MoH.

    a. Develop new scopes of practice that are acceptable to registration bodies
    b. Develop new roles that are for the future of the health sector in conjunction with training providers
    c. Develop agreed supervision plans with medical council and other relevant professional regulatory bodies.
    d. Consider options for private work to be carried out on the Coast

WORK PLAN OVERVIEW

Current status key

Objective 1

Increase the capacity and capability of the WCDHB health workforce

Goals	Action	Status (including by who)	Match to known good practice
1. Service needs and models of care will inform this aspect of workforce development			
a. Explore and develop new roles	Enable specialist skills to be freed up by upskilling base skills of others to take on additional scope and activities: • Secondary Care Specialists supportive of Primary care	The following need to be developed by Primary Health Services 1. Carelink, develop more qualified Home Based Support Workers 2. District Nurses 3. Care Assistants for GP's 4. Allied health e.g. Assistants The following needs to be developed by mental health Services 5. Mental Health Support Workers are qualified but not fully utilized	1. Allied Health research paper presented at Rural health Symposium June 2008 Chadwick M & Steed R 2007 The Feasibility of the role of the Allied health Assistant in the rural health delivery model. New Zealand Institute of Rural Health. 2. Model for WCDHB Carelink is based upon model from Wairarapa.
	Develop a Nursing Strategy for all nurse roles including community nursing positions and development of nurse practitioners • Moving to Primary Health Nursing/Neighbourhood models • Rural Nurse Specialists • Develop assistant nursing roles in the community	Director of Nursing and Midwifery DONM to continue to develop the work that has been commenced on the following 1. District Nurses becoming more generic primary health nurses 2. Continue to develop the role of the general specialists nurse for rural and secondary care facilities 3. Advance the Nurse Practitioner role based on the August 2008	1. informed by the neighbourhood nurses pilot (including a model for assessing educational needs) 2. Growing call for this to happen nationally and internationally 3. Identifying Training and Support Services Required to Encourage Rural Nurses to become Rural Nurse Practitioners. 2004 Institute of Rural Health 4. Swindlehurst H 2005 Rural Proofing for

		scoping exercise	Health. A guide for Primary Care Organisations. Institute of Rural Health
	Participation in the national nurse practitioner facilitation programme	1. Role of NP's as complimentary to, or substitution for, existing medical and nursing roles where Dr's are unavailable. 2. As above - Scoping exercise for the role of NP's across the Coast completed Aug 2008	1. Literature shows that patient NP generated outcomes are equal to Dr's. 2. Advice from scoping exercise that NP's an provide 80% of the care that GP's currently provide and RN's 50% of the work that an NP provides (WCDHB 2008)
b -Evaluate existing roles to enable integration and flexibility	Investigate how to structure community based multi disciplinary teams across primary, nursing, allied and home care assistants	Services involved to develop the following 1. Planning and Funding – Carelink expansion 2. Secondary services –Social Work department changes 3 Secondary services – strengthen allied health teams 4. Develop allied health assistant roles	1. Wairarapa older persons service and needs assessment model.
	Assess and plan for primary care capacity - discussion re generalists and specialists - how to best use specialists and who should be doing other bits of their work	As above – role of the nurse will expand to take on more clinical responsibility formerly held by Drs and assistants take on the more stable and predictable aspects of patient care.	Nurse Maude DNS in Christchurch has done a lot of this work already. Education and supervision models available Project plan for organizational approach to Standing Orders and for managing DN/RH's workload – WCDHB 2008.
	Work flow management • Improve filtering, triage etc at all levels - care in right place with right staff levels • Investigate and implement the	Project work that aligns to patient journey work	Current WCDHB project work in 2007/8

	paediatric acute model of levels 1,2,3 and 4 for escalating support for varying levels of acuity • Change in rostering practice		
c. Develop the Maori and Pacific health and disability workforce i)Recruitment and Retention	Review of current recruitment and selection policies and procedures	Sept/Oct 08	
	Promoting health and disability careers in schools, media and other learning institutions	June/July 08 HR/Mokowhiti	Te Waipounamu Recruitment Specialist Northern DHB Maori career pathways project Counties Manukau DHB
	Development Maori Cadetships	HR/Mokowhiti	Te Rau Matatini
ii)Training and Development	Further implementation of Cultural Training and development ▪ Te Piko Rua ▪ Treaty of Waitangi Training	Ongoing. Currently part of mandatory training programme	Auckland DHB
	S Island Maori GM's plans Work in schools	South Island GM's/Mokowhiti	National Maori GM workplan.
iii)Organisational Development	Review and update the current WC Maori Health Workforce Development Plan	Maori Health Portfolio Manager /Mokowhiti	
	Develop plan to increase Maori workforce to equal demographic equivalence e.g. 9% Maori nursing workforce	Part of DAP for 2008/9 to be developed between Maori Health and Human Resources	Maori Strategy
	Build capacity within current WCDHB Maori workforce by implementing Individual training plans and career pathways	Mäori Health Portfolio Manager	

iv) Information, Research and Evaluation	Establish robust data systems and data collection methods of Maori workforce information to ensure accurate workforce information to inform future planning processes	On completion of the review, implement any improvements and recommendations from the review findings	DHBNZ
	Undertake a workforce development future proofing plan to increase Maori workforce to equal demographic equivalence to ensure a sustainable workforce e.g. 9% Maori nursing workforce	Maori Health Portfolio Manager and Human Resources and Maori Services.	National Maori Strategy
d. Succession planning in the context of an ageing workforce	Plan and consider for the ageing workforce - succession planning and flexible working conditions	Requires HR to develop Organisation wide succession plans to include the following criteria 1. Assess the top critical positions in the organization and develop plans for succession. Ref to WCDHB HWIP data on age of current workforce 2. Assess other key positions and develop succession plans. 3. Assess larger HWIP info for critical areas in workforce and 4. Assess workforce sources to underpin these plans.	State Sector Strategy for Public sector organisations EEO HWIP DHBNZ Future Workforce Strategy
e. Explore innovative options for remuneration	• Remunerations Strategy • Engagement with unions to investigate the potential for a rural MECA that differs from the	Requires HR to 1. Establish remuneration committee 2. Establish remuneration strategy,	State sector Strategy for Public Sector and Crown Agencies EEO

	national MECA	P &P 3. Above needs to cover complete remuneration packages e.g. salary, super, accommodation, travel, education etc. 4. Be cognizant of MECA's that might restrict intended models of care	Partnership Agreement Bipartite and Tripartite agreements.

Objective 2

Advance opportunities within rural health where WCDHB is the rural centre of excellence

Goals	Action	Status (including by who and by when)	Match to known good practice
Promote rural health within existing educational programmes: • Undergraduate • Postgraduate • Research	Build up as a 'training centre' - centre of excellence for rural health and for training 1. Continue to build relationships - other DHBs, training schools, universities, Local polytech Refining and doing it well – new graduates 2. Steering Group to set up WCDHB Learning Centre and develop following 3. Develop MOU with all relevant training providers (CPIT/NMIT)– work has begun on MOU. at University of Otago DSM	Project Steering Group to be established in August 2008 Multidisciplinary clinical teaching paper with RIF funding for training centre faculty began February 2008	Australian model Scotland NHS Health Workforce Action Plan 2007-2016 Alberta, Canada. Norbye, B & Furu R. 2006 Educational challenges for multi professionals working in rural areas.

	4. Similar with Tai Poutini 5. Face to face meetings with relevant colleges, registration bodies etc on annual basis for rural DHB's		
	1. Strengthen links with training institutions including Universities and the local polytechnic as well as professional colleges (e.g. College of GPs, etc) Develop ToR /Principles Strategy/key linkages internally and externally 2. Establish joint appointments for current staff with Otago University /NMIT/CPIT 3. establish clear structure & guidelines for students 4. Link current good practice across all clinical training at WCDHB	Steering Group established as above to achieve this work. August 2008 onwards Joint appointments with NMIT and CPIT for clinical tutors being investigated currently Distance learning programme for undergraduate nursing students at CPIT being investigated currently	Australian model Scotland NHS Overview of the UK Wide Workforce Planning Competence Framework 2005
	CTA funding for post graduate education across all health	DONM currently holds CTA funding for nursing across the Coast and has	CTA funding model

	professional groups 1. Develop strategy to develop/maintain strong relationships with CTA for medical, nursing and allied workforce. 2. Maintain current relationship with Te Pou - funding for MH PG programmes - MH specific skills workshops 3. Nurse Entry to Practice (NETP) and NETP extension programme, new graduate mental health nursing programme ;CTA fundedpost graduate nursing programmes	established steering groups (including NGO's and PHO) for new graduate and postgraduate oversight. Opportunities to extend this across all disciplines to be developed.	
	Local allied health new graduate programme 1. Existing PG Allied MH programme through Te Pou 2. Establish and build relationships with relevant providers, CTA etc 3. Establish/build strong programme within the DHB that aligns and works with current WCDHB established programmes, e.g. Nursing 4. Develop brand that attract	Secondary Services/Primary services to develop project to do this work with HR input. Model on existing Graduate Nurse Programme	NEtP programme

	applicants 5. Provision of support for graduates eg resource etc.		
	Training re 5th year medical students. Rural Specialist pathway- 2-3 year outcome	Establish PGY1 intake by strengthening ability to provide training – Secondary services/RMO Coordinator	Rural Hospital Symposium June 2008
	Work to contribute to establishing registrar and NP training programmes and Registrar and NP intern positions for rural health (link with existing primary health registrar rural health training programmes.	Rural Specialists vocational registration programme – establish DHB as training ground. – Learning Centre Project	General Practitioner vocational Qualification Rural Generalist Pathway. Rural Health West, Department of Health. 2008 WCDHB NP scoping report August 2008
	Allied assistants	Develop S island training	Chadwick M & Steed R 2007 The Feasibility of the role of the Allied health Assistant in the rural health delivery model. New Zealand Institute of Rural Health.
	Training programmes with apprenticeships e.g. Electronet	Learning and Developing in conjunction with Support Services/local Polytechnic and Karoro Learning Centre	
	Develop and support training initiatives including: • PRIME training programme Chronic Conditions	DONM and GM Primary to develop	
Marketing and branding	Harness and develop the opportunity for positioning and branding the WC DHB as a rural centre of excellence, promoting	1. Branding is revisited regularly to ensure focus delivers intended results 2. Use of national health sector brand	DHBNZ Dr J Sullivan 2008 The many benefits of an employment-branding program

	opportunities for professional development	when available 3. Nationally-In-zone bus development 4. DVD development for graduates	
Cadetship and scholarships	Cadetship - opportunities eg for training 1. Careers and scholarships established and funded – ongoing 2. Opportunities for holiday work – established 3. mentors available but needs further development 4. Incubator	HR department on-going project work	Counties Manakau DHB
Career options for school leavers and tertiary students	Work experience links to high school, NCEA credits - "Education for Enterprise" 1. Incubator programme 2. Nationally – In zone Bus 3. E 4 E 4. Use of national career framework when available	HR department in conjunction with services	Counties Manakau DHB Hawkes Bay DHB National Inzone Bus project
Develop opportunities and programmes that support recruitment of overseas applicants	Develop streamlined recruiting processes by 1. Use of health sector branding 2. National collaborative recruitment 3. Develop migration	HR department in conjunction with the services	DHBNZ Projects Recruitment ,Recognition and Retention of Overseas Training Doctors for the rural and Remote Medical Workforce in Australia 2005 Australian Rural and Remote Workforce Agencies Group Limited.

	orientation package 4. Mirror current nursing internal recruitment process in other workgroups 5. Implement HRIS Project		
	Work with relevant responsible authorities to enhance registration processes Establish high priority registration bodies and develop a WCDHB strategic approach, eg Regular meetings with Medical & Nursing Councils	DHBNZ / Various registration bodies/MoH	
	Work with the Department of Immigration to enhance current processes by Liaising with department Developing submissions Attend relevant Immigration workshops	HR department /Services/immigration	The other side of the Equation- issues that impact on Overseas trained doctor in rural and remote Queensland. 2005 Health Workforce Queensland and Rural Doctors association of Queensland
Explore opportunities for a rural health vocational scope of practice	Work with relevant responsible authorities to test feasibility	Medical Council/Nursing Council/Other registration bodies/DHB's	Rural Health Workforce Australia. Strategic Plan 2007-2010.
	Work with relevant educational bodies to test feasibility • Develop rural Nursing programme similar to medical programme	DONM	H Swindlehurst 2005 "Rural Proofing for Health. Institute of Rural Health.
Return to work	Work with relevant	DONM and other services	Previous work. At WCDHB

options for those who have left the health workforce	Polytechnics/Universities to be able to offer opportunities to return to workforce Nurse RTWP both RN & EN Develop options for other work groups, e.g. Physio/OT etc.		

Objective 3

Strengthen District Health Board collaboration between South Island DHBs

Goals	Action	Status (including by who and by when)	Match to known good practice
	Co-operation with NMDHB re RMDI - remuneration packs - FT vs locum		
Joint appointments and secondments	Build relationships with larger organizations to give staff alternative opportunities - 'professional experience', 'secondments' 1. WCDHB employer with employee residing in a main centre. 2. Some occurring but needs to be mapped and coordinated 3. for joint appointments 4. ensure records are kept 5. Establish possible relationships and work to achieve.	Sub Regional Group Local initiative e.g. Older people residential care joint recruitment and employment project. Hr department	Worley PS 2004 "Always one doctor away from a crisis". International Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy..
Providing	1. CCU + ED exchanges	Various Services to be developing	NHS National Workforce Projects "18 Week

opportunities for staff to maintain and strengthen skill sets	2. Allied health professional training – managing assistants and delegation 3. Primary health – developing scopes. 4. MH Services already established focus - Let Get Real Project – core competency programme - Talking therapies programme - Sissal CBT project - Internal skills training programme Assessment Treatment planning Psychotherapeutic interventions - PG CBT/IPT/Motivational Enhancement	this in conjunction with HR and DON/W and other workforce development roles.	Patient Pathway:. 2006. NHS National Workforce Project "Six Step Guide: An Interim resources to support urgent and emergency workforce planning" Submission to the Minister for the Health and Aging. Audit of Rural health Workforce Shortages 2008. Rural health Workforce Australia.

Objective 4

Support workforce recruitment and retention strategies

Goals	**Action**	**Status (including by who and by when)**	**Match to known good practice**
Develop recruitment and retention strategy that focuses on right person in the right job			
Provision of a modern HRIS	A system that enables workforce support, management, reporting and data analysis	HR department with payroll and all other services Sept 2008 onwards Go live April 2009	Dr J Sullivan 2008 "Metrics and Measuring up HR"

	1. HRIS – payroll implementation 2009, 2. Other modules including recruitment, learning and development, performance management 2009/10		
Evaluation of factors that contribute to staff churn	Analyse the exit interview summaries and make a plan to address key issues. 1. Analyze data (system new and isn't collated currently) 2. Develop feedback system that ensures action is taken when appropriate.	HR department to develop existing Exit process to incorporate feedback loops	Dr J Sullivan 1997 Retention Strategy -- Why Do People Stay In Their Jobs De J Sullivan 2007 Retention Problems Begin During the Hiring Process
Career advancement opportunities for existing employees	Career pathway and structure, eg allied health flat structure and lack of opportunities. Structures for supporting, supervision and growing. PDRP Post Graduate DHBNZ Career pathway project MH – development of a clinical career pathway	HR department to use existing methods and develop additional rural pathways	NHS UK DHBNZ
Educate in teamwork, multidisciplinary and interdisciplinary ways of working		Human resources in conjunction with Service Managers	N. Petrie. 2008 Leadership Development without the Time Wasting

Promote a healthy workplace environment, EEO	Quality Joint Action Committee development	Service Managers DONM	EEO Employment Relations Act 2000
	Safety 1. Safe Staffing and health Workplaces project _NZNO 2. JAC –NZNO 3.Various MECA's that have agreements for efficiencies eg ASMS, NZNO, etc	DONM has completed detailed assessment of all nursing and midwifery sits against the recommendations of the SSHW report; work plan to fall out of this. DONM/HR department and services to develop this work HEHA involvement in healthy workplaces	NZNO MECA's PSA MECA's/ Partnership Agreement. Health and Safety Legislation.
	Leadership Development Develop competency framework for the DHB Lominger for Leadership 1. Map competencies required for future workforce (MH Let get real project) 2. map current workforce competencies Analyse the gap and set up programmes to address this	HR department to develop this in conjunction with other S Island DHB's and National Corporate Strategy Workforce Group	Robert W. Eichinger and Michael M. Lombardo (2004).Learning Agility as A Prime Indicator of Potential. Human Resource Planning , Vol. 27, No. 4, p. 12-15. Kenneth P. De Meuse, King Yii Tang, and Guangrong Dai Lominger Assessment Instruments: An Overview of Research Background and Support. (2007). Paul Englert, Sue Seymour & Sarina Johhstone 2006 "The Development and Application of a three-factor Leadership Model"

Objective 5

Work with MoH and Councils and registration bodies (recognizing we have little influence over those bodies but some influence with Ministry)

Goals	Action	Status (including by who and by when)	Match to known good practice
New scopes of practice that are acceptable to registration bodies	Work with other DHB's and rural hospitals and registration bodies to develop new scopes of practice. Work with MoH,NCNZ, PHO on Standing Orders and collaborative prescribing to suit West Coast workplaces.	DONM/MA/ HR/ Service GM Rural hospitals	Report on the Audit of Health Workforce in Rural and regional Australia 2008
Develop new roles that are part of the future of the health sector in conjunction with training providers	Identify roles that are required for the future Work with relevant bodies to agree registration and appropriate training/up-skilling required for current workforce E.g. Hospitalist	GM's/DON/HR and other relevant bodies	Rural Generalist Pathway, Western Australia. Department of Health. 2008
Agreed supervision plans with Medical Council that fit DHB needs	Work with Medical Council to develop more applicable ways of providing supervision to Dr's and NP's interns	MA/GM Secondary services/GM Primary services/CEO/ other DHB's	Ministry of Health 2006 Health Workforce Development An Overview
Consider options for private work to be carried out on the coast	Joint appointments	Sub regional	

IMPACT ON MODEL OF CARE OPTIONS

Options	Workforce Implications	Proposed Actions to implement this option	Match to current workforce objectives	Match to sustainability project evaluation criteria
Primary Options				
1. Nursing Community nursing roles are redefined and broadened to encompass neighborhood nurse model .Also RNS's work to edge of scopes. Care assistant role to support nurse and cover predictable aspects of client care Standing orders are Coast wide for nursing	More staff with broader range of skills. Need to develop competencies for NP's roles Increased need for care assistants who have qualifications	Project work to implement standing orders coast wide for nursing. Gap analysis to assess difference between current and future roles Training to close any gaps between current nursing and future roles Training for care assistants Training for staff and consumers to ensure common understanding	Standing Orders currently being discussed with MOH/NCNZ/PHO/DHB. Project not on current workforce objectives but is a high priority Gap analysis not on current workforce objectives PG CTA funding and DHB nursing education funding being well utilized to enhance skill levels with community and primary nurses Planning and Funding arm is addressing the Careerforce training options	Acceptability – Community base will require less travel. Family centered care. More choice for the patient Accessibility – increases patient access in rural areas Financial Sustainability – stable workforce lessens recruitment and turnover costs. Better use of skills mix will reduce costs Workforce and Clinical sustainability – better use of scopes of practice will increase staff satisfaction. Increased career pathways options. Maximizing health outcomes (effectiveness) – outcomes for community should be improved by accessibility

		around partnership in managing		Reducing health inequalities –increased educational programmes in the community. Patient access improved with community based services Efficiency – better use of aging workforce, better utilization of available skills. Increases flexibility of workforce, increases dynamics of the workforce.
Allied health More community focused. Qualified Roles are redefined to enable professionals to delegate some tasks to assistants. Other support (administration) increased so that assistants can focus on the client/patient.	Roles are strengthened Increase in allied health staff both qualified and assistants Allied health roles sit clearly in the primary arena Develop training for allied staff to address various needs that include ability to delegate, manage assistants etc	Recruit staff to fill vacancies Re-configuration of services and redefining some roles Consistent approach required across the DHB's. Develop training packages.	Recruitment campaign as of Sept 2008 Opportunity with new MECA implementation and translation process to makes changes within the HOD's roles if required. South Island Learning and Development Teams are looking at consistent training approaches across the DHB's. DHBNZ Allied and Technical; Workforce strategy group – add to their plan of work?	Acceptability –Scarce Professional workforce feels valued, supported by well trained assistants Accessibility – increases patient access will improve outcomes. Financial Sustainability – stable workforce lessens recruitment and turnover costs. Workforce and Clinical sustainability – better use of scopes of practice, more training to strengthen the professional workforce will result in better use of the available skills Maximizing health outcomes (effectiveness) – outcomes for community should be improved Reducing health inequalities –increased

				educational programmes Efficiency – better use of aging workforce, better utilization of available skills.. Increased confidence in meeting the communities needs.
Mental health A community focused model with two in-patient beds. Other community beds available in a community setting. Workforce is more community focused	Increase in Maori MH Workforce in line with population % Need for more cultural training Increased need for supervision Increased need for clinical training Increased need for GP training re routine preventative patient care, crisis management ability to integrate services i.e. GP and PHN and the MH Specialist Additional roles (expanded scopes) for GP's Increase the use of support workers who are qualified – to edge of scopes Use allied health workers not as case managers	Mokowhiti recommendations Provide more training Identify need and prioritise Identify need and prioritise Identify need and develop training packages or source training.	Staff ethnicity now being recorded which will illustrate how the DHB is performing in this area.] Mokowhiti recommendations and their implementation for Maori workforce in MH. Continue to develop the Virtual Learning Centre for provision of the learning programmes required.	Acceptability – Increased access, increased choice, family based care. Accessibility – increases patient access in the community Financial Sustainability – stable workforce lessens recruitment and turnover costs. Community based services would re-channel funds into Primary arena. Workforce and Clinical sustainability – better use of scopes of practice, more career pathways for staff. Increased supervision for staff. Maximizing health outcomes (effectiveness) – outcomes for community should be improved Reducing health inequalities –increased programmes available to the clients in the community, better outcomes for Maori

	Increase use of MH Social workers – redefine roles			Efficiency – better use of aging workforce, better utilization of available skills.
Emergency and after hours Co located with primary care 24/7 options	Rural Hospitalist roles Medical Officer roles that are supported by specialists either on or off the coast Paramedic roles need developing	West Coast group to include PHO and other relevant stakeholders to consider the options	As above Virtual Learning Centre development to continue	Acceptability – Joint appointments allow clinicians to keep up skill levels, better outcomes for patients Accessibility – increases patient access Financial Sustainability – stable workforce lessens recruitment and turnover costs. Better utilization of staff allows re channeling of funds into primary care. Workforce and Clinical sustainability – better use of scarce SMO resources, more career pathways for the generalist professional. Maximizing health outcomes (effectiveness) – outcomes for community should be improved Reducing health inequalities –increased educational programmes Efficiency – better use of aging workforce, better utilization of available skills.

Secondary Services A Sub regional services plan supports as many services as possible as close to the patient as possible, noting that some services will not remain as 24/7 but will shift to 24/5, or be off the Coast, a	More generalist professionals e.g. Rural hospitalist GP rural hospital programme Joint appointments or funding provided to other DHB's to employ additional staff to cover the WCDHB Flexible working within RMO's rotated through from other DHB's the facility Strengthen CNE and Specialist roles Anesthetic technician roles should be strengthened (role extensions) Nursing assistant role for high acuity areas with EN roles where predictable outcomes Explore nurse anesthetic role	Sub regional Service plan to build on options Work with relevant registration and regulatory bodies to gain better supervision processes Work Nationally with DHBNZ and other DHB's with regulatory bodies as well as taking local opportunities Develop good HR process to ensure Joint appointment work.	As above Virtual Learning Centre development to continue S Island Leadership development project.	Acceptability – Joint appointments allow clinicians to keep up skill levels, better outcomes for patients Accessibility – increases patient access Financial Sustainability – stable workforce lessens recruitment and turnover costs. Better utilization of staff allows re channeling of funds into primary care. Workforce and Clinical sustainability – better use of scarce SMO resources, more career pathways for the generalist professional. Maximizing health outcomes (effectiveness) – outcomes for community should be improved Reducing health inequalities –increased educational programmes Efficiency – better use of aging workforce, better utilization of available skills.
Corporate Workforce	Increase in project management skills in foreseeable future	Identify need for Project Management		Acceptability – increases support for clinical workforce

Finance, HR, IT Support services etc	Consider setting up project management team/department Consider options for outsourcing e.g. Laundry, Increase IT as need for increases in IT software and hardware. Increase in learning and development/training/workforce development staff. Organisational Change will require Change Agents.	Team, plan and develop. Review options for outsourcing Assess need and plan for additional IT needs Assess need and plan for additional training needs Assess need and plan for additional change agents		Accessibility – Increase patient access with better systems, enabling better outcomes for patients Financial Sustainability – More support for clinical staff increases the stability of the workforce. This lessens recruitment and turnover costs. Workforce and Clinical sustainability – better use of skills, spreads the workload , more career pathways Maximising health outcomes (effectiveness) – outcomes for community should be improved Reducing health inequalities –support to clinical staff enables the clinical work to happen which in turn results in better patient outcomes. Efficiency – better use of aging workforce, better utilization of available skills to handle the workload.