

Cardiac Surgery Services in New Zealand

**Cardiac Surgery Service Development
Working Group Report**

September 2008

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1. Executive Summary

A service development process for cardiac surgery services in New Zealand was requested by the Minister of Health and initiated in May 2008 by the Ministry of Health (the Ministry) with the New Zealand Branch of the Cardiac Society of Australia and New Zealand. The first phase is a report which has been produced by a Working Group with an in-depth understanding of cardiac surgery provision, from predominately clinical perspectives. The Working Group has based its advice on a range of data available and the members' expertise and experience, aiming to assess the current situation, identify issues and indicate potential solutions.

The service development process was initiated in direct response to concerns around the access of patients to cardiac surgery. Despite a relatively high incidence of heart disease, the provision of cardiac surgery in New Zealand is lower than that of comparable countries. More concerning is that waiting times for publicly funded cardiac surgery have been reduced to clinically acceptable levels in many other countries, but not in New Zealand. There is also significant variation between regions of New Zealand. The number of cardiac surgical operations declined between 2002/03 to 2006/07. Although additional funding was made available for Elective Services from 2006/07 onwards and the number of operations is increasing, the planned increase in service delivery has proved difficult to achieve.

The level of service (coronary artery surgery, adjusted for population mix) provided in the United Kingdom is 37% higher than in New Zealand, 75% higher in Canada and 85% higher in Australia (NSW). Therefore a key recommendation of the Working Group is that the national intervention rate for cardiac surgery be increased from the 2007/08 level of 54 per 100,000 people in New Zealand, to 73 per 100,000 people over the next five years (35% increase). This is equivalent to the current provision of publicly funded cardiac surgery by Otago DHB for the people of Otago and Southland. Although there are some limitations in the data on which this recommendation is based, there is sufficient confidence to proceed with the increase proposed over the next three years. Better data should be obtained over the next three years on the degree to which services are meeting patient needs, so that these targets can be refined in that time.

Cardiac surgery is only one of a number of options for addressing the burden of cardiovascular disease in New Zealand. As such, any additional expenditure will need to be carefully evaluated against other alternatives. However at this time, available funding is not the limiting factor. The main challenge to achieving this recommended increase in publicly funded cardiac surgery is the capacity of DHBs to deliver the increase. There will need to be a planned and continued increase in resourcing and throughput over the next five years (to 2012/13)

The provision of cardiac surgery involves a complex chain of human and physical resources. Cancellation of cardiac surgery due to one link in the chain being missing is inefficient and planning of resources must build in buffers to avoid these

inefficient cancellations and maximise productivity. However, even with optimal planning, lack of sufficient resources will remain the biggest obstacle to achieving the required increases in provision of cardiac surgery. These increases will require resource development of all hospitals providing cardiac surgery in New Zealand. Ensuring reliable access to post-operative cardiac intensive care is a major issue to be overcome in many centres. The most pressing resource issue is available nursing staff. It is recommended that a combined short term (0-1 year), medium term (0-3 years) and long-term (0-10year) strategy is embarked upon to improve the recruitment, education and retention of nurses for cardiac surgery wards, ICU and theatre. It is also recommended that units with a shortage of cardiothoracic registrars, cardiothoracic anaesthetists and/or anaesthetic technicians should review the reasons for this and implement plans to address this as soon as practicable.

While increasing capacity and provision of cardiac surgery in New Zealand is essential to bring the rate of cardiac more in line with comparable countries, access to surgery based on relative risk and ability to benefit must continue to be improved. This will ensure those patients with the greatest need and ability to benefit receive their surgery in a clinically appropriate timeframe. At present there is little correlation between assigned priority and time to treatment. It is recommended that priority is assigned to all cardiac surgery patients (i.e., acute and arranged as well as elective) using nationally agreed prioritisation systems to ensure transparent and consistent prioritisation of patients for cardiac surgery. Provision of surgery in accordance with assigned priority will require resolution of a number of factors which currently make this difficult.

Patients who would benefit from surgery, but whose access priority score does not afford them a guarantee of surgery within six months, should continue to be actively monitored and reviewed. The access threshold currently varies around New Zealand but should not be above a nationally agreed maximum level. Access thresholds are expected to come down toward a more equitable level as capacity and throughput improve.

The Working Group considers the distinction between acute and elective cardiac surgery to be somewhat artificial, as priority and urgency of patients are along a continuum. Mechanisms to recognise and to avoid artificial distortions due to this distinction will need to be developed. It is further recommended that categories of urgency are refined and maximum timeframes for surgery established. It is essential that explicit criteria for each of these urgency levels be set and agreed upon nationally with cardiologist and cardiothoracic surgeon input.

Monitoring the timeliness of provision of cardiac surgery against the priority and urgency assigned to patients will be added to the current national quality measures. Another valuable quality measure will be weekly reporting of cardiac surgery volumes. Marked fluctuations in volumes are sometimes an indication of fragile resourcing of cardiac surgery. Close monitoring of volumes and access for patients

will allow earlier identification of centres where DHB capacity limitations need to be resolved in a timely manner. This may include assistance from other units.

The final recommendation is that a small Ministry of Health sponsored taskforce be established to guide and facilitate implementation of these recommendations. The taskforce will be required to develop a national plan in collaboration with the DHBs, based on the production plans of each of the DHBs providing cardiac surgery. The purpose of this is to ensure adequate planning throughout New Zealand to achieve the agreed goals and to identify early any constraints which will need to be overcome. The taskforce will ensure that there is close monitoring of the delivery of cardiac surgical services to patients and assist the DHBs, the Ministry of Health and the Minister of Health in improving services and overcoming obstacles. It is acknowledged that each DHB has unique issues which will require them to develop local solutions. Nevertheless there will need to be a greater degree of integration and cooperation between cardiac surgical units and other stakeholders to ensure that people in New Zealand are provided with consistent and equitable access to cardiac surgery.

2. Summary of Recommendations

The key recommendations of the Working Group are as follows:

Service to Patients

1. That the patient journey for cardiac surgery is mapped with a focus on redesign to improve quality of service to patients.

Level of Provision

2. That the intervention rate for Coronary Artery Bypass Graft (CABG)¹, Valve and CABG plus Valve surgery is increased over the next five years, while maintaining the current level of provision of other cardiac procedures.
3. That the national intervention rate for these three types of operation is increased from 54: 100,000 in 2007/08 to 73: 100,000 by 2012/13.
4. A review of the level of service is also recommended to take place in three years.

Prioritisation

5. That a consistent prioritisation system is used in all five cardiac centres in New Zealand, and for acute and elective cases.
6. That current prioritisation systems are reviewed and aligned.
7. That all patients (acute and elective) are assigned a clinical priority prior to surgery and are treated according to the priority where reasonably possible
8. That data on time to treatment versus assigned priority is monitored
9. That factors which affect treatment according to priority are identified and addressed.

Monitoring

10. That key patient-focused and throughput performance indicators are reported consistently and monitored closely.

¹ A Coronary artery bypass graft is an operation to bypass a narrowed or blocked segment of a coronary artery using a graft.

11. Use of the National Booking Reporting System is made more consistent.
12. Artificial distortions of performance measures created by including only “elective” patients should be eliminated as far as possible

Capacity of Units

13. That a specific project is established to investigate capacity issues and link these with the needs of service delivery to patients
14. That each cardiac centre develops specific plans to make better use of current resources and to increase capacity in order to deliver to the above recommended intervention rate.
15. That specific capacity constraints in each of the units are identified and resolved.
16. That there is engagement and discussion with Intensive Care Unit staff and others, to identify and resolve the specific resource constraints and prioritisation issues relating to access to appropriate immediate post operative care for cardiac surgery patients.

Workforce Capacity

17. That each cardiac centre will review workforce requirements as part of the review of the patient journey and development of capacity plans.
18. That the Medical Council is asked to consider the role and utilisation of overseas trainees to assist as cardiac surgical registrars
19. That consideration is given to utilising alternative roles across the patient journey eg Operating Department Practitioners (ODPs), as used in the United Kingdom
20. That in order to develop a sustainable cardiothoracic nursing workforce:
 - i. a National Cardiothoracic Nursing Workforce oversight group is established to support national and local workforce strategies
 - ii. consideration is given to the establishment of designated (separately funded by the Ministry) senior nursing roles in each of the five cardiac centres that are dedicated to developing and maintaining a sustainable cardiothoracic nursing workforce.

Implementation

21. That an implementation taskforce is established by the Ministry of Health to refine and lead implementation of the recommendations of this report. This will include a process of wider consultation.
22. That the taskforce will ensure that key patient focused and throughput performance indicators are monitored closely.
23. That each cardiac surgery centre develops strategies and plans to improve local performance and collaborate in a national production plan for each year to be developed with the Taskforce and reviewed with all of the DHBs, the Ministry and the Minister of Health.
24. That the taskforce assists in identifying and resolving shared issues critical to the provision of enhanced cardiac surgery services.
25. That the task force ensure better information is obtained to clarify the place of cardiac surgery in managing heart disease, the degree to which this is being achieved in different parts of New Zealand, and to refine the targets for service delivery.

3. Introduction

1. This Report into Cardiac Surgery Services in New Zealand was initiated in May 2008 by the Ministry of Health (the Ministry) with the Cardiac Society, in direct response to ongoing concerns relating to an overall declining level of service, a high level of variation amongst the different regions, an apparent lower provision of cardiac services in most regions in New Zealand compared to other countries, and many DHBs not achieving the planned level of increase with the Electives Initiative funding from 2006/07 onwards. Ischaemic heart disease is a leading cause of death in New Zealand and the consequences of a lower provision of services are more serious than for most other specialities, because there is a greater likelihood of death if surgery cannot be accessed by a patient who needs it.
2. The report is part of a wider programme of work relating to access to elective services, being led by the Ministry. The work programme includes increasing intervention rates, improving the treatment of patients according to assessed priority, streamlining patient flow processes and understanding priorities for future investment. The report will provide specific information to direct future planning for cardiac surgical services, but will also contribute to, and be informed by, these projects.
3. Ensuring equity of access to health services, both for individuals and for those population groups who currently have poorer health status, (e.g., Māori, Pacific, and financially disadvantaged people), is a key guiding principle.

4. Aims

4. This report aims to review:
 - the current level of cardiac surgery provision in New Zealand compared to other countries
 - variation in provision of cardiac surgery by region within New Zealand
 - where in New Zealand the cardiac surgery is provided
 - the level of cardiac surgery provision that should be provided in New Zealand
 - the quality of service to patients, especially in relation to safety, adequacy, fairness, clarity and timeliness.
 - critical success factors and barriers to access and provision of services
 - options for overcoming barriers and improving service delivery
 - further information that needs to be collected to more effectively monitor and manage the provision of cardiac surgery services.

5. Context

5.1 History of Cardiac Surgery in New Zealand

5. Cardiac surgery was pioneered in New Zealand at Green Lane Hospital in the 1950s. Sir Bryan Barrett-Boyes performed the first surgery using a heart lung bypass machine operating first on an 11 year old girl for a hole in her heart. Initially most surgery was for congenital heart disease. Heart valve surgery began with congenital and rheumatic cases mainly in the young, but was soon found to be beneficial in older patients with degenerative heart valve disease. In the 1960s Green Lane Hospital was a world leader in the development of cardiac surgery. Research showed coronary artery bypass grafting gave benefit to long term quality of life and, for some people, clearly lengthened their lives. With these developments the demand for adult cardiac surgery grew.
6. This led to four other public Hospitals starting cardiac surgery; Dunedin and Wellington Hospital, followed by Waikato Hospital then finally Christchurch Hospital. In Auckland, cardiac surgery moved from Green Lane Hospital to Auckland City Hospital. In each of the five centres, private hospitals also provide cardiac surgery to privately-funded and, to varying degrees, publicly-funded patients. The five public hospitals serve their regions for adult cardiac surgery while Auckland City Hospital provides most of the congenital heart disease surgery for New Zealand and is our heart transplant centre.
7. Demand for cardiac surgery gradually increased with increased evidence of benefit and decreasing surgical mortality in patients of all age groups, including those in their 70s and, for valve surgery, even into their 80s. The complexity of surgery also increased. The demands of cardiac surgery have exceeded the human and funding resources available in New Zealand.
8. Excessive waiting time for cardiac surgery has been a problem to a variable degree for the past twenty years. In response to this, qualitative and later quantitative methods for prioritisation of patients were developed. In general, only patients with significant symptoms or those with a definite survival benefit from surgery have been listed for surgery in New Zealand. Internationally, the introduction of percutaneous coronary angioplasty and later stenting for symptom relief lead to a reduction in demand for coronary artery bypass grafting (CABG), mainly in patients with less severe one and two vessel coronary disease. Since patients benefiting from stenting were not routinely being offered cardiac surgery in New Zealand, the demand for surgery has not been reduced. Historically, New Zealand has had, and still has, a low level of cardiac surgery by international standards.
9. A further development in cardiac surgery is in the more active management of patients with Acute Coronary Syndromes (unstable angina and heart attacks). Research developments showed these patients benefit from more aggressive

treatment during their acute admission. Up to ten percent of these patients (and up to 30% of high risk patients) are now referred for coronary artery bypass grafting, ideally for most as an inpatient within days of presentation. (see references on GRACE and FRISCII). Balancing the needs of these acutely-presenting patients with those of similarly-deserving outpatients requiring cardiac surgery is a relatively new challenge faced by the cardiac surgery services in New Zealand.

5.2 Quality Improvement Plan for Cardiovascular Disease and Diabetes

10. The Quality Improvement Plan (QIP) was jointly developed by the Ministry, DHBs, clinical experts and consumers. It provides the health sector with a three-year plan to implement the nationally agreed priorities in a co-ordinated manner, to improve health outcomes and the quality of care for people with cardiovascular disease (CVD) and/or diabetes.
11. The QIP will work alongside other strategies including the Healthy Eating, Healthy Action (HEHA) programme and the Primary Health Organisation performance programme to provide a broad range of improvements in services for people with cardiovascular disease and diabetes. However, it also recommends specific actions that are likely to result in increased demand for cardiac surgical services that best meet the needs of patients.
12. The Quality Improvement Plan has, as one of its quality measures, the risk assessment and stratification of patients with acute coronary syndrome. This is currently performed at varying levels and the intention is for this to increase around New Zealand to a more consistent level, as resources enable. This will include in many centres a higher level of coronary angiography, with the likely flow-on effect of identifying a greater number of patients for whom cardiac surgery would be beneficial.

5.3 Quality Improvement Committee

13. The role of the Quality Improvement Committee (QIC) is to provide advice to the Minister of Health on any health epidemiology and quality assurance matters. The committee is overseeing the implementation of four national quality improvement programmes. One of the programmes in particular; the Optimising the Patient's Journey programme; has clear implications for cardiac surgical services.
14. The Optimising the Patient's Journey programme, being led by Counties Manukau DHB, aims to improve the quality of care received by patients within New Zealand. A key mechanism for improving the quality of patient care, particularly in hospitals, is to look at the patient's journey through the system as a whole. The programme will focus on improving the patient's journey within the inpatient setting, from before the patient's entry (attendance at the

Emergency Department or at outpatient medical and surgical services) until the patient is discharged from that episode of care. The programme will also focus on the management of patients with chronic diseases who present at the hospital for treatment, and on the flow of patients from the community/primary care setting through to the hospital setting.

15. Improvements in the quality of care that result from the programme should positively impact on the provision of cardiac surgery services. For example, objectives of the programme include reducing waiting times, reducing cancelled operations, and improving operating theatre utilisation; all of which would enable greater and/or more efficient provision of cardiac surgical services.

6. Process and Scope

6.1 Process

16. The first phase of the Service Development process was to convene a group of people with an in-depth understanding of cardiac surgery provision from a range of predominately clinical perspectives, to examine access to and provision of services and produce a report to assess the current situation, identify issues and propose potential solutions.
17. The Ministry invited health professionals and management representatives from DHBs and the private sector, to establish the Cardiac Surgery Service Development Working Group (the Working Group). The Working Group was co-chaired by the Ministry's Clinical Director, Elective Services and the Chair of the New Zealand Regional Committee of the Cardiac Society of Australia and New Zealand. All regions delivering cardiac surgery were represented on the Working Group.
18. The Working Group met three times; on 26 May, 27 June and 27 August 2008. A draft report was produced after the 27 June meeting, and discussed on 27 August. After being finalised, the report will be presented to the Minister of Health and the Ministry of Health, with specific recommendations for future delivery of cardiac services in New Zealand.
19. Issues of how cardiac surgery interfaces with other services (eg, Cardiology) where services might be delivered, how these might be arranged, funding arrangements, financial implications, etc., will be explored in later phases of the service development process.

6.2 Scope

20. All surgical procedures on the heart or intrathoracic great vessels, including coronary bypass grafting, and valve repair or replacement were included in the scope of the Report. Procedures for the correction of congenital cardiac abnormalities were considered in that they use similar resources, but their level of provision is not part of the scope of this Report. Angioplasty procedures, thoracic surgery and percutaneous procedures were excluded from the scope of the Report. The Report focuses on identifying issues of delivery of service and possible solutions, and making recommendations based on this. Detailed examination of implementation will follow.

7. Provision of Cardiac Services

7.1 Heart Surgery – the Patient’s Journey

Key Points:

- As cardiac disease is a common cause of death, patients are understandably concerned about the adequacy and safety of cardiac surgery services.
- Critical sequential decisions for an individual patient are:
 1. Is cardiac surgery the best option for me (benefits outweigh risks / costs)?
 2. Is publicly-funded cardiac surgery available to me in a realistic timeframe?
 3. How urgently do I need / will I receive cardiac surgery?
- Clarity, timeliness and fairness are important to patients in their journey through cardiac surgical services
- It is recommended that the patient journey for cardiac surgery is mapped with a focus on improving quality of service to patients.

21. Heart disease affects many people. More than 6000 people each year die of heart disease in New Zealand. Patients with more severe heart disease may benefit substantially from cardiac surgery; sometimes to reduce the risk of premature death, but usually to relieve symptoms of angina or prevent heart failure. As heart surgery carries substantial stress and risks for patients, it is not undertaken without serious consideration. However, because it is well-known that heart disease is a common cause of death and can occur suddenly with little or no warning, waiting for cardiac surgery is particularly stressful for patients and their families and those who care for them.

The patient journey

22. When heart disease is diagnosed, the patient wants to know:

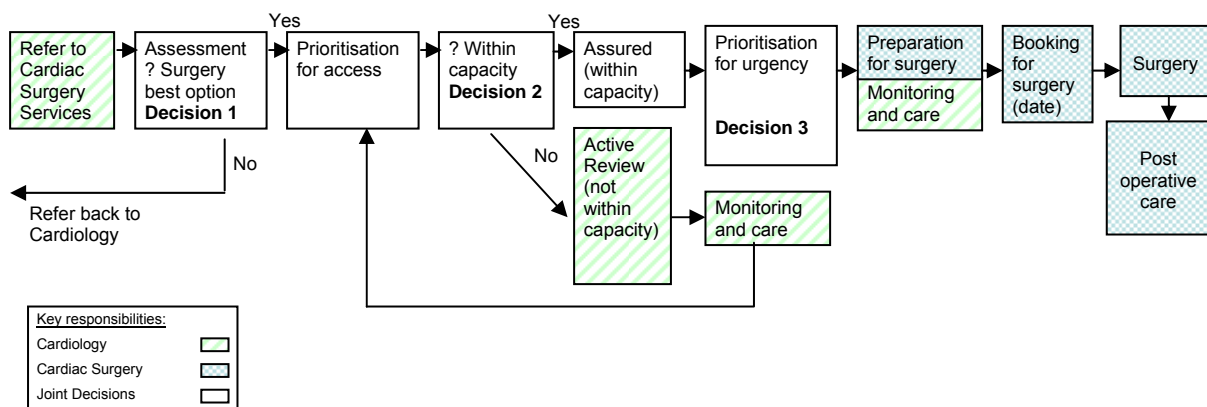
- what is wrong with me? (diagnosis)
- what is likely to happen to me? (prognosis)
- what can I do about it? (options for management)

23. For many patients, options other than heart surgery are best. However, for some patients, cardiac surgery is an option. In this situation, the patient wants to know:

- how can heart surgery help me? (benefits)
- what are the risks and other difficulties for me (pain, stress, etc) in having surgery? (costs)
- on balance, is heart surgery a good thing for me? (balancing the potential benefits against the risks / other costs) (QUESTION 1)

24. The doctors (cardiologists and cardiac surgeons) also need to consider this question. The figure below shows diagrammatically the process, and the key questions and decisions that must be made, between referral and treatment.
25. The patient journey from referral to treatment is shown diagrammatically in Figure 1 below, with the key question and decision points along the way as given.

Figure 1: Cardio-surgical service – key decisions



Key decisions

- Decision 1 – is surgery the best option for this patient?
- Decision 2 – is surgery available to this patient, within capacity of service?
- Decisions 3 – how urgently is surgery required?

26. If the patient and the doctors agree, then the decision is made that cardiac surgery is worthwhile for this patient (DECISION 1). The next question is then:
- is cardiac surgery available for me (this patient) in the public health system? (QUESTION 2)
27. If New Zealand had the capacity to offer publicly-funded cardiac surgery to everyone who would benefit from it, the answer would be simple. Unfortunately NZ does not have this capacity and therefore QUESTION 2 requires consideration of:
- how many patients can be given surgery (within a reasonable timeframe)?
 - what is the priority of this patient relative to other patients who also would benefit from cardiac surgery?
28. This decision is made by assessing the relative priority of each patient (based on his/her need and ability to benefit) compared to the priority assigned to all the other patients who would benefit. Available surgery is then provided to as

many patients as possible, giving priority to those with the greatest need and ability to benefit.

29. Over time, it becomes possible to estimate in each unit which priority scores will be high enough to qualify for surgery and which are not; that is, a threshold emerges depending on the relative priorities of the patients who present and the capacity of the unit. This threshold allows doctors to advise an individual patient whether their priority is sufficiently high for them to qualify for the limited surgery available, in which case they advise the patient that he/she is likely to have surgery within six months (“Assured” status). If the patient’s priority is not high enough at this time, compared to other higher priority patients, he/she will be advised that surgery cannot be offered at this time. The patient is then monitored by their cardiologist, who will ensure that their medical care (medication, etc) is optimal, and that their priority is re-assessed if the patient’s situation changes (“Active Review”).
30. DECISION 2 is then made by assessing each patient’s individual clinical priority and comparing this to the threshold determined by the capacity of the unit. For the patient who can be offered surgery within the capacity of the unit, the next question is:
 - how quickly should surgery be performed? (QUESTION 3)
31. Some patients have very unstable heart disease and require surgery quickly. These patients are classified as “acute” and surgery is usually provided as soon as possible, within a few days. Conversely, many patients are not compromised to any significant degree by waiting a few weeks or months. The risk of delay, and therefore the urgency of surgery, varies considerably between patients. This relative urgency of each patient is assessed based on the nature of their heart problem and their clinical condition (DECISION 3).
32. The patient’s assessed urgency then determines how quickly surgery is performed, with the most urgent patients being given highest priority. This urgency decision also determines how quickly the patient is prepared for surgery. There are advantages in this preparation being done without haste, but patients can be prepared for surgery very quickly if their urgency is high and some compromises are justified.
33. The patient then has their operation. This is a complex process involving many different health professionals, who are all needed to ensure that the patient is supported during and after the surgery. The safety of the patient is critically dependent on the anaesthetists, perfusionists, technicians, intensivists, etc who support the patient during the surgery and immediately post-operation. Specially trained nurses are essential at many steps in the process, including the pre-operation preparation, surgery itself, immediate post-operation care, in Intensive Care, the surgical ward, then at home after discharge and in rehabilitation.

34. Throughout the journey, the patient has many concerns and questions. These are handled in their relationship with the health professionals caring for them; especially the questions leading to their decision to have cardiac surgery (Informed Choice). Most of these questions relate only to themselves as an individual (see diagnosis, prognosis, options, etc earlier). However, some questions relate to “the system” and what the patient can expect. Assuming the decision is made that surgery is a good option for the patient (DECISION 1), subsequent questions include:
- given that publicly-funded cardiac surgery is not available to everyone; will my priority be fairly assessed relative to others? (DECISION 2) – FAIRNESS
 - will I be told clearly whether I will have publicly funded surgery? CLARITY
 - how soon do I need my cardiac surgery? (DECISION 3) CLARITY
 - will I have my surgery in a reasonable timeframe? TIMELINESS
 - will I have my surgery in accordance with my priority for urgency? TIMELINESS & FAIRNESS
35. The three key DECISIONS and the principles of FAIRNESS, CLARITY and TIMELINESS are fundamental to providing high quality cardiac surgery to patients. Two other critical issues for patients and the community are:
- how safe is cardiac surgery in New Zealand?
 - is there sufficient publicly-funded capacity available in New Zealand to ensure that a reasonable level of need for cardiac surgery can be met?
36. The safety of cardiac surgery in NZ is relatively high by international standards. The question of the adequacy of the level of cardiac surgery will be explored in some detail in this report, as will be the degree to which fairness, clarity and timeliness goals are being achieved.

Recommendations

37. That the patient journey for cardiac surgery is mapped with a focus on redesign to improve quality of service to patients.

7.2 Level of Provision

Key Points:

- New Zealand has a high incidence of cardiac disease.
- Delivery of cardiac surgery services in New Zealand is 25-45% lower than in comparable countries
- The rate of provision has decreased over recent years
- The Working Group recommends that:
 - the intervention rate for CABG, Valve and CABG plus valve surgery is increased over the next five years, while maintaining the current level of provision of other cardiac procedures.
 - the national intervention rate for these three procedure groups is increased from 54:100,000 in 2007/08 to 73:100,000 by 2012/13. This would consist of an increase in CABG from the current 31: 100,000 to 43:100,000, an increase in valve surgery (from 15 to 20:100,000) and an increase in valve plus CABG surgery (from 8 to 10:100,000). A review of the appropriateness of the intervention rate is also recommended to take place in three years time (after the 2010/11 financial year).

Current situation

38. New Zealand has a high incidence of ischaemic heart disease, and is above the 75th percentile for male and female deaths from ischaemic heart disease compared to other OECD countries.² Ischaemic heart disease is the basis of approximately two thirds of cardiac surgery.

Discharges and Intervention Rates

39. The analysis for this report was restricted to analysis of open chest procedures for CABG, valve repair and replacement, and CABG plus valve surgery, for patients aged 15 years and over. This is because:
- these procedures are the ones that are provided routinely by all the tertiary cardiac surgery centres
 - there is significant variability between centres in levels of provision of these procedures
 - the number of quaternary services is very stable, and there is only one provider of these services.
40. In terms of publicly funded services, Table 1 below shows the number of discharges following CABG procedures, valve repair and replacement procedures and combined CABG and valve procedures for people aged 15 years and over, for the years 2002/03 to 2007/08. For reference, the number of

² Source: Health at a Glance 2007, OECD.

other cardiac procedures, such as repair of congenital heart defects, has been included in this table.

41. It can be seen that from 2002/03 to 2006/07 there was a decline in the number of CABG procedures. Valve and CABG + Valve, and the “Other” group remained fairly constant. The provisional numbers for 2007/08 show an increase in the total for CABG, valve and CABG + Valve procedures, to a level which is slightly higher than the 2004/05 level of provision.

Table 1 New Zealand Cardiac Surgical Discharges from 2002/03 to 2007/08

Discharges	People aged 15 Years and Over				Other (All Ages)	Combined Total (incl “Other”)
	CABG	CABG + Valve	Valve	CABG, Valve & CABG+Valve		
2002/03 Total	1,733	286	520	2,539	271	2,810
2003/04 Total	1,483	271	547	2,301	245	2,546
2004/05 Total	1,389	287	560	2,236	287	2,523
2005/06 Total	1,361	274	533	2,168	294	2,462
2006/07 Total	1,253	277	585	2,115	250	2,365
2007/08 Total (Provisional)	1,295	313	646	2,254	239	2,493

42. Currently, as shown, in Table 2 below, the provisional 2007/08 New Zealand intervention rate is 54 procedures per 100,000 population. This rate is lower than in 2002/03 and 2003/04, similar to 2004/05, but higher than in 2005/06 and 2006/07.
43. Rates vary across New Zealand, ranging between 43 and 84 procedures per 100,000 population. Waikato DHB and CCDHB have consistently provided a lower level of service than other providers, while Otago has consistently provided service at a higher rate than the national average.

Table 2 Intervention Rates for Cardiac Surgical Services - People Aged 15 Years and Over

Total*	Age Standardised Intervention Rate per 100,000 pop					
	Auckland	Waikato	Capital & Coast	Canterbury	Otago	New Zealand
2002/03 Total	70	52	59	63	78	63
2003/04 Total	55	55	49	61	84	57
2004/05 Total	50	57	53	57	71	55
2005/06 Total	52	51	46	54	79	53
2006/07 Total	54	44	47	53	64	51
2007/08 Total (Provisional)	55	43	54	56	73	54

*Total = CABG, Valve and CABG + Valve procedures for people aged 15 years and over
Data extracted from the National Minimum Data Set (NMDS) 21 August 2008

44. The data above includes publicly-funded privately-provided services, but not privately funded services. Information on privately funded services is given in Table 3 below.

45. This indicates that approximately 25 percent of all cardiac surgery provided in New Zealand is privately funded. This data was obtained from the New Zealand Private Surgical Hospitals Association, from information provided by members. It provides an approximation of the level of privately funded services which the Working Group considers to be consistent with its understanding of the level of privately funded services. The working group expects the private sector to maintain its current level of service.

Table 3 Privately Funded Provision of Cardiac Surgery

Region	2006/2007	2007/2008
Auckland / Waikato Region	458	527*
Wellington region	116	136
Canterbury Region	93	91
Otago	42	50
Total	709	804

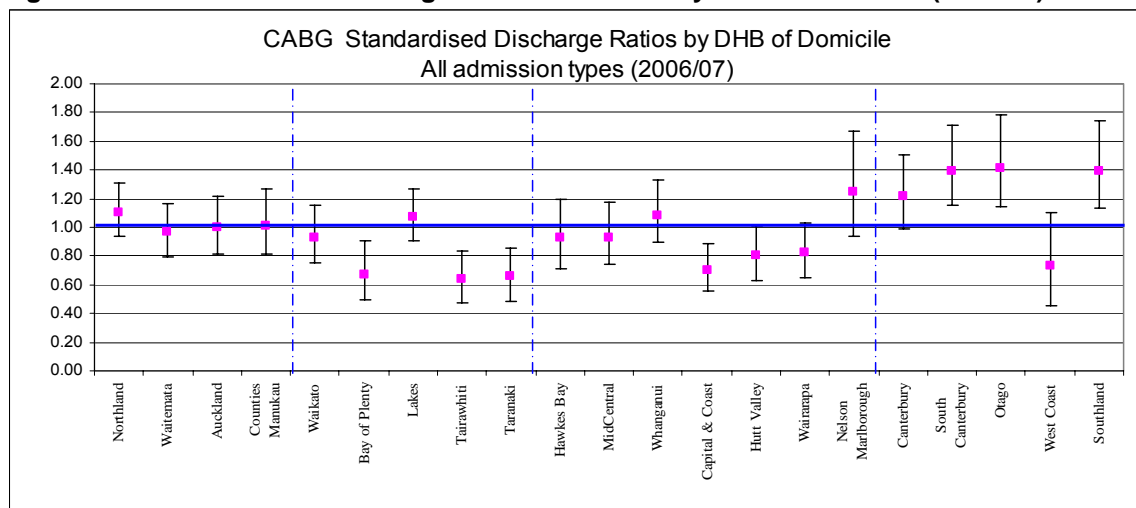
Prepared by: New Zealand Private Surgical Hospitals Association, from information provided by members. Dated: 25 June 2008.

* Incomplete figures estimated 120

Standardised Discharge ratios

46. Standardised Discharge Ratios (SDRs) compare the number of interventions provided to a DHB population to the number which would be expected if the average intervention rates for New Zealand as a whole were provided for each of population group. Therefore an SDR of 0.80 implies that the DHB population receives 80 percent of the average intervention rate for New Zealand.
47. Figure 2 shows the standardised discharge ratios for CABGs by DHB of patient domicile. (Data is standardised by age, gender, ethnicity and deprivation level.)

Figure 2 Standardised Discharge Ratios for CABG by DHB of Domicile (2006/07)



Intervention Rates – International Comparisons

48. There is only limited information available on how New Zealand's rate of cardiac surgery compares to other countries. International comparisons are complex. OECD data in the past has been misleading due to different countries reporting different data, (e.g., the number of grafts (NZ) vs the number of patients treated). It is usually not explicit whether international rates include private activity or not.³ Also, many other countries have substantially older populations which will impact on the comparative level of service provision.
49. The available information is provided in Table 4, and shows New Zealand's rate for CABG compared to the United Kingdom, Australia and Canada, and the year in which the data was obtained. The Expected Rate for other countries is calculated by applying the New Zealand 2006/07 intervention rates to the population mix of the respective country, and an Observed to Expected ratio calculated (comparing the actual Intervention Rate for the country relative to the rate expected if the NZ rate was applied.)
50. In all cases, the actual rate for each country is substantially higher than the rate would be if New Zealand intervention rates were applied for the population. The intervention rate is 37% higher in the UK, 78% higher in Canada, and 85% higher in Australia (New South Wales).
51. The New Zealand rates are standardised for New Zealand's population, and do not include any privately-funded service. As noted, it is estimated that 25 percent of the total cardiac surgery provided in New Zealand is privately funded. Information available suggests the UK provides somewhat less private cardiac surgery than New Zealand, and Canada provides virtually none.

Table 4 CABG Discharge Rates per 100,000 if NZ intervention Rates Applied

	New Zealand	Scotland	United Kingdom	Canada	New South Wales	
Year of Population data	2006/07	2006	2002/03	2006	2004/05	
Expected rate for CABG	29.8	36.3	34.5	33.3	31.3	
Observed rate for CABG	29.8	46.7	47.2	59.3	58.0	
Intervention rate relative to New Zealand	1	1.29	1.37	1.78	1.85	

Source: see Appendix 3

52. Increasing the New Zealand national intervention rate to 73:100,000 for CABG, valve and CABG + Valve would bring the national rate of CABG to approximately 43:100,000, which is similar to the United Kingdom but substantially lower than in Canada and Australia. This would also permit the

³ OECD data was not used because there is a lack of clarity on whether procedures or discharges data has been provided by the different countries.

current intervention rates for valve and CABG plus valve procedures to be increased by 5:100,000 and 2:100,000 respectively.

53. While comparison to international intervention rates may be helpful in determining that the level of provision of cardiac surgery in New Zealand is low, these rates do not necessarily provide an estimate of the level of cardiac surgery provision that should be provided in New Zealand.
54. The current level of surgery provided by Otago DHB is 73:100,000. When Christchurch began cardiac surgery it took workload away from Otago. This left Otago DHB with the resources to provide cardiac surgery to the people of Otago and Southland at a higher level. However, even at this level, there are still patients who are regarded as benefiting from cardiac surgery who are not able to be treated publicly

What's working well?

55. The projected 2007/08 intervention rate for CABG for the Otago population is 50 per 100,000 which compares favourably with UK rates, but is lower than Canadian and Australian intervention rates. In 2005/06 Otago's rate was 59 per 100,000, which equalled the Canadian intervention rate.
56. Nationally, the intervention rate for valve surgery (projected to be 16 per 100,000 in 2007/08) appears to be consistent with Scotland.
57. Currently, approximately 25 percent of cardiac surgery is privately funded, through the private sector. In addition, the private sector has some capacity to provide surgery for publicly funded patients.

What isn't working well/issues?

58. All DHBs except Otago are well below the international rates for CABG discharges. There is also considerable variability in the provision of valve surgery by DHB region, ranging from 12 to 19 procedures per 100,000 in 2007/08.

Recommendations

59. It is proposed that the three procedure groups experiencing excess demand are increased as follows over the next five years, while maintaining the current level of provision of other cardiac procedures (eg heart transplants and cardiac surgery for congenital heart disease).
60. It is recommended that the national intervention rate is increased from 54:100,000 to 73:100,000. This would consist of an increase in CABG from the current 31:100,000 to 43:100,000, an increase in valve surgery (from 15 to 20:100,000) and an increase in valve plus CABG surgery from 8 to 10:100,000).

61. This recommendation would increase cardiac surgery discharges from 2,254 (provisional 2007/08 numbers) to 3,241 by 2012/13, which is a 44% increase in patients treated per year. This represents the 35% increase in intervention rate plus population growth and age. This will result in the following increase in the number of discharges provided and overall intervention rates.

Table 5 Recommended Increase in Discharge Volumes

	Estimated Distribution			CABG, Valve & CABG+Valve vols to reach intervention Rate	Intervention Rate per 100,000	% increase in volumes from 2007/08
	CABG	Valve	CABG + Valve			
2007/08 (Provisional)	1,295	646	313	2,254	54	0%
2008/09	1,470	714	352	2,537	59	13%
2009/10	1,592	762	379	2,734	63	21%
2010/11	1,681	797	399	2,878	66	28%
2011/12	1,807	846	427	3,081	70	37%
2012/13	1,906	885	449	3,241	73	44%

62. A review of the appropriateness of the intervention rate is also recommended to take place in three years time (after the 2010/11 financial year).

7.3 Prioritisation

Key Points:

- Ethical and equitable access to beneficial treatment is the fundamental goal of transparent prioritisation systems
- Priority for cardiac surgery is based on individual patient's relative need and ability to benefit.
- Numerous barriers exist to prevent the achievement of this goal. Cardiac surgery is no exception and these barriers are not unique to New Zealand.
- The Working Group's main recommendations are that:
 - a consistent prioritisation system is used in all five cardiac centres in New Zealand, and for acute and elective cases
 - all cardiac surgery patients, including acute and arranged as well as elective cases, are assigned a clinical priority prior to surgery
 - patients are treated according to their priority where reasonably possible
 - current prioritisation systems are reviewed and aligned data on time to treatment versus assigned priority is monitored
 - incentives/disincentives which affect treatment according to priority are identified and addressed.

Background

63. Cardiac Surgery is available to only a proportion of patients who would benefit. Therefore prioritisation choices have to be made to determine which patients have priority for the limited surgery available.
64. Fairness matters to people. The public understands rationing is necessary but people are rightly intolerant of⁴:
- inequity (easier access to surgery based on geography or inconsistent approaches)
 - delayed access leading to more costly interventions
 - denial of life-saving treatment.
65. The process of prioritisation should be fair, systematic, consistent, evidence-based and transparent. Doctors have a responsibility to ensure that the process of assigning priority is appropriate and patients should receive treatment in accordance with his or her assigned priority.⁵

⁴ Ron Paterson – Health and Disability Commissioner, International Health Priorities, Toronto October 2006.

⁵ Medical Council of New Zealand: Statement on safe practice in an environment of resource limitation - Approved by Council, October 2005

66. New Zealand's Code of Patient Rights identifies that consumers have the right to services that meet relevant professional and ethical standards and minimise potential harm. Prioritisation systems support health professionals to deliver care in an environment of limited resource in accordance with these consumer rights.
67. There is little debate (within New Zealand society and health professional communities) that access to and timing of delivery of services should be based on clinical need and ability to benefit. Relative need and ability to benefit therefore provide the ethical basis upon which clinical prioritisation systems are developed. Prioritisation involves:
 - assigning priority to individual patients relative to others
 - treating patients in accordance with their assigned priority.

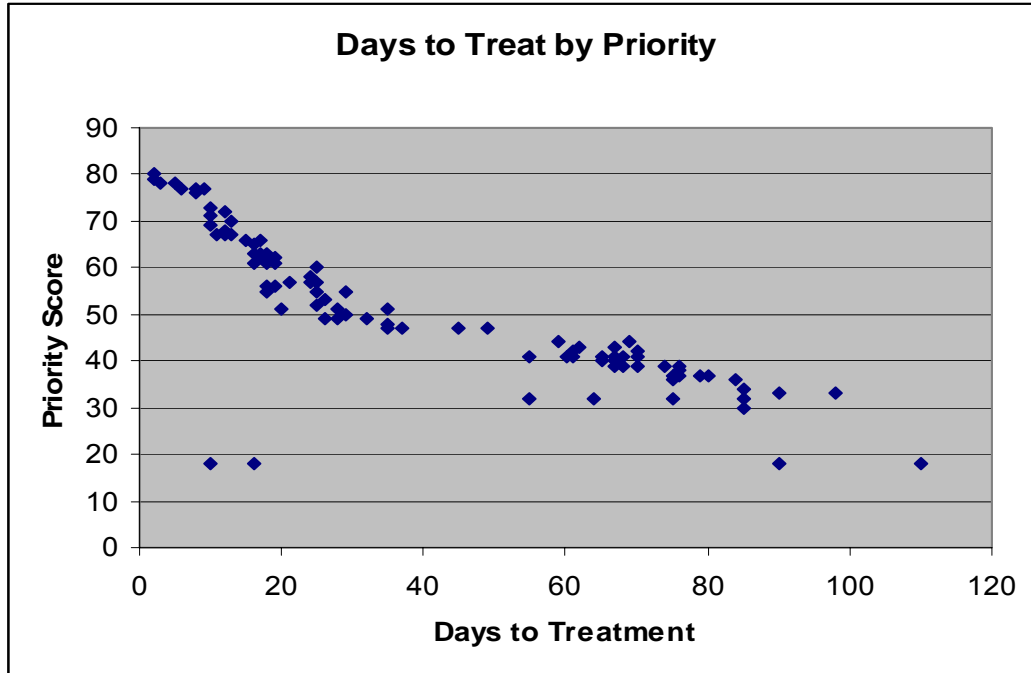
Priority Assignment

68. National prioritisation criteria exist for the major conditional groupings in cardiac surgery and effectively provide a guideline for individual patient assessment of relative clinical need, risk and ability to benefit from the surgical intervention proposed.
69. With the exception of paediatric cardiac surgery, all five cardiac surgery centres are declaring (through NBRS tool code) that they are using the national tools to assign priority to the majority of cardiac surgical patients. Some conditions (e.g., adult congenital defect repair) are not covered within the existing nationally agreed criteria.
70. The consistency of individual patient priority assignment across the country using these national tools is uncertain but likely to be variable and only able to be evaluated through individual patient clinical audit.

Relationship between Priority Assigned and Access to Treatment

71. Assessment of priority takes into account appropriate diagnostic indicators and risk factors. There is a correlation between mortality, higher clinical priority, and time waiting. Given this, it could reasonably be expected that most patients would receive treatment in order of priority and priority should correlate with time waiting to safely manage clinical risk. Therefore, it could be expected that the pattern of treatment in accordance with priority (or clinical risk in the case of cardiac surgery) would have an appearance similar to that represented in Figure 3 below:

Figure 3: Days to Treatment based on Priority at time of Decision to Treat.

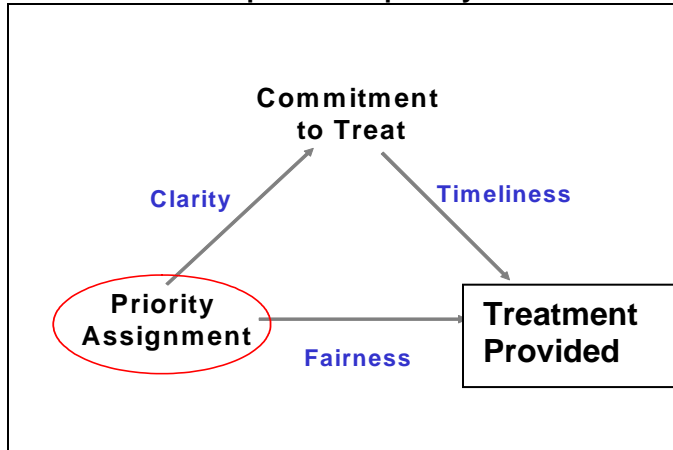


Prioritisation and Patient Management

72. Prioritisation is nested within the wider processes of patient flow management. Following the clinical decision regarding which treatment is optimal for an individual patient (Decision 1 - refer Figure 1), prioritisation is the fundamental next question (Question 2) in the determination of an appropriate plan of care that includes clarity as to whether and when treatment can be offered or not.

73. Figure 4 below demonstrates the relationship between the process of prioritisation (assignment and treatment according to priority) with the principles of Clarity, Timeliness and Fairness to patients.

Figure 4: Relationship between priority and core electives principles



74. Clarity and Timeliness of treatment are monitored closely and there are significant incentives for these to be managed well. Fairness (consistency of actual treatment with assigned priority) has not been regularly monitored.

What is working well?

75. The need to make clinical prioritisation decisions, because of limited availability of cardiac surgery, is well-recognised and there are processes, often involving multi-disciplinary meetings, to discuss individual patient's situations and priority.
76. Most centres are using standardised clinical prioritisation scoring tools to guide priority assignment. Most patients are assessed in detail and considerable information is obtained on each to inform prioritisation decisions.
77. All patients who are placed on the waiting list for elective cardiac surgery have a priority score assigned. This is recorded in local information systems and in the national booking and reporting system (NBRS) data collection. A variable proportion of acute patients and patients whose priority is below the access threshold also have their priority score recorded.

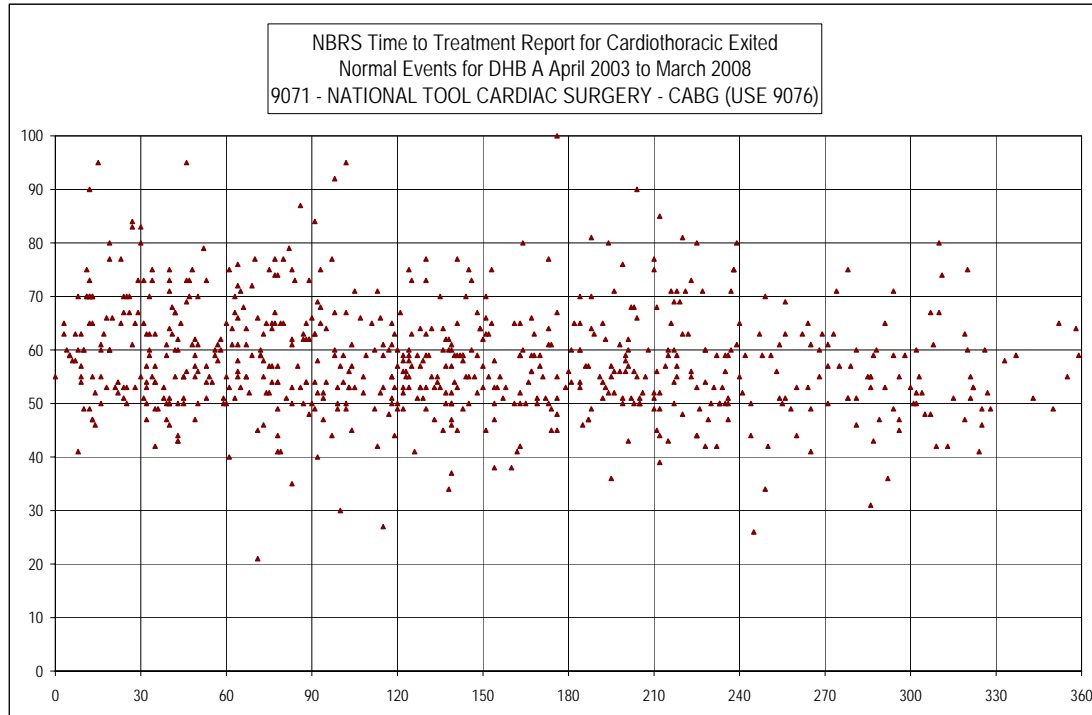
What is not working well?

78. Within the DHBs, the prioritisation processes of assignment of patient priority and acting in accordance with that priority are not always consistent nor following principles or standards of ethics or consumer rights. New Zealand is not necessarily alone in this.⁶
79. Patient priority (determined either by systematic tools such as CPAC or using broader categorisation and individual clinical judgement) is not necessarily used well to manage individual patient's clinical risk or ability to benefit relative to others. Although standardised clinical prioritisation scoring tools are in use, it is unclear how consistently these are being used.
80. While there are reasonably valid prioritisation tools for the different cardiac surgical treatments (CABG, aortic valve replacement for stenosis, etc), the scores on each of these tools are not aligned. (A score of, for example, 50 on the CABG tool does not carry the same relative priority as 50 on the Aortic Stenosis tool. Therefore it is not possible to assess readily the relative priority of patients prioritised for different types of cardiac surgery. Even within a single treatment, there is little relationship between priority assigned and the time patients wait for treatment.

⁶ Priority setting and cardiac surgery: a qualitative case study [Health Policy](#). 2007 Mar;80(3):444-58. Epub 2006 Jun 6; Walton NA et al

81. Figure 5 below represents a typical pattern of essentially no correlation and is seen generally for all cardiac prioritisation tools across all DHBs.⁷

Figure 5: Days to Treatment based on Priority at time of Treatment.



82. The dataset to assess this relationship is taken from the National Booking Reporting System (NBRS) using the latest priority assigned by date and number of days waiting until treated either electively or acutely. It excludes patients admitted acutely who have not been entered onto a waiting list.
83. Historically originated population based categorisations (“Urgent” and “semi-urgent” or “In-hospital” and “Outpatient Urgent”) are still used in some DHBs to primarily define priority. Such broad based categories lack the specificity and sensitivity to safely manage the risk (and achieve maximal benefit) for individual patients relative to other patients in the same category.
84. The time to treatment shows wide variation within these categories and considerable overlap between categories, indicating that these classifications also have little influence on actual time to treatment. This is especially important when ideal time to treatment cannot be met. For example, patients within a category such as “urgent” are waiting for times between 0 and >180 days with no apparent reason.

⁷ An exception is emerging for Auckland DHB Paediatric Cardiac Surgery.

85. Similarly “average waiting times”, while an indicator of performance for a population, lack the sensitivity and specificity to manage safely and fairly the clinical risk and deliver the maximum benefit for individual patients.

Issues / Problems / Causes

86. It is generally accepted that assigned priority, based on relative need (which incorporates clinical risk) and ability to benefit, should determine whether and when a patient is treated. However, other factors and competing priorities often override the capability of a service to deliver to this goal.
87. The barriers to offering patients access to surgery based on relative need and ability to benefit are multiple but can be grouped into the following areas, which are further explored below:
- highly constrained access to cardiac surgery
 - priority of “Acute” versus “Elective”
 - clinical responsibilities and practice
 - organisational factors
 - Non-availability of limited critical resources
 - relative priority of cardiac surgery patients for limited shared resources.

Highly constrained access to Cardiac Surgery

88. When there is a high level of pressure on available services, such as on cardiac surgery in recent years, systematic prioritisation tends to be over-ridden in favour of dealing with immediate and pressing priorities. As an individual clinician becomes increasingly concerned that the patient in his/her care will not have timely access to surgery, with consequent risk, the doctor becomes increasingly focused on achieving surgery for his/her patient rather than the potentially greater benefit of other patients. This has led to decisions for access being dominated by the “acute” patient and the patient “in a hospital bed”.
89. As these factors have become the predominant determinant of priority for access, there has been a tendency to classify patients as “acute” or keep them in hospital as the only practical way of ensuring that they will have priority for the limited surgery available. (see also “Acute” vs “Elective” below.) The variability in availability of surgery from day to day makes these decisions quite variable also. The underlying cause is the lack of capacity to provide surgery to sufficient “elective” patients in a reasonable timeframe.

Priority of “Acute” versus “Elective”

90. In order to determine clinical priority and urgency⁸ fairly, nationally consistent and systematic criteria have been developed. These were historically developed to determine access within a limited resource environment. In a 2005 update of the criteria for CABG, urgency was included and it was agreed

⁸ Urgency as defined as the clinically appropriate timeframe for treatment in order to adequately manage the likely clinical risk.

the criteria were now relevant for assignment of priority for CABG patients on an acute basis. The intent of this decision was to make transparent any disparity in priority between acute and elective cases.

91. There was evidence at the time to suggest higher priority elective cases, including patients with high clinical risk eg: left main stem disease, were remaining untreated in the community while significantly lesser priority acute cases were treated if they were admitted to hospital.
92. There is little evidence to indicate these standardised criteria are being used systematically and transparently to assess the priority of patients described as 'acute'. It is unclear whether there is national agreement amongst cardiologists and cardiac surgeons as to the criteria that define a clinically acute cardiac patient.

Clinical Responsibilities and Practice

93. Ethical responsibilities for Clinicians, especially balancing advocacy for individual patients against the needs of others, have become more explicit in recent years. The level of understanding and awareness of these responsibilities amongst clinical staff, while increasing, remains variable across the health sector. Confidence in the evolving systems designed to support clinicians to meet their increasing responsibilities is slow to develop for historical reasons. Change at the level of individual clinical practise requires considerable time and support before it is embedded and sustained.
94. The impact of multiple and sometimes competing forces can all contribute to make it difficult to achieve a goal of treatment based on patient's relative need and ability to benefit. This includes factors such as the degree of individual clinical practise variation, perceived risk, sub-specialty expertise and interests, clinical leadership, surgical team structure, allocation of responsibilities, clarity of roles, multi-disciplinary communication methods and competency mix.

Organisational Factors

95. There are a number of important and significant other pressures that appear to 'overwhelm' the ability to treat according to need. In recent times there has been an expectation that patients who have waited longer than six months are treated, to gain necessary compliance and access additional funding. This has seen providers focus on offering access to treatment on the basis of length of time waiting.
96. A sector with a focus weighted more in favour of efforts to improve and maximise efficiency, capacity utilisation and productivity can have a restraining impact on the delivery of treatment to those with the greatest need, particularly when such decisions are made without reliable information about what and where that need is. Again New Zealand is not alone in this and it is

questionable whether this tendency constitutes legitimate and fair priority setting and decision making.⁹

Non-availability of limited critical resources

97. Cardiac surgery requires a number of critical elements to be available to allow surgery to proceed. Where these are unavailable or restricted, patients may be selected for treatment based on the availability of resources rather than the relative clinical priority of the patient.
98. For example, if theatre time is restricted, patients may be selected on the basis of who can be operated on within the time offered by the available theatre session, even though this may mean complex but higher priority patients are repeatedly deferred. This may be reasonable in exceptional circumstances, but is of significant concern when it occurs frequently overall, or repeatedly for the same patient.

The relative priority of cardiac surgery patients for limited shared resources

99. Cardiac surgery patients often “compete” for limited resources with other patients from other specialties, in particular in relation to access to ICU beds. The decision to admit another patient to ICU ahead of a planned elective cardiac surgery patient (whose surgery then needs to be cancelled) is essentially a prioritisation decision that the first patient has a higher priority than the booked cardiac patient. The relative priority given to these other patients may sometimes be based more on immediacy (“first in – first served”) than on relative need and ability to benefit of the two patients.

Recommendations

100. The following actions are recommended to achieve improvement in prioritisation:

Confirm / Refine the Criteria to Assess Patient’s Relative Need / Risk and Ability to Benefit

- Review the current national criteria against updated clinical evidence relating to the risks of cardiac disease and benefits of surgical intervention. The scope of this review will expand to include prioritisation criteria for the current group of ‘planned acutes’.
- Align and validate priority tools to ensure consistency of priority scoring across the different types of procedures within cardiac surgery.
 - In the short term, (three months) align the current valve criteria with the CABG CPS. This process will include acute cases as above.
 - Over the next twelve months, redevelop the prioritisation criteria for cardiac surgery to create a single integrated, nationally consistent and agreed validated prioritisation system for all adult cardiac surgery.

⁹ Priority setting and cardiac surgery: a qualitative case study [Health Policy](#). 2007 Mar;80(3):444-58. Epub 2006 Jun 6; Walton NA et al

- Achieve national clinical agreement and professional body endorsement of updated criteria.

Promote Consistency of Priority Assignment

- Achieve local clinical agreement to use the agreed validated national criteria as the basis for determining access to and timeliness of treatment to achieve consistency of priority assignment.
- Support the development of local implementation plans to :
 - Enable clinicians to easily engage in reliable prioritisation, e.g. through the use of electronic technology via integration into Hospital PMS systems wherever possible.
 - Create a commitment to measure and monitor/audit, in conjunction with clinical professional bodies, the quality of individual clinician prioritisation.

Establish and monitor timeframes for treatment related to clinical priority

- Establish agreed treatment times with clinically appropriate tolerance limits related to assigned priority.
- Agree a simple measure that can be readily derived from existing datasets (eg: % improvement¹⁰ in the number of patients treated in accordance with their assigned priority treatment timeframe).
- Regularly measure, monitor and report treatment delivery in accordance with these timeframes at both a local service and national DHB level.
- Regularly review variances and evaluate the barriers to achieving treatment delivery within these timeframes (at a system and individual patient level, eg: why high priority patients are deferred beyond expected time to treatment)

Increase the availability of cardiac surgery

- The level of surgery will need to be increased to a level where there is confidence that high priority patients at least can be treated in a reasonable timeframe (to make it unnecessary to “go around” the system)

Address Organisational and Clinical Barriers

- DHB level review to identify the important local barriers regularly preventing treatment according to priority (including the priority of cardiac surgery patients relative to other patients for limited shared resources (ICU beds, theatre staff, etc)).
- DHB commitment to local impact analysis of the changes required to improve treatment according to priority.

¹⁰ Given the extent of poor correlation between priority assigned and treatment delivery, % Improvement to be recorded in the 1st year rather than % of actual patients treated within their priority timeframe as an incentive based measure.

Manage the incentives / disincentives for treatment in accordance with clinical priority

- Develop additional incentives for improved prioritisation, over and above the moral and ethical imperatives to treat in order of need and ability to benefit (possibly similar to those which have been effective in increasing the number of procedures in other specialties and in improving clarity and timeliness of delivery of services).
- Monitor the effect of other incentives which have the potential to override the importance of treatment in accordance with clinical priority based on patient's relative need and ability to benefit.

7.4 Use of the National Booking and Reporting System to Monitor the Provision of Cardiac Surgical Services

Key Points:

- There is considerable variability in how the National Booking and Reporting System (NBRS) is used
- This variability makes it difficult to effectively compare waiting times for treatment between Cardiac Surgery units.
- The Working Group recommends that:
 - Following mapping of the patient journey for cardiac surgery, consistency of use of the national booking system is improved
 - key patient-focused and throughput performance indicators are reported consistently by all DHBs offering cardiac surgery services, and monitored closely
 - Artificial distortions of performance measures created by including only “elective” patients should be eliminated as far as possible.

Current situation

National Booking Reporting System (NBRS)

101. Patients referred for elective cardiac surgery are reported through the National Booking and Reporting System (NBRS). There is considerable variability in how patients are entered into and managed within NBRS.

Average days Waiting

102. Information on waiting times is usually based on the days waiting assured, which is the number of days between the patient being advised they would have surgery (and are entered into NBRS with an “Assured” (Certainty) status, and the date that the patient was exited from NBRS, having had surgery provided. National information on the average days waiting assured for Cardiothoracic Surgery (which includes thoracic as well as cardiac surgery) is in Table 6 below.¹¹ DHBs enter patient data at different stages along the patient pathway. Direct comparisons cannot therefore be used with confidence.

¹¹ An Assured status means that the patient has been told that they will have their procedure within six months. Included in this status are patients who do not yet have a date for surgery, but have been given a commitment that they will have surgery within six months, as well as patients who are booked, rebooked or deferred. (See the Elective Services Policy documents for a more detailed description)

Table 6 Average Days Waiting Assured for Events Exited Treated

Average Days Waiting Assured for Events Exited Treated						
Financial Year	Auckland	Canterbury	Capital and Coast	Otago	Waikato	New Zealand
2001/02	45	17	106	22	10	52
2002/03	29	42	151	70	16	54
2003/04	41	18	98	60	22	54
2004/05	73	12	138	40	25	77
2005/06	79	21	111	107	14	74
2006/07	57	28	129	69	23	65
2007/08	46	49	109	96	59	62

information is as at 8 September 2008

103. Another way of calculating the average days waiting is to calculate the average time between the date of entry into NBRBS with any status, and the date exited, with treatment provided.

104. Table 6 above shows that at a national level waiting times have changed very little since 2001/02, although they did increase in 2004/05 and 2005/06.

Table 7 Average Days Waiting from Entry to Booking System to Exited Treated

Average Days from NBRBS Entry to Exited Treated						
Financial Year	Auckland	Canterbury	Capital and Coast	Otago	Waikato	New Zealand
2001/02	81	65	123	22	201	105
2002/03	49	155	166	110	180	95
2003/04	52	124	110	232	240	111
2004/05	117	145	145	78	262	140
2005/06	121	156	116	159	308	147
2006/07	91	90	157	131	161	113
2007/08	75	123	163	106	80	98

information is as at 8 September 2008

105. The difference in time between “days waiting assured” and “days from entry onto NBRBS” is largely due to patients being entered into NBRBS with an Active Review status, or with a “planned” flag.¹²

106. Active Review is appropriately used only for patients who are considered to be of a lower priority, below the capacity of the unit to provide surgery, and where there is a reasonable expectation that their condition will deteriorate within the

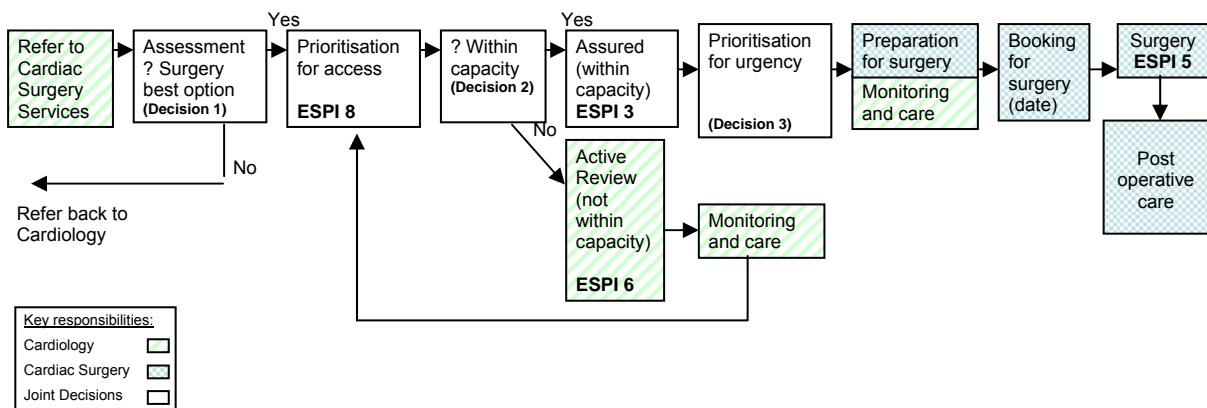
¹² A Planned procedure is a procedure that is intentionally delayed, where a delay in treatment is in the best interests of the patient, beyond six months from the decision to treat, and the timeframe for treatment is known. Common examples of Planned Flag procedures include the future treatment of a child once a milestone/age is reached, A single plastic surgery procedure, or in pregnancy, but only when the future treatment timeframe is known of

next 12–18 months. Many DHBs have used this status for higher priority patients, rather than giving Certainty. DHBs may also inappropriately assign an Active Review status or planned flag while the patient is undergoing necessary investigations prior to surgery.

Elective Services Patient Flow Indicators (ESPIs)

107. The Elective Services Patient Flow Indicators (ESPIs) are measures of the DHBs’ patient flow processes, and provide a measure of how well the DHBs have delivered on their commitments to provide clarity, timeliness and fairness in their assessment and treatment of patients. ESPIs are published monthly. The figure below shows which part of the patient flow process is monitored by each ESPI.

Figure 6 Cardio-surgical service monitoring



Key decisions

- Decision 1 – is surgery the best option for this patient?
- Decision 2 – is surgery available to this patient, within capacity of service?
- Decisions 3 – how urgently is surgery required?

What’s working well?

108. Management guidelines to DHBs on patient flow processes have been clarified, along with expectations regarding patient flow process management. Since October 2006, there has generally been a significant improvement in ESPI compliance across most surgical specialties.

109. Monitoring of waiting times and patient flow management within NBRs, both within the ESPI framework and through other reports, has improved. The improved reporting allows for better identification of emerging issues.

110. In June 2008 all five DHBs achieved compliance in cardiac surgery in ESPI 8 indicating that >90 percent of elective patients were prioritised using nationally recognised prioritisation processes.

What isn't working well/issues?

111. Reporting to NBRIS, and classification of patients within NBRIS, is inconsistent. This inconsistency makes it difficult to effectively compare waiting times for treatment and ESPIs.

112. While compliance with patient flow processes, as measured by ESPIs, has improved nationally, and within most services, cardiothoracic compliance is inconsistent.

113. In June 2008 three DHBs were ESPI non-compliant in cardiothoracic surgery. These were Auckland (non-compliant in ESPI 3¹³), Capital & Coast (non-compliant in ESPI 3, 5¹⁴ and 7¹⁵), and Otago (non-compliant in ESPI 5). Otago have generally managed performance on ESPIs well, with the current non compliance being a recent occurrence. Auckland and CCHDB have a prolonged period of non compliance (at least 12 months).

114. Currently, a number of DHBs have a high proportion of patients categorised as requiring a "staged or planned" procedure. The impact of this is that these patients, who frequently have waiting times longer than 6 months, are not included in the ESPI calculations. Since August 2007 there has been increased monitoring of the number, nature and waiting times of patients reported as needing a staged or planned procedure.

115. Active Review is intended as a category for patients who are ready for surgery and have not yet reached the threshold for publicly funded services, but are likely to reach the threshold in the medium term (ie less than 18 months). However, it appears that some DHBs are incorrectly coding patients who are undergoing pre-surgical investigations and workup as Active Review.

116. Planned flags may also be being used inappropriately, where patients are undergoing presurgical investigations and workup, before a definite decision has been made that surgery is the best option.

117. The date of referral to the Cardiac Surgery Service is not collected in NBRIS, so the time from referral to treatment cannot be calculated.

¹³ ESPI 3 – Patients waiting without a commitment to treatment whose priorities are higher than the actual treatment threshold

¹⁴ ESPI 5 – Patients given a commitment to treatment but not treated within six months

¹⁵ ESPI 7 – Patients who have not been managed according to their assigned status and who should have received treatment

118. The “Days Waiting” calculations are usually “Days Waiting Assured”. It is noticeable that most DHBs providing information to the booking system seem to delay giving cardiac surgery patients an assured status until very close to the date of surgery.
119. The delineation between acute, arranged and elective admissions is less clear for cardiac surgery than for other procedures, and may be leading to distortion of measures of performance. Clinician behaviour to optimise patient access to constrained resources (e.g., by keeping patients in hospital after they have presented acutely) can lead to recording of patients as “acute” instead of “elective”. This underestimate of elective output can distort measures such as ESPIs. ESPI non-compliance can lead to reduced access to additional elective services funding. .

Recommendations

120. To improve the management of patient flow processes, DHB’s need to manage patients within a consistent framework. This means consistent management of patients and adherence to a specified process against key performance indicators (KPIs). Monitoring of performance through variation reports will identify areas where improvement is required.
121. That the following additional patient focused KPIs are reported by all DHBs offering cardiac surgery services:
- length of time taken from priority assignment to operation
 - relationship of time to surgery to priority assignment
 - number of operations per week, against a planned number (weekly)
 - intervention rate per 100,000 population, by DHB of domicile
 - relevant indicators that form part of the Quality Improvement Committee ‘Optimising Patient Journey’ programme.
122. It is also recommended that more consistency is required in collection of data, especially the use of the Assured status and collection of date of referral on NBRS.
123. Artificial distortions of performance measures created by including only “elective” patients should be eliminated as far as possible.

8. Enablers of Service Provision

8.1 Capacity of Units

Key Points:

- There needs to be a significant increase in utilised theatre sessions per week, ICU beds and ICU FTE nurses, to accommodate the recommended increase in cardiac surgery.
- The Working Group's main recommendations are that:
 - a specific project is established to investigate capacity issues and link these with the patient journey
 - each cardiac centre develops specific plans to make better use of current resources and to increase capacity in order to deliver the recommended intervention rate. The plans should ensure that capacity constraints in each of the units be identified and resolved.
 - there is engagement and discussion with Intensive Care Unit staff and others, to identify and resolve the specific resource constraints and prioritisation issues relating to access to appropriate immediate post operative care for cardiac patients.

Current situation

124. Units are working to their individual resourced capacity. However, all units also report issues with loss of production and inability to meet contracts as a result of throughput constraints. These are generally workforce related with staff shortages being the most difficult to overcome. Most units are planning to continue to subcontract this financial year at least, to manage waiting lists and contracts.

Intensive Care Unit Demands

125. Most centres in New Zealand manage post-operative cardiac surgical patients in 'general' Intensive Care Units (ICUs). The exception is Auckland DHB, which has a separate Cardiac/Vascular ICU (although cardiac patients are still not guaranteed unrestricted access in this ICU).

126. Intensive Care Units require specialist medical and nursing staff. Recruitment and retention of these highly trained staff is difficult, as New Zealand must compete on an international market. Auckland DHB currently cannot fill nursing vacancies, and Otago DHB has Intensive Care Specialist vacancies. ICU staffing shortages directly impact on cardiac surgical throughput. If there is no staffed ICU bed available, then elective cardiac patients are cancelled even when they are high priority.

127. Acute, general ICUs have unpredictable variations in workload. Acute patients from all specialties compete for ICU beds. Priority is generally given to acute cases, necessitating cancellation of 'elective' surgical/cardiac cases when the ICU is at full patient capacity. Prioritisation of admission to general ICUs is controlled by Intensive Care Specialists. There are no national cross specialty prioritisation guidelines for ICU admission.
128. 'Ring fencing' of ICU beds for elective surgical cases is not currently practised. It has been suggested as a mechanism for ensuring elective throughput but has the potential to generate ethical dilemmas (declining admission to acute cases may result in their death). Completely separate Cardiac Units represent the ultimate in 'ring fencing' but as witnessed in Auckland do not guarantee throughput.
129. Increasing resourced ICU capacity may help by providing a 'buffer' for times of increased demand. However, it is quite possible this buffer would be absorbed by competing general ICU patients, and elective surgical cardiac cases would remain vulnerable to cancellation.

What's working well?

Surgical Teams

130. Cardiac managers report commitment and engagement from their surgical teams as being major strengths in their services.

Clinical Nurse Specialist role

131. At Canterbury DHB there is an established Clinical Nurse Specialist (CNS) role which adds value on many fronts by coordinating pre-operative preparation and ensuring no last minute delays. Waikato DHB is establishing a similar role and Capital Coast DHB has an established cardiac liaison nurse. In addition, patients are better prepared mentally and psychologically for their impending surgical experience especially if needed to be called at short notice. The CNS also completes a post discharge follow up by phone.

Private Capacity

132. When private capacity is available this is recognised as an advantage and currently necessary, as it provides options for outsourcing suitable cases. A good relationship and communication with the public sector is essential however, as the public private mix also carries with it the risk of creating an environment where there is competition for critical staff.

Multidisciplinary planning group

133. At Auckland DHB a cardiothoracic surgery unit multidisciplinary production and throughput group meet fortnightly in a local forum to review and monitor

performance in relation to service demand. The particular strength of this meeting is the bringing together of all parts of the production line.

Capacity Planning

134. Over the past twelve months, staff from the cardiothoracic unit at Auckland DHB and staff from the University of Auckland statistics department have been working together to develop a capacity planning tool for the Cardiothoracic Surgical Unit.
135. This has involved the development of a detailed 24 hour 7-day simulation which models patient flow through the cardiothoracic surgical unit, focusing on the cardiovascular intensive care and high dependency units. The model incorporates several patient arrival streams, including electives, acute/emergencies, and vascular. In addition it incorporates a variable nursing roster and variable elective schedule.
136. The project objectives are ultimately to reduce waiting lists. Specifically:
- reduce cancellations
 - assess the effect of changing the number of beds on cancellations
 - assess effect of changes in the surgical elective schedule
 - assess the effect of changes in the nursing roster.
137. Model outputs include:
- average number of cancellations per week
 - average number of electives per week
 - average occupancy (% of beds in use)
 - effect of changing number of available beds on cancellations
 - effect of changing elective schedule (and other arrivals e.g. adult congenital) on cancellations
 - effect of changing nursing roster on cancellations.
138. Because this simulation model is purpose built for Auckland DHB's service, it is anticipated that the existing modelling will be built on and the outputs further refined as contract volumes and/or other circumstances change.

What isn't working well/issues?

ICU shortages

139. The most significant issue identified consistently across all cardiac units in New Zealand is the high rate of cancellation of cardiac cases due to ICU shortages; either because of a lack of access to beds and/or shortage of ICU nurses.

Smaller services

140. There are inherent problems in the ability of smaller services to flex up production when there is acute demand or ICU is quiet. In addition, sometimes

production is slowed because of sickness or other leave, and/or staff stand down because of overnight acute work.

Ward capacity

141. Ward bed capacity in some units is marginal and the extent of the problem may be hidden behind the ICU shortage in some units. In addition, ward bed capacity is subject to “outliers” from other services and high hospital occupancy. Elective surgery is reduced when bed demand increases (for example during winter workload).

Operating room access

142. Adequate access to operating rooms to enable services to manage contracts let alone additional cases is a problem in some cardiac centres. Capital and Coast DHB have experienced rolling cancellations in the past as a result of theatre capacity issues which have had an impact on the service. However, cardiac services are now exempt from this and Capital and Coast expect overall theatre capacity issues will be resolved by moving into the new hospital.

Recommendations

143. That a specific project is established to investigate capacity issues and link these with the patient journey. The project should investigate why current funding models are not achieving the goal of more patients having cardiac surgery, and what should be done to resolve these issues.

144. That each cardiac centre develops specific plans to make better use of current resources and increase capacity in order to deliver the recommended intervention rate. The plans should ensure that capacity constraints in each of the units are identified and resolved.

145. In relation to ICU demands, it is recommended that there is engagement and discussion with ICU staff and others, to identify and resolve the specific resource constraints and prioritisation issues relating to appropriate immediate post operative care for cardiac surgery patients.

8.2 Workforce

Key Points:

- There are currently sufficient cardiac surgeons in NZ but some units may choose to increase the number of surgeons given the ongoing commitment to funding and recommended increase in case load.
- There are difficulties in obtaining sufficient registrars in some centres
- Some units have issues with anaesthetists but currently each unit has a full complement of cardiac perfusionists
- Currently several of the DHBs providing cardiac surgery have substantial nursing vacancies in their Intensive Care Units, up to 20% of complement.
- The Working Group's main recommendations are that:
 - each cardiac centre will review workforce requirements as part of the review of the patient journey and development of capacity plans
 - the Medical Council is asked to consider the role and utilisation of overseas trainees to assist as cardiac surgical registrars
 - consideration is given to utilising alternative roles across the patient journey eg Operating Department Practitioners (ODPs), as used in the United Kingdom
 - in order to develop a sustainable cardiothoracic nursing workforce:
 - a National Cardiothoracic Nursing Workforce oversight group is established to support national and local workforce strategies
 - consideration is given to the establishment of designated (separately funded by the Ministry) senior nursing roles in each of the five cardiac centres that are dedicated to developing and maintaining a sustainable cardiothoracic nursing workforce.

8.2.1 Cardiac Surgeons and registrars

Current Situation

146. Currently the five public units have a full complement of cardiac surgeons. The number of surgeons is not an immediate barrier to increasing throughput. However Canterbury has plans to increase the number of cardiac surgeons by one. It may be in the long term that some units will choose to increase the number of surgeons given the ongoing commitment to funding and increased case load.

147. With every cardiothoracic case, the surgeon needs an assistant. Typically the assistant is a Cardiothoracic Registrar. These registrars usually have either

General Registration or Special Purpose Scope of Practice (SPSP) Registration. Most of the overseas trained registrars have SPSP registration while in New Zealand to increase their training experience. Almost every one of them is a junior specialist in their own country or a general surgical trainee.

What is working well?

148. Within the current constraints that the units work under (as described elsewhere in this report) the current organisation/deployment of surgeons seems appropriate.

What is not working well/issues?

149. Some units have difficulty attracting cardiac surgical fellows/registrar to develop a consistent and appropriately staffed infrastructure for the units. All units, apart from Christchurch, are recognised by the Royal Australasian College of Surgeons (RACS) for advanced training in cardiothoracic surgery. As a result, trainees rotate through the various units but these are limited in number and there is a reliance on non advanced trainees to make up the numbers.

150. Registrars under SPSP are governed by strict criteria, including the following:

- a very high level of English is required (greater than Australia)
- ineligibility for night call in the first three months of their run
- a Medical Council of New Zealand policy that requires no more than 25 percent of the registrars have SPSP registration.

151. This is currently mainly a problem for Auckland DHB, but it can also cause problems in other centres.

Recommendations

152. It is recommended that the Medical Council is asked to consider the role and utilisation of overseas trainees to assist as cardiac surgical registrars.

8.2.2 Anaesthetists, technicians and perfusionists

153. The perfusionist workforce is relatively small and vulnerable. Currently each unit has a full complement of cardiac perfusionists. Most perfusionists are also involved with running the Intra Aortic Pumps and other circulatory support devices depending on which unit they work in.

154. In Dunedin, there is a general shortage of anaesthetists but sufficient cardiac anaesthetists for the current or an expanded workload. In Wellington, there is a shortage of anaesthetists wanting to do cardiac work. In Auckland, there is a general shortage of theatre nurses and anaesthetic technicians which impacts on Cardiac Surgery.

What's working well?

155. The units with no cancellations due to shortages of Anaesthesia team members are in hospitals that are generally well staffed with anaesthetic staff. These anaesthetic departments and their hospital place a strong emphasis on recruitment, training and retention of staff.
156. It appears that the need for perfusionists is currently being met by the available workforce.

What isn't working well/issues?

157. The anaesthetic time commitment required to do cardiac surgical lists is more onerous than other lists.
158. If a hospital has a general shortage of Anaesthetic or theatre staff, this will have an impact on all surgical services including cardiac.
159. There is not a uniting body/organisation for perfusionists in New Zealand. New Zealand is very dependent of programmes in Australia and the United States for the certification of this speciality and for ongoing CME. There has to be a very good succession plan for perfusionists in units because much of the training is 'in house' prior to sitting the more formal aspects of the requirements of the certifying body.

Recommendations

160. It is recommended that consideration is given to utilising alternative roles across the patient journey eg Operating Department Practitioners (ODPs), as used in the United Kingdom, who take a range of roles in relation to the Operating Room.
161. Other recommendations are as follows.
- All units recognise the effect of anaesthetic and theatre staff shortages on cardiac surgical throughput.
 - A staffing plan is drawn up that takes into account the required cardiac surgical workload with appropriate allowances for leave of all types. The units responsible for the anaesthetic staffing of Cardiac Surgery need to formulate detailed staffing plans. These need to be linked to the surgical production plan and have provision to cover leave of all types.
 - Units with a shortage of Anaesthetic and theatre staff should review the reasons for this and implement a plan to address this as soon as practicable.
 - Each unit should review the number of staff it trains internally to ensure that this is sufficient to replace the known levels of staff turnover

- Attention is given to the ongoing professional support and continuing medical education for New Zealand perfusionists.

8.2.3 Nursing¹⁶

162. Nurses contribute at every point along the cardiothoracic care pathway. Whether it is in the pre-assessment clinic, the inpatient ward, the theatre or the intensive care, the role of the nurse is pivotal to achieving the best outcome for the patient undergoing cardiothoracic surgery. Conversely, where there are not enough nurses or the nurses who are available are not adequately skilled, the nursing workforce can cause critical delays in the continuum of care.

Current Situation

163. Currently the largest tertiary provider of cardiothoracic surgery has 25 out of approximately 100 FTEs of nursing vacancies in its Cardiac Intensive Care Unit. At the moment the other DHB ICUs are not experiencing the same issues, with vacancies ranging from 10 FTE to 0 with a waiting list. However, this is changeable. ICU nursing is specialised and requires intensive input to have a nurse functioning competently. Auckland is the only DHB to have a dedicated Cardiac ICU. The other DHBs combine cardiac patients with other specialties. Sourcing and growing nurses in a unique specialty is a challenge, often the only source of experienced cardiac ICU nurses is from overseas.

164. Data suggests that most specialist areas in nursing have recruitment problems. A recent snapshot of vacancies (in March 2008) stated the most significant impact is in the medical/surgical settings. Of the total reported vacancies in DHBs; 63 percent were medical/ surgical, which includes operating rooms and intensive care.¹⁷ This is consistent with international reports, which state that medical, surgical, intensive care and emergency departments experience the most vacancies.

165. The cause of the nursing shortage is multi-faceted. For the large DHBs, there is a reliance on the core permanent workforce and retaining transient, mobile workers is a continued challenge. There is also significant competition from other public and private NGO health providers in the area, who are all recruiting for registered nurses to lead teams and care delivery initiatives.

¹⁶ The information in this section includes responses from the DHB members of the Nurse Executives of New Zealand (NENZ). NENZ is an organisation of nurse leaders representing primary, secondary and tertiary health providers with the purpose of providing strategic leadership for nursing in New Zealand

¹⁷ NENZ DHB Nurse Leader Response to Nursing Review Jocelyn Peach on behalf of Nurse Executives of New Zealand, 12 April 2008.

166. A number of DHBs have added beds to meet population growth with resultant recruitment of nurses to provide care to the patients admitted.

- many DHBs have built new facilities that required a new mix of workforce
- a number had added nursing positions in primary care, community nursing for acute demand management.

167. The number of nurses working for agencies has reduced significantly. This is thought to be because of the high demand for permanent employees as well as recruitment to Australia and other countries. Using the 2006 Nursing Council of New Zealand data, only 211 nurses are identified as working in agencies in the Auckland region (1.8 percent of nurses with current practising certificates).

Nursing numbers and attributes

168. New Zealand's population is projected to increase from 3.81 million in 1999 to a peak of 4.64 million in 2044 (Statistics New Zealand), significantly increasing the demand for health services. The demand for nursing services is expected to rise at a time when there is potential for a nursing shortfall, or at least no increase.

169. The number of active nurses issued with an annual practicing certificate grew by 655 to 44,752 in 2007/2008. This is about double the increase recorded between 2006 and 2007. Despite this increase, the number of nursing graduates being trained remains relatively static, as shown in Table 8.

Table 8: New Nursing Graduates in New Zealand

Year	Number of New Graduates
2001- 2002	1199
2005- 2006	1354
2006-2007	1199
2007-2008	1243

170. Nurses are not generally a young workforce and there is a leaning towards the nursing workforce being a part time workforce, as shown in Table 9.

Table 9: DHB Nursing Workforce - Details¹⁸

DHB nursing workforce	June 30 2006	June 30 2007
Full time equivalent nurses	16,465	16,950
Number of nurses	20,551	21,254
Average FTE	0.8	0.8
Average age	43.6	43.9
Average length of service	7.8yrs	8yrs

¹⁸ Sources DHBNZ Health Workforce Information Project Base Data Report (snapshot 30 June 2006 & 2007), New Zealand Nursing review July 2008 vol. 9 issue 3.

Education

171. The preparation of a nurse to work in any role along the cardiothoracic continuum requires time, financial commitment, and a programme designed to grow a nurse clinically and academically.
172. Currently there are at least five tertiary education providers who provide education for nurses who may be working in the cardiothoracic specialty, but there is no integrated programme on offer. There is no one centre of excellence for the preparation of the cardiothoracic nurse. Education such as general ICU, theatre nursing and acute care courses are all relevant to the cardiothoracic nurse, but the cardiothoracic specialty component is not often addressed at the level of detail it would be in a specially designed programmes.

Historical perspective

173. National Leadership around speciality clinical practise contributes to the sustainability of the specialty. Cardiothoracic nursing does not currently have that National overview which some other specialties do.
174. In the mid 1960s Green Lane Hospital in Auckland was experimenting with new surgical procedures for patients with Heart disease. During this time, under the leadership of the Senior Medical staff, the development of the Cardiothoracic Surgical Unit nursing programme commenced. This programme was run over 18 months and involved structured rotations through the different areas of practice in the cardiothoracic continuum. The Green Lane nursing programme became world renowned, and there are many nurses who are still practicing who went through this programme over the thirty years that it ran.
175. During the 1990s however there was an overall reduction in senior nursing roles in NZ as a result of the Crown Health Enterprises (CHEs). Key senior nursing leadership roles were lost, including roles that would provide frameworks and education for specialty nursing. In the late 1990s, post graduate education for nurses in New Zealand was undergoing significant change. Nurses were now degree prepared and this challenged the tertiary institutes to provide education at the post graduate level that was still grounded in clinical practice. The Green Lane programme in its previous form disappeared and was replaced with post graduate specialty papers, firstly at Auckland University of Technology and now the University of Auckland.
176. In 2005 the Clinical Training Agency (CTA) devolved the money dedicated to nursing post graduate education to DHBs. The rationale behind this was that instead of national centralised coordination of funds, the population based model was applied to each DHB, and the individual DHB was tasked with utilising the money to educate nurses in the defined areas of need for the particular district. In the tertiary DHB, the patient group is more diverse. This poses a challenge for these DHBs to ensure their staff are educated around all the specialities that require tertiary nursing care.

Opportunities

177. There are opportunities to look at a closer relationship with private hospitals. There could be some benefits to rotation between public and private when there is down time, to assist with skill development and maintenance.

Leadership

178. Specialty clinical practice requires leadership, at a local and national level. Cardiothoracic specialty nurses do not have a strong homogeneous nursing network, whereas general ICU nurses have strong networks and cardiac nurses have a sub group of the Australia and New Zealand Cardiac society. Not only is leadership in the specialty required, but the development of Charge Nurse Manager/Nurse Manager roles is essential to provide the platform for the development of the overall specialty.

Clinical practice/best practice

179. Some DHBs use clinical pathways for the management of the cardiothoracic patient through their episode of care. These are not standardised throughout the country and not all DHBs use them. Where used, clinical pathways support a safe patient journey, and reduce variation in clinical outcomes. The use of best practice pathways can provide a measure of mitigation when there is a lower skilled nursing workforce.

Opportunities

180. There are opportunities for nursing research in cardiothoracic nursing. However, the current staffing and leadership challenges make it difficult for appropriate levels of audit and research to occur.

Ward nursing

181. As a result of contracted throughput, not all DHBs have dedicated cardiothoracic wards. Where wards are dedicated solely to care of the cardiothoracic patients there would be expected benefits to the recruitment and retention of nurses. This, however, is not always the case. The key elements of nursing satisfaction in a ward setting are leadership, working with colleagues who are skilled, good staff to patient ratios, and positive team culture (including relationships with medical staff)¹⁹.
182. Barriers to recruitment exist for some of these wards where it is perceived that only “experienced” cardiothoracic nurses can be employed into these areas. We need to be developing experienced nurses ourselves.

¹⁹ Source: Needleman, J. Buerhaus, Mattke, Stewart, & Zelevinsky, 2001.

ICU & Theatre

183. The issues here are the same as for ward nursing. Not all DHBs have a specific cardiothoracic ICU. As can be noted from below the ICU/Theatre workforce represents less than 10 percent of the total nursing workforce.

Table 10: Number of active registered nurses and midwives working in nursing and midwifery in New Zealand by work type, numbers, 2004.

Work type	Number	Percentage
Accident and emergency	1363	3.9
other	26386	76.1
Intensive care/coronary care	1441	4.2
Perioperative care (theatre)	1949	5.6
Surgical	3521	10.2
Total	34,660	100.0
<i>Source: Nursing Council of New Zealand, 2004.</i>		

184. Opportunities exist for the development of different roles in the theatre setting, including the use of generically trained theatre assistants. The United Kingdom has the Operating Department Assistant (ODA), which is a non-nursing role and is able to undertake many of the tasks currently done by nurses in theatres.

What's working well?

185. The CTA funds around 800 new graduate nurse placements in New Zealand. This is recent and supports the recruitment of the new graduate into DHBs. The Nursing Council of New Zealand registers about 1200 nurses each year. DHBs employed about 86 percent of available graduates in early 2008 into CTA funded positions. Most respondents would have employed many more new graduates had these nurses been available for employment.

186. Cardiothoracic nursing best practice occurs throughout New Zealand. Anecdotally there are examples of clinical pathways and nurse led activities, such as nurse led extubation, in existence.

187. In a recent survey undertaken by the Chief Nurse smaller secondary centres do not seem to have the same issues with recruitment and retention into ICU. This could be related to the smaller workload in these areas.

188. New Zealand nurses are well respected internationally and large recruitment groups come to New Zealand from April each year to interest nurses with "packages". Australia has been very active in recruiting nurses for short and long terms contracts.

What isn't working well/issues?

189. Working in intensive care nursing involves a disproportionate amount of night-shift work, and at present nurses do not feel they are proportionally compensated for this. While money is not the only issue, the high proportion of shift work does tend to result in burn-out and staff retention problems.
190. The attraction of intensive care for many nurses is that it offers opportunities for education and learning new skills in a high-intensity environment. Hospitals that have attracted funding from the CTA for postgraduate, hospital-based nursing training (eg, Wellington and Rotorua) report fewer problems in attracting and retaining nurses. Anecdotally retention problems are prevalent in the larger centres, (the opposite problem from medical staff).
191. A number of nurses have reduced their hours to work part time, although they may increase their hours when asked to support team pressures. Change to reduced hours is said to be because of workload pressures, aging workforce, personal commitments for care of elderly parents and grandchildren, personal health issues and a desire to study. Recruiting for Monday to Friday positions is not generally a problem; it is more difficult to recruit to rostered shifts in Medical/Surgical areas.
192. The private sector has the same problems as the public sector, in addition to the part time nature of some of the ICUs and the sporadic nature and volume of contracts.

193. Recommendations

Key Recommendations

- The establishment of a National Cardiothoracic Nursing Workforce oversight group who will support the development and implementation of National and Local workforce strategies. This would also include targeted recruitment strategies to attract overseas nurses. This group could be a sub group of the already established Nursing Workforce Strategy Group.
- Consideration is given to each affected DHB having a designated (separately funded by MOH) senior nursing role dedicated to developing and maintaining a sustainable cardiothoracic nursing workforce. This senior nursing role would have connections professionally to the other senior roles in the other DHBs. These roles could develop a National Career Framework (linking into existing frameworks) for cardiothoracic nurses, outlining pathways to advanced nursing roles within the specialty.
- That best practice clinical/care pathways for cardiothoracic nursing are developed (where they don't exist) and applied across all DHBs, thereby mitigating the clinical risks where the skill level is low.

Further Recommendations

Short Term 0-1 years

- Each of the DHBs will have a comprehensive nursing workforce plan for all services, which will include a current state analysis of the nursing workforce with predicted trends out to 10 years. Will include strategies relating to dedicated expenditure of CTA funds to support development of cardiothoracic nurses.
- Lobby existing workforce (e.g. Future Workforce) strategy groups to look specifically at strategies for the development of “at risk” specialities, such as ICU nursing.
- Examine the feasibility of return to ICU/theatre programmes. Anecdotally nurses who leave these environments for any length of time often lack confidence to return.
- Establish and utilise core competencies for cardiothoracic nurses that can be shared Nationally and used to inform education programmes and linked to career pathways.
- Include NZNO in the development of strategies to address immediate risks around staffing and skill shortages in affected DHBs.
- Give consideration to the number of post graduate education providers in New Zealand who can provide specialty advanced nursing papers in Cardiothoracic Nursing. Consider the benefits of having two main providers.
- Consider the possibility of rotations, between and within DHBs.
- Consider opportunities to share staff between public/private providers, particularly during “down time”.
- Consider all settings for the placement of Graduate Nurses, support as cohorts and offer extra specialty support in CT nursing.

Medium Term 0-3 years

- Agree to CT nursing workforce benchmarks that can be applied and used to lever workforce best practice occurring in DHBs. Nurse Sensitive indicators and outcome measures to be identified and reported against.
- Identification of “rising stars”, succession planning focusing particularly on leadership roles
- Encourage DHBs to support and employ nurse assistants in the perioperative setting. Programmes are now underway at Manukau Institute of Technology with the Christchurch Polytechnic Institute of Technology commencing either July or beginning of 2009. This will increase the overall pool of theatre nurses.
- Engage in dialogue with the Critical Care Nurses Section (CCNS) and the Perioperative Nurses group. A recommendation from the Intensive Care Services In New Zealand report (2005) was that CCNS and the DHBs got together to develop a career pathway for ICU nurses

Longer Term 0-10 years

- Rotation of key roles amongst affected DHBs and internationally where possible, to share knowledge, skills and best practices.
- Development of Advanced nursing roles such as Nurse Practitioners in the cardiac specialty, particularly in Heart Failure and specialist theatre and ICU roles.

8.3 Cardiology

194. In most DHBs in New Zealand, cardiology services monitor and care for patients awaiting cardiac surgery whether inpatient or outpatient. Longer waiting times for cardiac surgery leads to more patients under the care of cardiology services. The effective monitoring of a large number of patients awaiting surgery can be a significant resource drain on cardiology services. Alternative models of care such as specialist nurse practitioners have been developed in many centres to improve the monitoring of these patients. However, the ability of any model of care to effectively monitor these patients diminishes as their number increases and can be undermined by other, often urgent and emergency demands on a cardiology service. Reducing waiting times for cardiac surgery enables better monitoring of those waiting and allows cardiology resources to be directed more appropriately to assessment and management of patients newly referred from primary care.
195. Cardiology services are also essential in the assessment of patients with coronary artery and valvular heart disease. These patients are then, when appropriate, presented at a weekly cardiosurgical conference for consideration of listing for cardiac surgery. These cardiology services are appropriately provided by a mixture of General Physicians and Cardiologists. The resources available to these specialists varies around New Zealand. A good marker of this variation is the level of provision of coronary angiography by each DHB. This is the test most frequently used to identify patients requiring cardiac surgery. It is of note that the provision of coronary angiography mirrors the provision of cardiac surgery in most DHBs in New Zealand. To increase the provision of cardiac surgery to an appropriate level throughout New Zealand, many DHBs will need to increase their provision of cardiology services to identify appropriate patients for cardiac surgery referral.

9. *Implementation*

196. The main focus of this report has been on recommending what should be improved in relation to the provision of cardiac surgery services. The next step will be to consider the implications, and refine and implement these recommendations.
197. The Working Group recommends that an implementation taskforce is established by the Ministry of Health to refine and lead implementation of the recommendations of this report. This will include a process of wider consultation.
198. The valued efforts of the clinical staff and management of DHBs will be essential in successfully implementing the recommendations of this report . The taskforce should aim to serve as a facilitator helping them overcome obstacles on the way to achieving the aimed for increase in publicly funded cardiac surgery in New Zealand.
199. It is also recommended :
- That the taskforce will ensure that key patient focused and throughput performance indicators are monitored closely
 - That each cardiac surgery centre develops strategies and plans to improve local performance and collaborate in a national production plan for each year to be developed with the Taskforce and reviewed with all of the DHBs, the Ministry and the Minister of Health
 - That the taskforce assists in identifying and resolving shared issues critical to the provision of enhanced cardiac surgery services.
 - That the task force ensure better information is obtained to clarify the place of cardiac surgery in managing heart disease, the degree to which this is being achieved in different parts of New Zealand, and to refine the targets for service delivery.

10. Appendices

Appendix 1

Working Group members

Name	Organisation	Role
Andrew Hamer (Chair)	Nelson-Marlborough DHB	Cardiologist / Chair of NZ Regional Committee of Cardiac Society
Paget Milsom	Auckland DHB	Cardiac Surgeon
Pam McCormack	Auckland DHB	Manager
Ralph Stewart	Auckland DHB	Cardiologist
Nand Kejriwal	Waikato DHB	Cardiac Surgeon
David Brydon	Waikato DHB	Manager
Barry Mahon	Capital & Coast DHB	Cardiac Surgeon
Cheyne Chalmers	Capital & Coast DHB	Director of Nursing
Peter Hicks/Bob Ure	Capital & Coast DHB	Intensivist
Paul Smeele	Canterbury DHB	Anaesthetist
Harsh Singh	Canterbury DHB	Cardiac Surgeon
Richard Bunton	Otago DHB	Cardiac Surgeon
Philippa Pringle	Mercy Hospital – Dunedin	Director of Nursing

Ministry Officials

Name	Organisation	Role
Ray Naden (Co-Chair)	Ministry of Health	Clinical Director, Elective Services
Sylvia Watson	Ministry of Health	Team Leader, Patient Flow Management
Gary Tonkin	Ministry of Health	Project Manager

Sponsor

Name	Organisation	Role
Karen Orsborn	Ministry of Health	Sponsor - Group Manager, Funding (with responsibility for Elective Services)

Appendix 2

The table below shows the number of discharges for CABG, Valve replacement and repair and CABG + Valve heart procedures by DHB of Domicile and year for people aged 15 years and over.

		Discharges by Region ²⁰ of Domicile						
Procedure	Financial Year	Auckland	Waikato	Capital & Coast	Canterbury	Otago	Overseas	NZ Total
CABG	2002/03	639	295	373	236	186	4	1,733
	2003/04	460	315	298	227	180	3	1,483
	2004/05	420	307	288	222	148	4	1,389
	2005/06	452	275	266	189	176	3	1,361
	2006/07	437	215	269	192	136	4	1,253
	2007/08 ¹	448	183	320	184	152	8	1,295
Valve Replacement and Repair	2002/03	194	80	140	82	23	1	520
	2003/04	202	102	119	71	47	6	547
	2004/05	192	112	153	59	39	5	560
	2005/06	191	106	119	84	31	2	533
	2006/07	246	101	127	65	41	5	585
	2007/08 ¹	239	137	143	80	43	4	646
CABG + Valve	2002/03	102	54	59	40	31		286
	2003/04	95	32	64	52	28		271
	2004/05	69	60	77	50	29	2	287
	2005/06	81	46	71	39	36	1	274
	2006/07	78	56	71	52	18	2	277
	2007/08 ¹	101	43	79	60	28	2	313
Total	2002/03	935	429	572	358	240	5	2,539
	2003/04	757	449	481	350	255	9	2,301
	2004/05	681	479	518	331	216	11	2,236
	2005/06	724	427	456	312	243	6	2,168
	2006/07	761	372	467	309	195	11	2,115
	2007/08 ¹	788	363	542	324	223	14	2,254

¹ Data extracted 21 August 2008 so 2007/08 data is provisional

²⁰ **Auckland** includes people living in Northland, Auckland, Waitemata and Counties Manukau DHB areas
Waikato includes people living in Waikato, Bay of Plenty, Lakes, Tairāwhiti and Taranaki DHB areas
Capital & Coast includes people living in Whanganui, MidCentral, Hawke's Bay, Hutt Valley, Wairarapa, Capital & Coast and Nelson Marlborough DHB areas
Canterbury includes people living in Canterbury, South Canterbury and West Coast DHB areas
Otago includes people living in Otago and Southland DHB areas

The table below shows the age standardised intervention rates for CABG, Valve replacement and repair, CABG + Valve, and total intervention rates per 100,000 population by DHB and year

The discharges are by region of domicile, with the population used being the normal catchment population for each DHB of Service.

Discharges/100,000 pop		Region ²¹ of Domicile – Age and Ethnicity Standardised Rate					
Procedure	Financial Year	Auckland	Waikato	Capital & Coast	Canterbury	Otago	NZ Total
CABG	2002/03	48	36	39	41	60	43
	2003/04	34	38	30	39	58	37
	2004/05	31	36	29	38	48	34
	2005/06	32	33	27	32	57	33
	2006/07	31	26	27	33	44	30
	2007/08 ¹	31	22	32	31	50	31
Valve Replacement and Repair	2002/03	14	9	15	16	8	13
	2003/04	14	13	12	13	17	13
	2004/05	13	14	16	11	14	13
	2005/06	13	13	12	16	11	12
	2006/07	17	12	13	12	14	14
	2007/08 ¹	16	16	14	14	15	15
CABG + Valve	2002/03	8	6	6	7	10	7
	2003/04	7	4	6	9	9	7
	2004/05	5	7	8	8	9	8
	2005/06	6	5	7	6	11	7
	2006/07	6	6	7	9	6	7
	2007/08 ¹	7	5	8	10	9	8
Total	2002/03	70	52	59	63	78	63
	2003/04	55	55	49	61	84	57
	2004/05	50	57	53	57	71	55
	2005/06	52	51	46	54	79	53
	2006/07	54	44	47	53	64	51
	2007/08 ¹	55	43	54	56	73	54

¹ Data extracted 21 August 2008 so 2007/08 data is provisional

²¹ **Auckland** includes people living in Northland, Auckland, Waitemata and Counties Manukau DHB areas
Waikato includes people living in Waikato, Bay of Plenty, Lakes, Tairāwhiti and Taranaki DHB areas
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Otago includes people living in Otago and Southland DHB areas

Appendix 3

Analytical Methodology

Data sources

- Inpatient data was extracted from the National Minimum Data Set (NMDS).
 - o All publicly funded cardiac discharges were included, including privately provided publicly funded discharges.
 - o ACC data was excluded
 - o Data was extracted by ICD 10 codes for cardiac surgical procedures, for the financial years 2002/03 to 2007/08. Data was refreshed on 21 August 2008, therefore data for the 2007/08 year remains provisional.
- Waiting time information was extracted from the National Booking and Reporting System (NBRIS).
 - o Data was refreshed on 8 September 2008, therefore data for the 2007/08 year remains provisional
 - o Waiting time data is for all Cardiothoracic surgery.
- International surgery numbers and population data obtained from the following websites
 - o **Scotland**
 - o **Data**
 - http://www.isdscotland.org/isd/information-and-statistics.jsp?pContentID=2446&p_applic=CCC&p_service=Content.show
 - Data in table OC5 at
 - http://www.isdscotland.org/isd/servlet/FileBuffer?namedFile=Operations_type_Council_OC5.xls&pContentDispositionType=inline
 - o **Population**
 - <http://www.statistics.gov.uk/census2001/pyramids/pages/179.asp>
 - o **United Kingdom**
 - o **Data**
 - <http://www.scts.org>. Society of Cardiothoracic Surgeons of Great Britain and Ireland (2006)
 - o **Population**
 - <http://www.statistics.gov.uk/STATBASE/Expodata/Spreadsheets/D9543.csv>
 - o **Canada**
 - o **Data**
 - <http://www.cihi.ca/hireports/search.jspa?language=en&healthIndicatorSelection=CABG&ref=http%3A//www.cihi.ca/hireports/SearchServlet&href=http%3A//www.cihi.ca/hireports/SearchServlet>
 - <http://www.cihi.ca/hireports/SearchServlet>
 - o **Population**
 - <http://www.cbc.ca/news/background/census/population-growth.html>
 - o **Australia**
 - o **Data**
 - http://www.health.nsw.gov.au/public-health/chorep/cvd_cvdprochos_table.htm.
 - o **Population**
 - <http://www.censusdata.abs.gov.au/ABSNavigation/prenav/ViewData?breadcrumb=LPTD&method=Place%20of%20Usual%20Residence&subaction=->

1&issue=2006&producttype=Census%20Tables&documentproductno=0&textversion=false
&documenttype=Details&collection=Census&javascript=true&topic=Population%20Size%
20%26%20Growth&action=404&productlabel=Age%20by%20Sex&order=1&period=200
6&tabname=Details&areacode=0&navmapdisplayed=true&

Where regional numbers and intervention rates have been provided, the information has been provided by DHB of patient domicile, grouped around the service unit to which people from those DHBs are usually referred. Therefore numbers given for:

- Auckland includes people living in Northland, Auckland, Waitemata and Counties Manukau DHB areas
- Waikato includes people living in Waikato, Bay of Plenty, Lakes, Tairāwhiti and Taranaki DHB areas
- Capital & Coast includes people living in Whanganui, MidCentral, Hawke's Bay, Hutt Valley, Wairarapa, Capital & Coast and Nelson Marlborough DHB areas
- Canterbury includes people living in Canterbury, South Canterbury and West Coast DHB areas
- Otago includes people living in Otago and Southland DHB areas

The inpatient analysis for this report was restricted to analysis of open chest procedures for CABG, valve repair and replacement, and CABG plus valve surgery, for patients aged 15 years and over. This is because:

- these procedures are the ones that are provided routinely by all the tertiary cardiac surgery centres
- there is significant variability between centres in levels of provision of these procedures
- the number of quaternary services is very stable, and there is only one provider of these services.

The standardised intervention rates are standardised on the basis of age and ethnicity

Estimation of the relativity between New Zealand data with international data was done by standardising New Zealand intervention rates to the different population age profiles of the relevant countries. This "Expected Rate" was then compared to the "Observed (ie actual) Rate to obtain an observed to actual ratio.

Comparison of population intervention rates is a relatively simple methodology to compare relative access to treatment, but can be difficult to interpret

The major assumption underlying the use of raw intervention rates is that levels of need are the same across different population groups. However, the need for cardiac surgery is dependant on a range of drivers including differences in age, gender, ethnicity and deprivation level. The profile of people in each of these groups varies between populations.

Standardising intervention rates takes account of such differences between different populations. Other influencing factors, such as rates of smoking, obesity and diabetes cannot be accurately incorporated into calculation of intervention rates.

Privately funded cardiac surgery, and alternative revascularisation treatments (eg angioplasty) are not included in this analysis, and are likely to differ between regions. This means that the intervention rates as given show a partial view of total revascularisation services

11. References

Brieger D, Elsik M, Gore JM, Knobel E, Nussbacher A, Piegas LS, Allegrone J, Anderson FA, Avezum Á, on behalf of the Global Registry of Acute Coronary Events (**GRACE**) investigators. Predicting coronary artery bypass graft surgery in acute coronary syndromes. *EuroIntervention* 2007;2:452–458

5-year outcomes in the **FRISC-II** randomised trial of an invasive versus a non-invasive strategy in non-ST-elevation acute coronary syndrome: a follow-up study
Bo Lagerqvist, Steen Husted, Fredrik Konrny, Elisabeth Ståhle, Eva Swahn, Lars Wallentin, The Fast Revascularisation during InStability in Coronary artery disease (FRISC-II) Investigators
The Lancet - Vol. 368, Issue 9540, 16 September 2006, Pages 998-1004

Citation: Intensive Care Clinical Advisory Group. 2005. Intensive Care Service in New Zealand: A report to the Deputy Director-General, Clinical Services. Wellington: Ministry of Health.

Sources DHBNZ Health Workforce Information Project Base Data Report (snapshot 30 June 2006 & 2007) (*Source New Zealand Nursing review July 2008 vol. 9 issue 3*)

NENZ DHB Nurse Leader Response to Nursing Review Jocelyn Peach on behalf of Nurse Executives of New Zealand, 12 April 2008

Needleman, J. Buerhaus, P. I., Mattke, S., Stewart, M. & Zelevinsky, K. (2001). Nurse staffing and patient outcomes in hospitals. Final report US Department of health and human services. Harvard school of public health.