

# Cardiac Surgery Service Waikato Hospital



[www.waikatodhb.health.nz/cardiac](http://www.waikatodhb.health.nz/cardiac)

## Mortality, Morbidity and Annual Report January 2010-January 2011

Surgeons : Mr Adam El Gamel (AEG), Mr Grant Parkinson (GP)  
Mr Nand Kejriwal (NK), Mr Ravi Ullal (RU), Mr Zaw Lin (ZL)



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## Introduction

Albert Einstein once said *“The whole of Science is nothing more than the refinement of everyday thinking.”* Over the past year, we in the department have strived to this belief that every day’s hard work and miniscule refinements will bear the fruits of its burden in the future.

It gives us pleasure to amalgamate the work of 2010 and present the improvements and progress to provide quality cardiac surgical care to the population of this country. General awareness of the services provided has had a positive effect in the incremental increase of the numbers of acute and elective patients.

In the 2010 calendar year, we performed 617 surgical procedures, a significant increase of 57 per cent to the previous year.

The overall mortality for these surgical procedures was 4.5 per cent. This figures dominated by complex aortic surgeries and valve surgeries with end stage cardiac disease, which serves as an ominous reminder that there is still a lot of improvement, and development required in this field of cardiac surgery.

As a service, we believe; what we’ve performed through our endeavours is part of an overall greater achievement of what is yet to be done.

The task still ahead a mountain, the summit though approachable, is daunting. But with every small step forward what we seek appears nigh.

This is the first annual report of Cardiac Surgery at Waikato Hospital that meets the demands for tertiary services of a catchment area of just under one million people within the Midland region. [www.midlanddhbs.health.nz](http://www.midlanddhbs.health.nz)

Hamilton is a city of constant change and innovation and is steeped in farming, commerce, manufacturing, tertiary academia, technology and healthcare.

Its cardiothoracic surgery department has five surgeons whose work is supported by a skilled team of junior medical staff, nurses, perfusionists, anaesthetists, management and clerical staff. Cardiac surgery is (arguably) the most demanding, innovative and technological branches of surgery. The team does, not only meet the demands of international standards of quality, they are exceeded.

The presentation of surgical results for public scrutiny for the first time is a courageous, but inevitable, step in a world where there is increasing public awareness and regulation of healthcare.

International recognition in developed healthcare economies indicate that it is no longer acceptable to practise cardiac surgery without collecting robust data to allow for risk-adjusted analysis and audit of results.

Reports demonstrate a responsible and professional approach to quality assurance and improvement, and provide a solid platform, which enables surgical groups to help healthcare funders and providers, allocate appropriate resources for service development for the benefit of patients. Effective quality assurance is further enhanced by reference to national or international standards.

## Annual Report 2010

This annual report emphasises the capture of data, which can enable risk stratification and outcome analysis. The data collected and presented has been based on the minimum dataset of the Society of Cardiothoracic Surgeons of Great Britain and Ireland. <http://www.scts.org/sections/society/index.html>

Future data collection will prove more comprehensive and meet if not exceed, international standards.

In the future, the data will yield increasingly important epidemiological information about our patient population. The report will provide insight into the clinical activity in cardiac surgery, and chart progress in measuring and reporting risk-adjusted outcomes for our patient population.

Presenting this information on an annual basis will ensure that important changes in the nature of disease treatment by cardiac surgery are observed in a timely manner.

Community access to these annual reports will reassure that our service quality and outcomes are being effectively monitored using international standards.

This data should provide reassurance for patients, clinicians, managers and commissioners of services at Waikato Hospital that the cardiac surgery programme is safe, and that the unit is actively looking to monitor and improve its standards.

## Cardiothoracic Surgery Waikato Hospital

The Cardiothoracic Surgery service is based at Waikato Hospital, a tertiary centre with the full range of specialities including a Midland regional trauma service and a clinical school.

The Cardiothoracic Surgery provides tertiary adult services within the specialty for a population of just fewer than one million people. Paediatric cardiac surgery, cardiac transplantation and oesophageal surgery services are provided at other specialist centres in NZ.

## Facilities

- Two operating theatres (OT) with 14 sessions per week are allocated to cardiothoracic surgery. Thoracic surgery uses two of those sessions every alternate week.
- The Intensive Care Unit (ICU) is adjacent to OT and has 15 beds in two separate units. Unit 1 of four beds, although not exclusively, are utilised for post cardiac surgery patients. Currently the 15 bed ICU has enough nursing staff resource for 11 beds during the week and nine beds over the weekend. Accredited intensivists provide a “closed” unit for the care of the postoperative patients. Cardiac surgical input is on an as required basis.
- The High Dependency Unit (HDU) has 12 beds and the cardiothoracic team, with input from other support specialties as necessary, provides care.
- The postoperative ward (Wd 14) is 36 beds shared with Vascular surgery. Generally Cardiothoracic surgery utilise 24 of the beds including exclusive use of a four “high-dependency” area for patients transferred from ICU and 12 ward beds for cardiac surgical patients.

## Referrals

- Acute cardiology inpatients from are referred directly via the Clinical Nurse Specialist (CNS) or the surgeon, or via the Cardiology conference if complex, and once accepted and ready for operation are scheduled according to clinical need and are done within the next few days.
- Elective patents are referred via a centralised referral centre and are seen at outpatients' clinics for review.
- A CNS manages the elective wait list and all patients have their operation well within the MoH parameters.

## Conferences

- Cardiothoracic surgeons attend the Cardiology Conference each Friday and the Chest conference each Wednesday for case presentations and accept referrals for either acute inpatient or elective surgery on behalf of the service.
- Formal multidisciplinary audit and mortality and morbidity meetings are held four times annually.

## Clinics

- +/- 30 referrals are a received every month for elective surgery
- Four clinics for referred elective cardiac and thoracic patients and one registrar follow-up clinic each week.
- A preoperative cardiac assessment clinic will be held on alternate weeks.



## The Team

### Mr Adam El Gamel, Clinical Director

Commenced in January 2010, after a serendipitous phone call advising of short listing for a position unaware had been applied for. A visit to the mighty Waikato sealed the deal.

<http://www.waikatodhb.govt.nz/news/pageid/2145849119>



#### Previous experience:

- Performed thousands of the full range of cardiac and thoracic surgical procedures with excellent results reported by the British Society of Cardiothoracic surgeons.
- Presented and invited speaker at many international conferences over at least two decades.
- Countless publications including chapters in several books.
- Specialised trainer and examiner for medical students, questioner setter for final examinations, and was active in postgraduate training of junior medical staff in new developments of beating heart operations and minimally invasive procedures.
- Primary investigator in a number of clinical trials
- Developed bloodless cardiac surgery for Jehovah Witness patients, and ventricular assist programme.
- Established new surgical approaches to heart failure and atrial fibrillation
- Clinical Governance, Clinical audit and Infection control lead.

### Mr Ravi Ullal

Commenced two months after the service was established 1989 and was one of the two founding surgeons.

Preferring an adventurous rather than conservative approach to clinical practice established:

- Mammary and radial artery harvesting
- Retrograde cannulation
- Videoscopic thoracic surgery
- Warm blood cardioplegia
- Off –pump surgery



His active support of his Cardiology colleagues enabled the beginnings of the Cardiology intervention programme.

Clyde Wade says of Ravi “His skill, energy and commitment to the unit has undoubtedly ensured its success”

Ravi retired in January 2011, and his days are now filled with golf, gardening, tennis, enjoying his family and looking after his two cats and two dogs.

In 2011 he will be returning to the operating theatre on a casual basis to cover the period of time between appointment and the commencement of the new surgeon

### **Mr Grant Parkinson**

Commenced in the department in 1996, Grant has maintained a particular interest in reducing medical misadventure and cardiac surgical morbidity.

Adam El Gamel says of Grant “he will readily assist his colleagues with the prolonged and complex case in operating theatre”

Responsibilities:

- RACS Cardiothoracic registrar trainee supervisor
- Non- trainee registrar supervisor
- Cardiothoracic house surgeon supervisor



### **Mr Zaw Lin**

Commenced in February 2000.

Maintains a general interest in adult cardiac and thoracic surgery.

Responsibilities:

- Facilitating journal club
- Development of the initial audit and database programme.



### **Mr Nand Kejriwal**

Commenced in 2006 after working here as registrar.

<http://www.waikatodhb.govt.nz/page/pageid/2145864364>

Particular interests:

- Transapical aortic valve implantation
- Surgical ablation for atrial fibrillation
- Mitral valve repair
- Hybrid aortic procedures

Additional responsibilities:

- Senior lecturer in Surgery, University of Auckland
- Supervisor of Cardiothoracic training for 3 years
- MOH Cardiac surgery clinical network for 2 years
- Journal Reviewer, Heart lung & Circulation
- Interviewer for Advanced Cardiothoracic training, RACS



## Annual Performance and Resource Utilisation

During the period 19 January 2010 to 19 January 2011, 617 patients had cardiac surgical operations. This performance was achieved against a target of 500 cases.

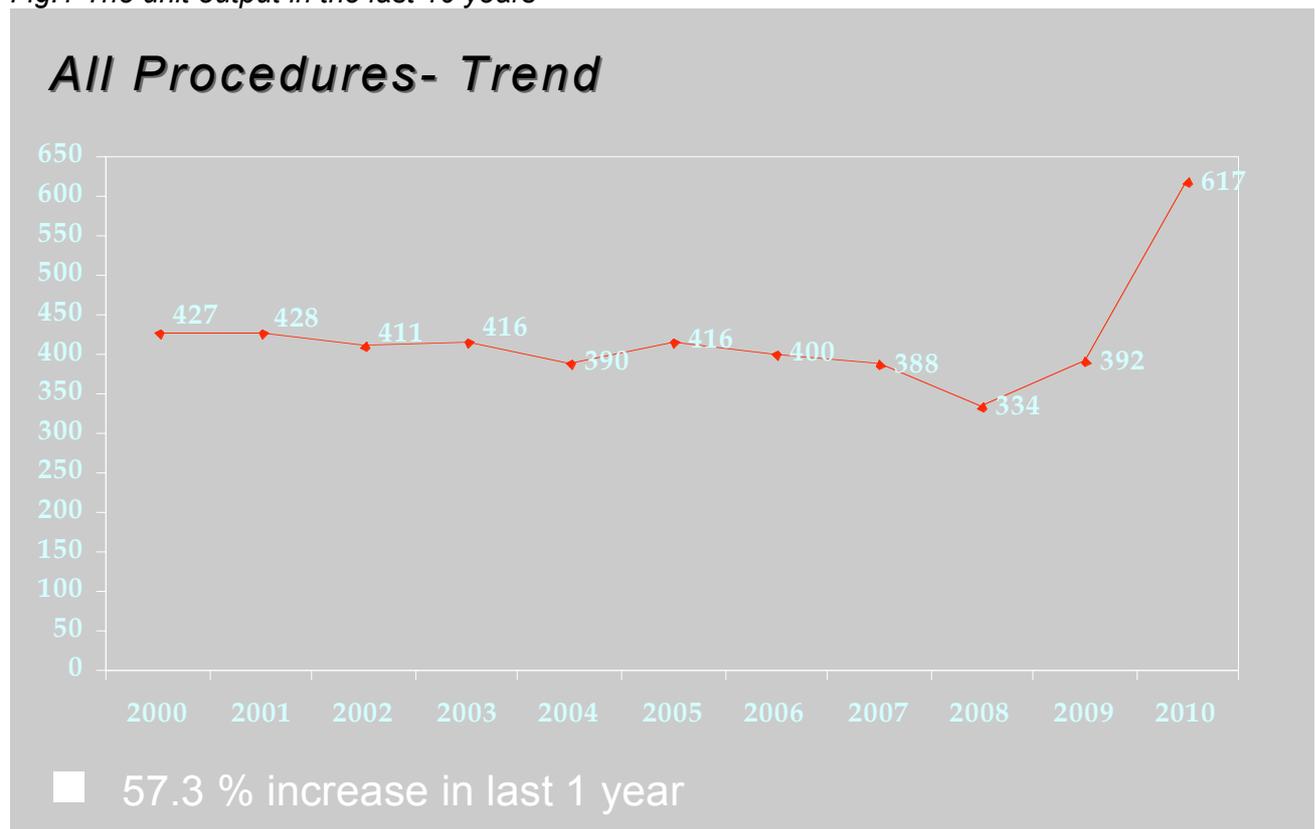
With an assumption of performing three cases per operating day, the complexity of staff resource, access to 14 sessions of cardiac operating theatre for five days a week in real terms provides maximum capability of 500 cases per year,

Given patient complexity and other constraints that precluded the ability to perform three operations per day, 2010 has seen the highest recorded number to date with over 620 cases performed.

This achievement is not to be underestimated and is testament to the dedication of colleagues in anaesthesia, intensive care, perfusion, nursing and clerical staff whose flexibility and tenacity enabled the provision of service for the clinical demand despite resource restraints.

Figure one below chart the last 10 years out put through the Unit highlighting 57.3 per cent increase from last year's output. (Fig1)

Fig:1 The unit output in the last 10 years



Did we use our resources efficiently?

The main efficiency drive was directed to reduce waiting time for patients. The impact was felt across bed utilisation and hospital stay. We have managed to maintain the positive direction with our waiting time according to the weekly report MoH (Fig 4)

## Theatre Utilisation

We have optimised the use of theatre time available to us for elective cardiac work.

57 hours / week for 44 working weeks a year average 2530 hours of operating time per. All hours have been utilised in 2010 with 20 per cent increase from 2009 to accommodate 57.3% increase in the throughput. The mean operating time /case has decreased from five hours in previous years to 3.5 hours in 2010. (Fig 2)

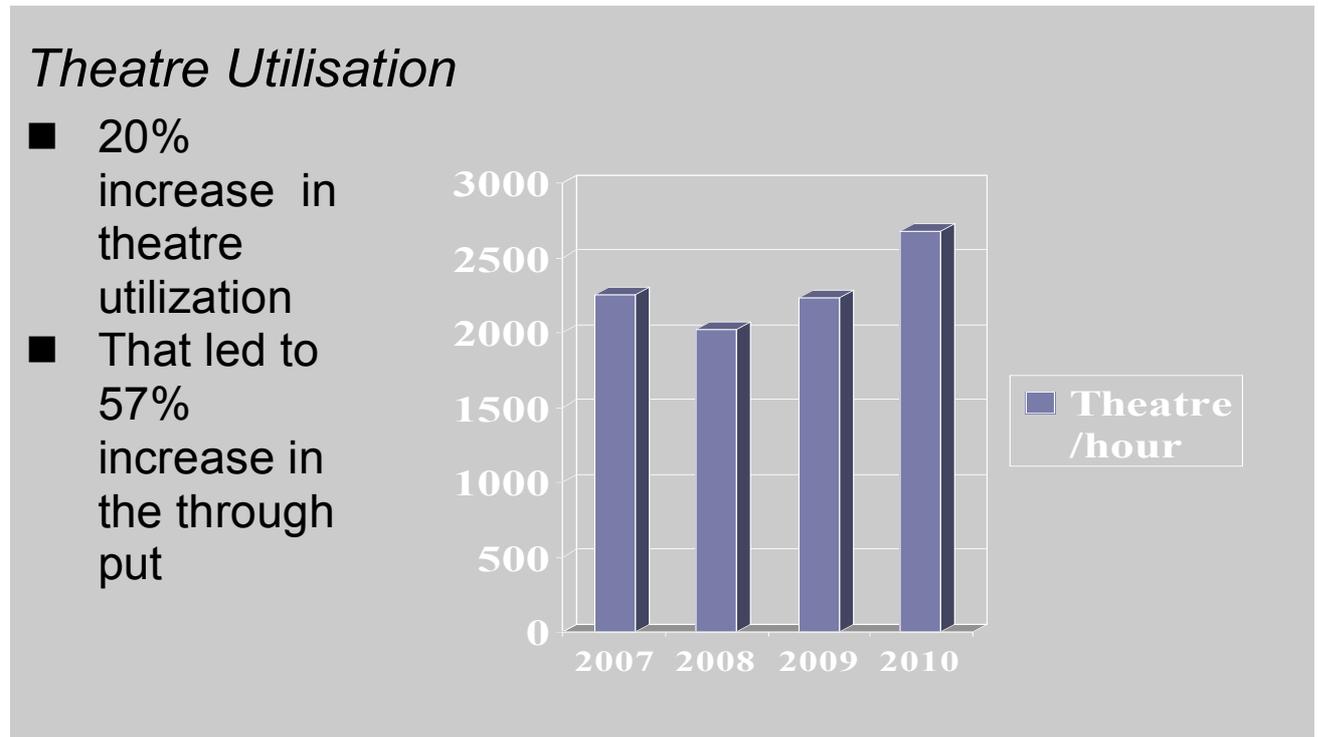


Fig:2 Theatre Utilisation

## Mean Operating Time /Case

Reduction in operating time /case help to increase the through put

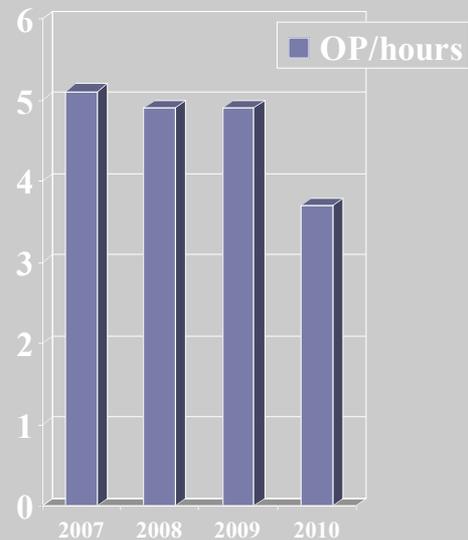


Fig:3

### Bed Utilisation and Hospital Stay

The number of beds used / months to provide the service has only increased by 12 per cent from previous years with a 57.3 per cent increase in patient numbers.

In 2009 on average 2.1 patients used a bed /month year

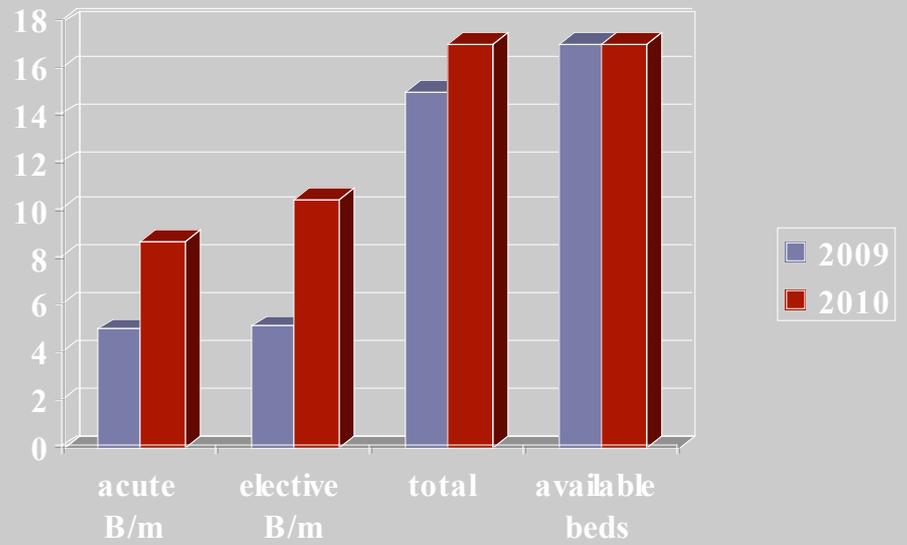
In 2010 three patients used a bed/month ( Fig 4)

Fig: 4

## Beds Utilisation / Months

■ 2009  
392 patients  
used 15/17  
bed/month  
88% BU

■ 2010  
617 patients  
Used 17/17  
100% BU



Data provided by **Claire Forsythe**, Business Analyst 'Programme Management Office Health Waikato



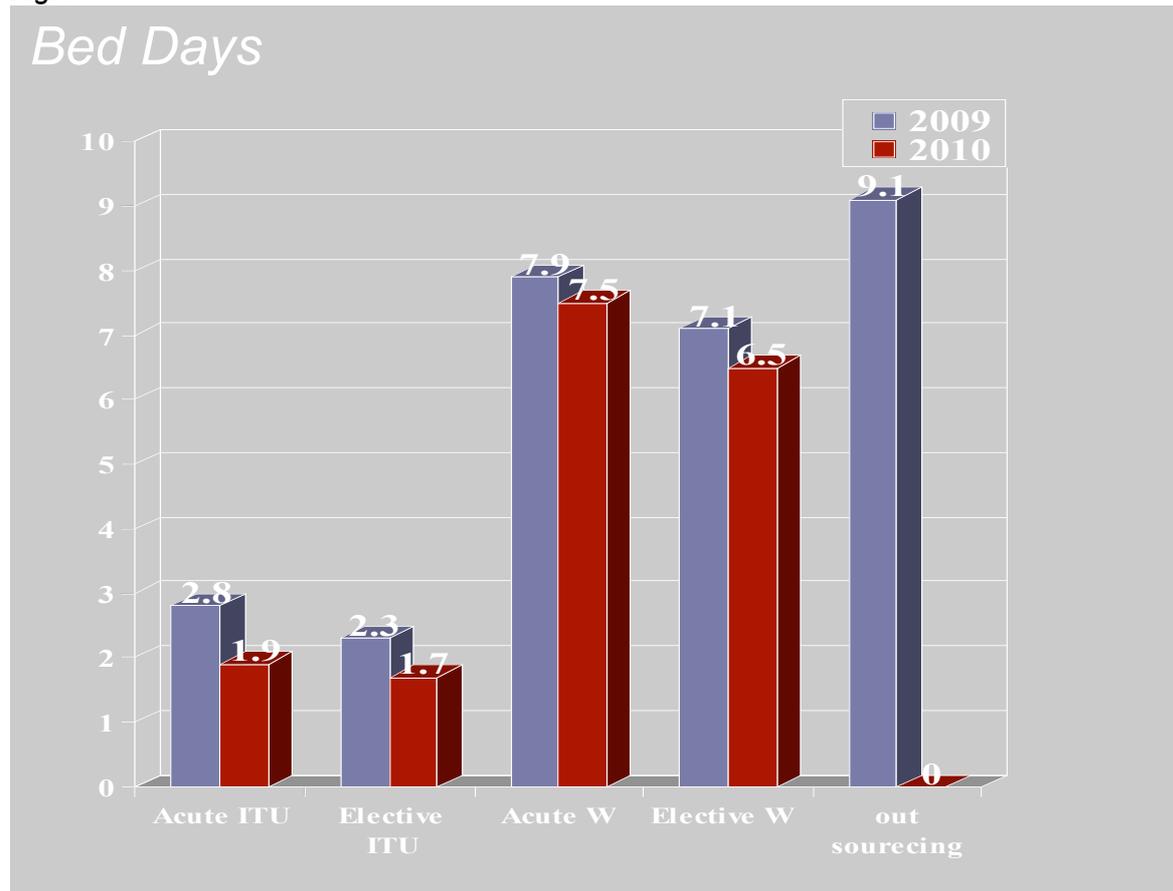
### Hospital Stay (LOS)

Achievement of 30 per cent reduction in ICU stays per patient and 10 per cent reduction in LOS per patient for the year 2010.

Further reduction is anticipated with full utilisation of preadmission clinic and same day cardiac admission to be introduced 2011.

The requirement for expensive outsourcing to cope with backlog and patients flow has been eliminated. (Fig5)

Fig:5



Contract and MoH national targets this data are monitored and reviewed by MoH on a weekly basis.



## Cardiac Surgery National Report (Week Ending 30 January 2011)

In the week ending 30 January 2011, DHBs delivered 45 operations against a plan of 50 operations.

For the year to date, 1477 operations have been provided against a plan of 1596 operations, or seven per cent behind target.

For the same period in 2009/10, there were 1419 (or four per cent fewer) procedures reported to the national collections.

Auckland DHB is on target for the week and remains nine behind the year to date target.

Waikato DHB is on target for the year to date. The waiting list is reducing.

Capital & Coast DHB is on target for the week but behind for the year to date. The number waiting has reduced slightly. The DHB will increase its planned delivery from 7 February to 12 cases per week.

Canterbury DHB remains behind delivery with the waiting list starting to increase. The cardiac angiography recovery plan is underway.

Otago DHB is ahead of plan and has started to reduce its waiting list. Dr Hamer continues to work with the DHB to streamline referral and scheduling processes.

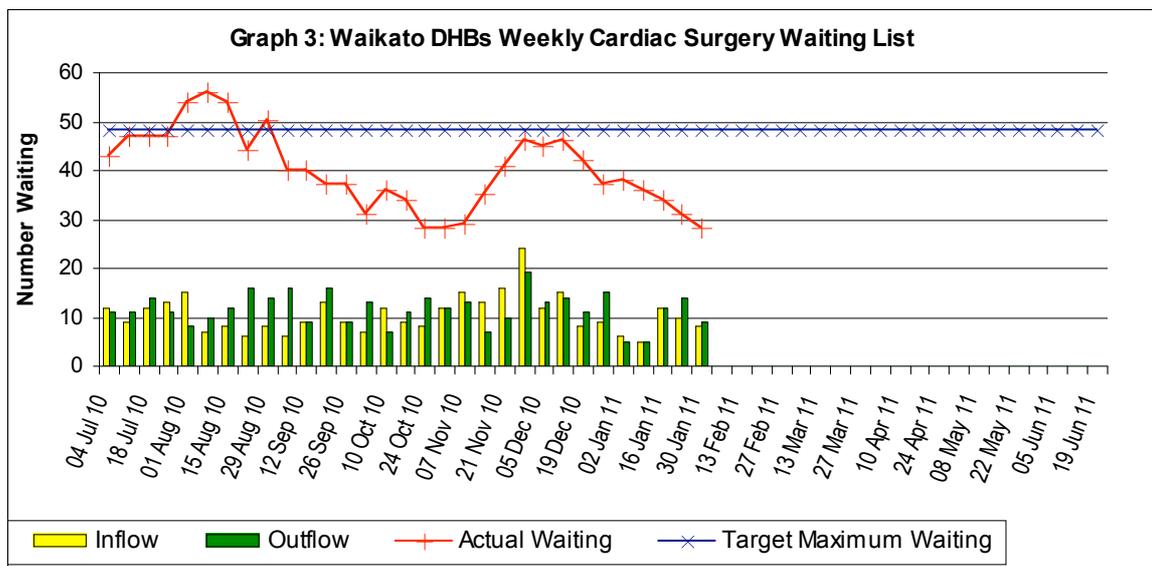
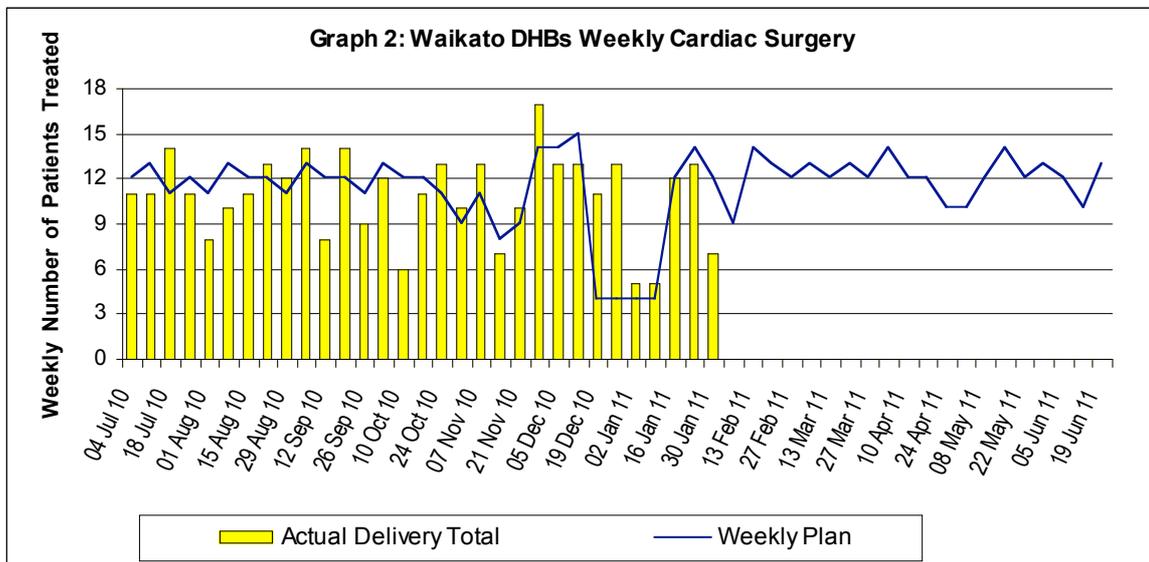
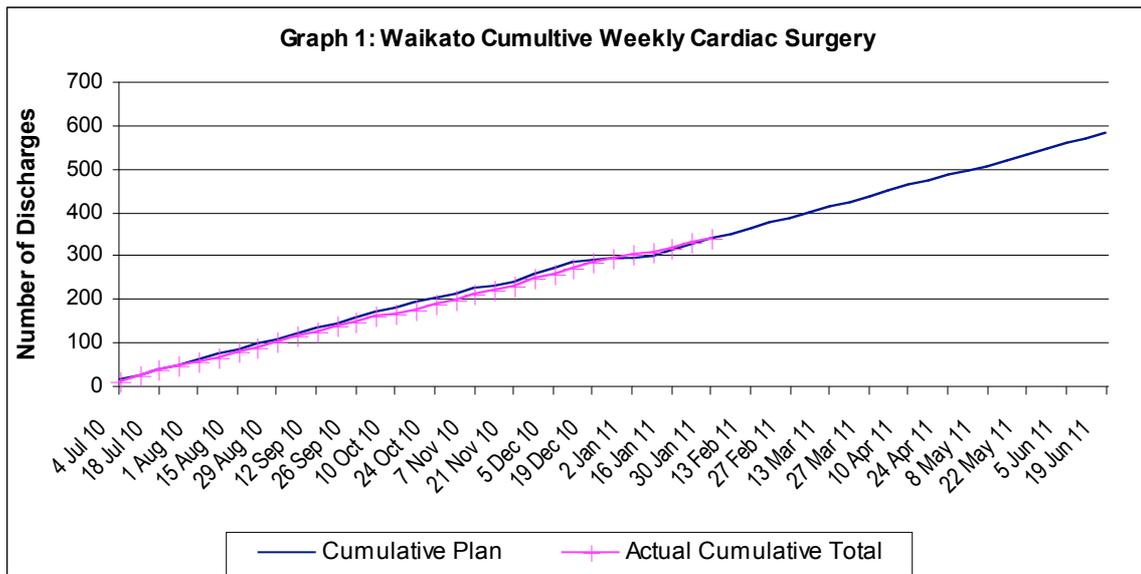
Table 1: Cardiac surgery results for week ending 30 January 2011

DHB	YTD planned	YTD actual <sup>1</sup>	YTD variance	Weekly agreed plan	Weekly actual (internal data)	Number waiting	Change from last week (+inc / - dec)	Max no.waiting <sup>2</sup>
Auck	551	542	-9	19	19	47	-6	81
Waik	337	337	0	12	7	28	-3	48
C&C	372	297	-75	8	8	49	-4	60
Cant	225	171	-54	8	6	18	+3	35
Otago	111	130	19	3	5	41	-3	25
<b>Total</b>	<b>1596</b>	<b>1477</b>	<b>-119</b>	<b>50</b>	<b>45</b>	<b>183</b>	<b>-13</b>	<b>249</b>

<sup>1</sup> YTD actual is as reported by DHBs.

<sup>2</sup> "Maximum number waiting" is the maximum number of patients a DHB should have, consistent with treating all patients within a clinically appropriate timeframe. It is assumed at 10% of the DHB's full year target, with the exception of Auckland and Capital & Coast where the actual number has been agreed.

# Waikato Results



## In Summary

Introducing a common referral triage and waiting list, managing weekly referrals to avoid bed blockage, reduction of pre-op hospital stay for both in-patients and electives has improved through put and optimised bed use.

With two beds /month increase, a 57 per cent increase in patients through put is achieved, with reduction in ICU and ward stay despite increasing complexity of cases, and low wait times are achieved.

## Cardiac Anaesthesia

**Dr M P Lala**  
**Chief of Cardiac Anaesthetists**

Dr B Chan, Dr R Griffiths, Dr G Hopgood, Dr D Kibblewhite, Dr M Lala,  
Dr J Lau, Dr A Munro, Dr A Rudman, Dr S Robinson



The Cardiac Anaesthetists after some difficult beginnings this year have developed into a strong and unified group.

The achievement of 600 cases for the year has occurred as the result of a co-operative effort by all groups in the cardiac surgery environment, together with the arrival of the new Director of Cardiac Surgery, Mr Adam El Gamel.

Cardiac anaesthesia has undergone subtle changes over the 22 year history of the Unit, which when considered in a yearly timeframe seem minimal, but when considered over the total 22 years are significant.

These changes have occurred as the result of the changing nature of the patient population, i.e. increasing age and co-morbidities, pre-operative cardiological interventions and medications, the complexity of the surgery undertaken, and in more recent times the need for a more co-operative approach between cardiac surgeons, cardiologists, and vascular surgeons. Of equal importance in an effort to contain costs and increase throughput, modifications have been needed in anaesthesia to effect a more rapid transit time through theatre, ICU, and Ward 14 recovery.

The key areas where changes have occurred, and continue to occur in cardiac anaesthesia are:

1. The increasing workload of complex percutaneous valve procedures carried out in the Catheter Laboratory.
2. Pharmacological and mechanical support of the failing heart.
3. Monitoring of the cardiac surgery patient.
4. The treatment and monitoring of haematological abnormalities associated with or the result of cardiac surgical intervention.
5. The need for a multi-disciplinary team approach.

Of these, monitoring of the patient continues to become increasingly complex. Cardiac Anaesthetists have as their defining feature an expertise in transoesophageal echocardiography. Every patient undergoing cardiac surgery is monitored with real time 2D echocardiography. This modality not only monitors the patient, but can also guide the surgeon in the location and treatment of complex disorders. This year will see us move from two dimensional to three dimensional echocardiography; a significant advance to aid in the surgical treatment and monitoring of patients.

It should not be forgotten that Cardiac Surgery is a high risk procedure performed by a multi-disciplinary team using complex tools and technologies. Efforts to improve patient safety and reduce human error for cardiac surgical patients have been ongoing for more than a decade, yet the literature provides little guidance regarding best practice for hazard identification, and intervention to effectively reduce risk.

The Society of Cardiovascular Anaesthesiologists F.O.C.U.S. initiative (flawless, operative, cardiovascular, unified, systems) is a complimentary and co-operative effort designed to raise the bar for patient safety through human factors engineering.

The system analysis being the study of the organisation, interactions and interdependencies of people, information resources, equipment, and procedures as they work toward a common good: safely operating on a patient; and human factors engineering being the study and redesign to environments and processes to assure safer more effective and more efficient use by humans. As our environment within the operating theatre continues to become more complex we watch with interest the developments in the F.O.C.U.S. initiative.

As a unit we have in the past year seen major changes in assessment and scheduling of patients, intra-operative care; ICU treatment, and ward rehabilitation.

Education and Audit are a major part in ensuring patient safety in treatment. As cardiac anaesthetists we have an added responsibility in maintaining expertise in cardiac anaesthesia, transoesophageal echocardiography, as well as our general departmental responsibilities. We partake in a regular two monthly echo, audit and education session, and attend regular revision courses and conferences. We also participate in the cardiac surgical audit within the surgery department.

It is appropriate to recognise and acknowledge the work done by Mr Adam El Gamel as Director of Cardiac Surgery, and his cardiac surgical colleagues in the hard work done over the past year, as well as the co-operative effort of the nurses, perfusionists, cardiac technicians, and the unseen personnel who ensure the continuous and smooth flow of patients.

Finally I would like to acknowledge that we now have a group of cardiac anaesthetists, whose breadth and depth of knowledge of all things cardiac will serve us well for the types of procedures and the nature of patients that will be presented in the future.

## Perfusion Services

### **Jon Van den Berg. Charge Perfusionist**

The workload of the perfusion service has increased significantly over the last year. The three fulltime perfusionists, Jon Van den Berg, Emma Peplow and Mark Greaves with the ongoing commitment of locum Jack Bhana, provided support for 617 cardiac surgery procedures in 2010 compared with 392 in 2009.



60 patients received Intra-aortic balloon pump support, up from 48 supports in 2009 and there was significant increase in the number of standby calls from the Cardiac Catheter Lab.

Three patients were supported in the intensive care unit with Extra-Corporeal Oxygenation and 2 patients received Isolated Limb infusion procedures for melanoma treatment.

Eight patients received Hyperthermic intra-peritoneal post-peritonectomy chemotherapy treatment in 2010. This service has been developed over the past three years in conjunction with the General Surgery dept. Waikato Hospital is the only centre to offer this treatment in New Zealand. Literature reports this procedure improves the five year survival rate to 80 per cent for patients with bowel cancers, in particular pseudo-myxoma.

The procedure is subject to ongoing review and development and there is expectation the workload will increase to one procedure all day procedure per month.

For the first time, one cardiac case was cancelled because ECMO support was required in the ICU and a Perfusionist needed to remain onsite.

Two Datascope fibre-optic intra-aortic balloon pumps were commissioned at the end of 2010 and will provide superior support to acute cardiac patients and require less input from Perfusion staff once support has been initiated.

A third cell-saver unit was brought into service further decreasing the donor blood transfusion rate for Cardiac Patients.

The Perfusion dept work area was downsized by almost half due to the construction of a corridor through the existing space resulting in an isolated workspace. Backup equipment was moved into the theatres as a result. The department will move to larger interim space March 2011.

The perfusion team attended British/ UK Society of Perfusion Conference, The National Cardiac Surgery Meeting, Rotorua, Perfusion Downunder meeting Queenstown, and The American Society of Perfusion conference in Reno Nevada.

The department continues to provide lectures and ongoing education to allied groups.

In 25 weeks of the 2010, staff were on non-work injury Accident Compensation leave, which created significant staff shortage during a time when workload increased. To compensate, the services of a Locum Perfusionist were extended, the ability to take leave was limited, and there was increased workload and on-call duties for remaining staff. The commitment and flexibility are outstanding features of the team and this is not to be underestimated. Jack Bhana joins the team as a full time employee in 2011.

Jon Van den Berg celebrated his 20<sup>th</sup> year in the dept

## Nursing

### **Barbara Roberts. Clinical Nurse Specialist Cardiac theatre.**

The nursing staff in cardiac theatre has risen to the challenge of change and has worked hard to manage the increased case load from 392 cases in 2009 to 617 year ending 2010.

There are nine nurses with a seven RN and two EN mix, working both full and part time and 176 years of theatre experience between them.

Some of the instruments are 20 years old and this year were condemned and replaced throughout year. Surgeon specific instruments have also been purchased.

The nursing team has included a new graduate nurse for the first time and have embraced the new role of RNFSA.

2010 has been an exciting time of very positive change and the challenge of 2011 and beyond is welcomed. Thank you to all the nurses for going the extra mile.

Congratulations to Barb Roberts who with 36 years of theatre experience has been working in cardiac theatre since the day it opened.



### **Jacque Roberts RNFSA**

Under the mentorship of Adam El Gamel, I commenced training in July 2010 to become a Registered Nurse First Surgical Assistant (RNFSA) for Cardiac Theatre. My previous experience in Cardio-thoracic and Vascular, Orthopaedics and PACU has all been at Waikato Hospital.

The role of RNFSA is part of a national pilot based on academic study from University of Auckland and practical training that working alongside surgeons and registrars and directly assisting the surgeon in a theatre. The RNFSA role is also able to assist in the control of bleeding, providing wound exposure, suturing, and other surgical tasks.



Currently I am training to harvest vein conduits for cardiac bypass surgery, and learning to assist the surgeon with cannulation for bypass and valve surgery.

I recently harvested my first vein autonomously.

The team of professionals in the cardiac theatre setting have been very encouraging, patient and have provided a wealth of knowledge and intra-operative clinical skills to train me at the highest level, and for this I am grateful.

I am working towards completing the post graduate diploma in Health Science and have completed one paper on clinical assessment and diagnosis.

In 2011 I will complete two papers, the first a biological sciences paper followed by a RNFSA specialty paper

My role in cardiac theatre is a first for Waikato Hospital and I will complete my training in 2012.

### **Alison McAlley - CNS. Elective Cardiac services**

2010 has been a year of growth for cardiac surgery at Waikato Hospital, not least for the elective service.

A significant increase from previous years, approximately 50 per cent of the 600 + cases were from the elective waiting list.

iPm reports demonstrate a median waiting time of 48 days.

We have been working hard to assure equity of access for all patients across the Midland region.

Average waiting times range from 53 to 64 days.

- Waikato DHB            56 days
- Lakes DHB             64 days
- Bay of Plenty DHB    61 days
- Tairāwhiti              55 days
- Taranaki                53 days

Operations involving single valve have shown to have shorter waiting time e.g. Mitral valve repair with an average wait of 47 days

More complex procedures eg those involving ascending aorta wait longer, with an average wait of 75 days.

This is influenced by a number of factors including psychosocial needs of patients, challenges with achieving dental clearance and limitations on Organisational resources required for an optimal outcome including Theatre, Intensive Care and post op ward resources.

Significant effort is put in to scheduling of patients to maximise our limited resources and we have sought to maintain a level of twelve operations per week.

There is a commitment to scheduling 50 per cent of the weekly list with elective pts with an aim for the coming year is to increase to 15 operations per week, which will likely place further demands for elective patients.

Cancellations are at times unavoidable and there is a commitment to NOT send people home if at all avoidable, rather reassessing schedules to accommodate patients according to their clinical need.

There has been introduced an algorithm for these instances and the Clinical Nurse Specialists are the primary point of contact at these times.

Looking ahead to 2011, we would like to reduce the outpatient waiting time, that is the time from referral to first clinic visit. We would also like to address preadmission and look towards same day admission for selected patients.



### **Ruth Aspden - CNS Acute Cardiac Services**

The position covers two specialties of cardiology and cardiac surgery. Approximately 150 cardiology and 20 inpatient cardiac surgeries each month are received from the Midland region and via ED.



#### **Cardiology**

- All patient data from referral is entered onto the acute theatre list
- All referred patients are triaged daily for prioritisation of intervention.
- Cath Lab schedule for 2 labs is established at the end of each day and confirmed the following morning.
- Management of the safe and timely transfer of patients in regional hospitals
- Maintain database of Midland regional patients for quality assurance and audit.

#### **Cardiac Surgery**

- Facilitation of the process with Cardiac surgery registrars to ensure workup of the inpatient prior to cardiac surgery.
- Management of pre operative investigations and completion of EURO score
- Direct liaison with the surgeon for changes in priority of acute patient.
- Schedule inpatients for cardiac surgery in liaison with CNS and surgeons.

#### **Key aspects of the role:**

- Establishing and maintaining contacts with key people in the regional hospitals to ensure guidelines appropriate and safe and timely transfer.
- Work in liaison with the CNS (elective) covering annual leave
- Resource to nursing and medical staff.

This is a busy role and the workload has increased significantly over 2010. It is now well established and has well demonstrated that it has reduced wait times for procedures, dramatically reduced cancellations and delays and overall improved the patient flow through both the Cath Lab and cardiac surgery

### **Helen Sutton. CNM Wd 14**

2010 has been a very busy year for ward 14. There has been an increase in the number and complexity of the patients through the ward with an average of 15 admissions, discharges or transfers in any one day.

Bed numbers have increased from 32 beds to 36 beds making Ward 14 a six bedded Cardiothoracic and Vascular unit and a 30 bedded Cardiothoracic and Vascular ward with eight telemetry beds.

We are tertiary referral centre for Midland region for all three specialties and patients are scheduled on theatre lists five days a week.

Nurse resource has had it difficulties with seven senior nurses on parental leave, one secondment and six staff nurse resignations and with the increase in staff for the extra beds eighteen new staff nurses have been orientated to our team in 2010.



### **The Ward 14 team comprises of:**

- Clinical nurse Manager – Helen Sutton
- Associate Clinical nurse manager – Maggie Hicks
- Nurse Educator – Debbie Trail
- 55 nurses – 53 staff nurses and two enrolled nurses.
- four health care assistants
- three receptionists

We have 23 senior nurses (working in unit area) plus five on maternity leave

- 14 intermediate nurses (orientating to unit area)
- four junior nurses consolidating CTV expertise planning to be unit certified by end of 2011.
- four Net P nurses (first year post graduation)

### **Plans for 2011**

- Increase the acuity of the patients we manage in our unit area taking day of surgery off-pump patients with arterial lines within the first quarter.
- Introduction of the Post graduate Certificate in Cardiac Nursing
- Established Productive Wards with staff members improving placement of equipment and resources to increase the amount of time nurses can spend with their patients.
- Pilot ward for the centralised rostering project beginning in Feb 2011.
- Update all patient information booklets by the end 2011
- Retha Van der Westhuizen is creating TAVI patient information booklet and guidelines
- Avril Fernandez is updating thoracic patient information booklets and guidelines.
- Developing the IV insulin protocol suitable for the CCTV cluster
- Working with CCU and Cath Lab to integrate our study days, education plans and clinical guidelines.

I acknowledge the incredible team of nurses who worked exceptionally hard throughout the year to manage this increase in acuity and demand.

### **Debbie Trail - Nurse Educator Wd 14**

There has been a greater than usual education need last year with the appointment of 10 new staff and four returning NETP nurses. In addition, we continued to support eight NETP nurses throughout the year and second and third year Wintec students. We also had 4 Gateway students (high school students who wish to pursue a career in health).



### **Study days**

- Introduction to Cardio-Thoracic and Vascular Study Day in April and November.
- Two Advanced Cardiac Certification study days were held in May and September.
- A study day was held in December to prepare nurses for the coordinator role

- In Emergency Scenario study day in March encompassing nursing management of emergency situations in Ward 14 culminating in simulation sessions in the Clinical Skills lab
- All nurses are current with their CORE certification with 14 nurses completing Level 5 CORE Resuscitation, one completing Level 6 CORE Resuscitation and one completing Level 4 training in 2010.

### ***Representative Roles***

- Mavis Kasongo and Andrea Bradley attended the Preceptor training at Wintec and we now have six fully trained preceptors.
- Six IV certicators with three of the preceptors having done their IV certicator training to facilitate the certification of new staff.
- The representative roles in Health & Safety, Infection Control, Smoking Cessation, Manual Handling, Diabetes Resource and Quality and Risk have all had new faces this past year due to staff leaving and the new reps are very enthusiastic about their new roles.
- Karen Nixey is Educator second in charge. She will cover my leave, facilitate study days and assist with the educational needs of the staff; Karen also works with and supports staff on the floor.

### ***Professional Development***

- Development an educational hub on the staff computer, for access to information for patient management
- Weekly in-services with a variety of speakers. Thank you to Sarah Jones
- Fortnightly wound review session to discuss aspects pertaining to wound care management including case studies and discussion.
- Four nurses attended the Wound Care Series in 2010 and they all presented their case studies as well at various sessions.
- Four staff completed their Post Graduate Certificate at Wintec with four nurses continuing with post graduate study in 2011.
- Facilitation of the cardiac course runs through Auckland University at Waikato Hospital.

### ***Education given in 2010***

- Support of staff using the new ADDS chart
- Support of staff undertaking Productive Wards
- Development of new protocols for GIK infusions, Day of Surgery Cardiac patients returning to ward 14, & Amiodarone.
- Review of existing protocols
- Support and development of new seniors
- Wound management and VAC certification
- Introduction and staff support for the new glucometer
- Support for CCU in latter part of 2010
- Support of staff developing patient information booklets

## **Diane Penney - Unit Manager**

There is one thing certain in life. If we always do what we always have done, then we will always get what we have always have got.

2010 can probably be labelled as the year of such change within the Cardiothoracic service that two years ago we would not think was possible.

The internal review of 2007 and subsequent project identified the need for some significant quality improvements to systems and processes that would improve the patient journey. It was planned that the intended need for an increase the number of operations happen alongside those improvements.

Adam El Gamel was appointed into the role of Clinical Director after a significant international search undertaken. The criteria used for appointment:

- Internationally recognised expertise, experience and technical skills with excellent patient outcomes reported by the British Society of Cardiothoracic surgeons.
- Positive leadership qualities
- Demonstrated ability to teach and mentor
- Demonstrated patient focused quality improvement
- Proven record of research, publications and presentations.

## **Highlights for 2010**

- Increase in operation numbers
- Operations with increased risk and mortality because of their complexity performed.
- Common elective waiting list has ensured equity of access for patients. Wait time well within MoH directives
- Nurse practice as Registered Nurse as first assistant
- New theatre instruments
- Acute inpatients wait time and thus numbers significantly reduced
- Positive national profile and influential in national groups such as Cardiac Network.
- Further development of CNS roles with a unified approach of referral for both elective and acute for the Waikato Hospital and regional referral centres.
- Improvements to clerical processes have reduced unnecessary work
- Formalised and documented audit meetings

The one thing certain in health is that there will be change. There is no doubt that change can challenge and be difficult for some and yet others will see the need accept and readily adapt.



The ability and willingness of all parts of the wider Cardiothoracic team needs to be acknowledged

The positive influence and impact of Adam El Gamel cannot be underestimated. His strategic and lateral planning, his mentorship, his manner, his patient focus, his collegiality and commitment have taken the Cardiothoracic service to where it was not imagined it could go two years ago.

Acknowledgement and thanks in particular to the clerical team who have raised to the challenge of the significantly increase workload.

Fiona Woods who has worked in cardiac surgery since it opened in 1989. She was instrumental in its set up. Her historical knowledge and memory is legendary.

Rochelle Lazarus who manages the outpatient clinics and Margaret Comer who maintains the bulk of the typing work, and who has worked to improved processes.

## **The Out Come Data for 2010**

### **Outcome Reporting and International Comparisons**

In the absence of a New Zealand comparator, the outcomes presented in this report have been compared and benchmarked against the National Cardiac Surgical Database report from the United Kingdom (UK).

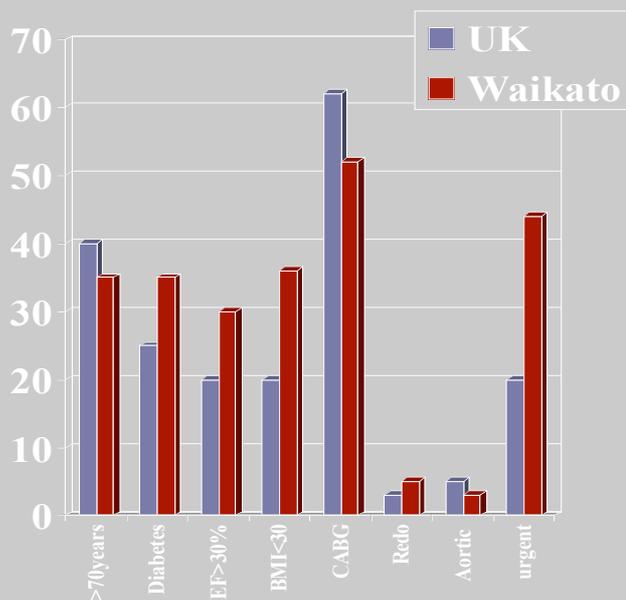
Although the patient population is different, the UK publication is one of the most authoritative and comprehensive documents of national cardiac surgical practice available anywhere in the world, and is used here as the 'gold standard' for comparison (United Kingdom Cardiac Surgical Register, UKCSR) (1)

The first step is to compare case mix

## Case Mix

Waikato case mix shows increases in risk factors

- Diabetes
- Poor LV
- Obesity
- Other surgical procedure than CABG
- The urgency of the procedure



Cardiac patient population in Midland region is of a higher risk compared to the UK case mix

### Outcomes

The result of all cases coming through the unit without risk stratification reflect healthy comparable results to the UK 4.4 per cent versus 4.6 per cent.

## Cardiac Procedures n = 617



- Deaths - 26 (4.53%)
- Euroscore predicted mortality – 6.92%
- UK 4.6%

## Risk-Stratification and Presentation of Outcomes

### Introduction

The risk that any one patient will not survive surgery depends on a number of different factors, some of which can be quantified.

Risk scoring systems for patients undergoing cardiac surgery take some of these factors and turn them into a numerical risk score, which represents the probability of death or some other outcome for an individual.

Over time a variety of risk-stratification systems have evolved, ranging from simple additive systems to highly complex statistical algorithms.

These provide the basis for rational and meaningful comparisons of outcomes between groups of patients and institutions.

## Results of Coronary Artery Surgery

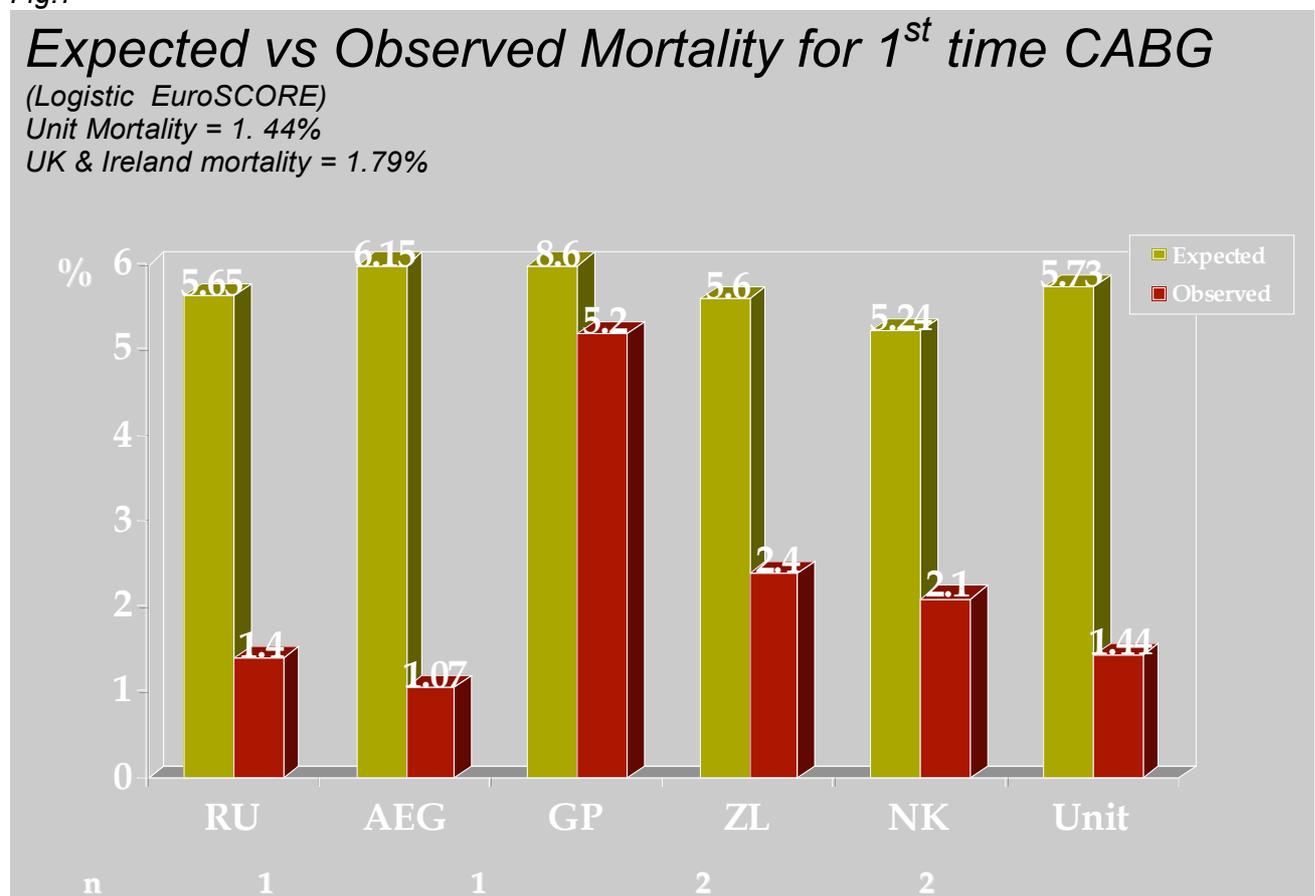
## Coronary Disease and Myocardial Function

Nearly 70 per cent of our cohort had triple vessel coronary disease, and the incidence of left main stem (LMS) stenosis is 35 per cent. Left main stem disease may be associated with poorer outcomes following coronary artery surgery. In the UK, only 21 per cent of patients undergoing CABG had LMS disease.

Our figure of 35 per cent indicates a higher prevalence of LMS disease in our patient population, with the potential consequences relating to the outcome. Heart function (ejection fraction) remains one of the most important predictors of postoperative outcome with 34 per cent of our patients undergoing CABG had moderate or poor left ventricular function.

This figure is very similar to other reported figures (UKCSR 32 per cent). Despite case mix factors Outcomes of coronary artery surgery for the unit is excellent (Figure 7).

Fig:7



## Conduits for Coronary Artery Bypass Grafting

It is well recognised in the cardiac surgical community that, in general, arterial grafts are preferable to vein grafts, particularly when revascularising the left anterior descending coronary artery. 89 per cent of our patients received one or more arterial grafts, usually the left internal mammary artery to the left anterior descending artery.

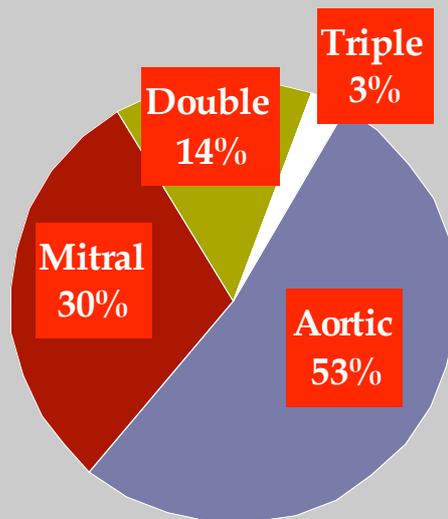
This is an important factor in long-term outcome and compares well with the UK national figures (UKCSR 90%; UBHT 94.3%, 2005)

## Valve Surgery

48 per cent of the work load is valve related in one way or another.

The unit performance is measured by first time aortic valve replacement, which shows equivalent results to the UK data in the last year

### *Distribution of Isolated Valve Operations*



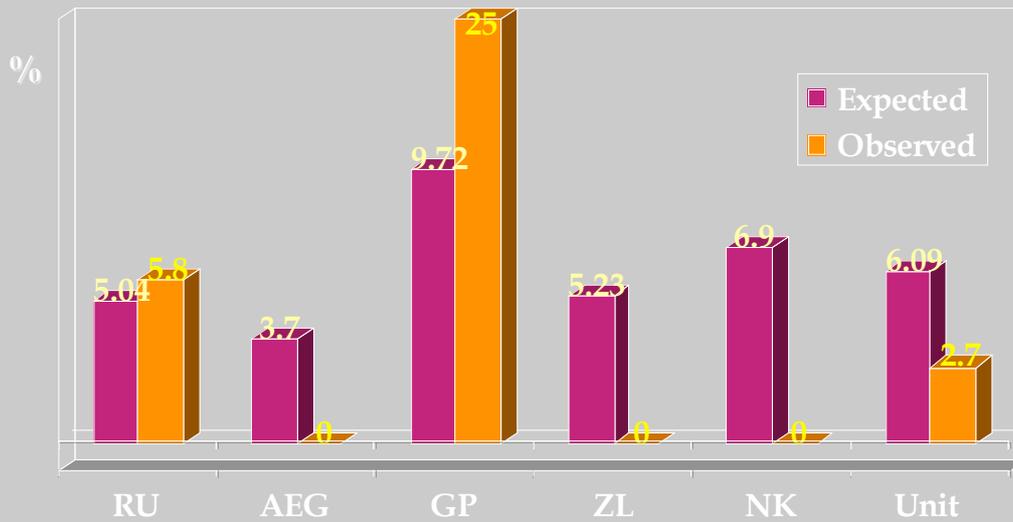
We have used our year data to analyse in particular mitral valve practice in more detail, as we see a preponderance of mitral valve disease due to the residual impact of rheumatic valve disease in the region.

Rheumatic disease accounted for nearly 45 per cent of mitral interventions (30 per cent in the UK).

**First time Aortic valve replacement results**

*Expected vs. Observed Mortality for 1<sup>st</sup> time AVR*

*Unit mortality – 2.8 %*



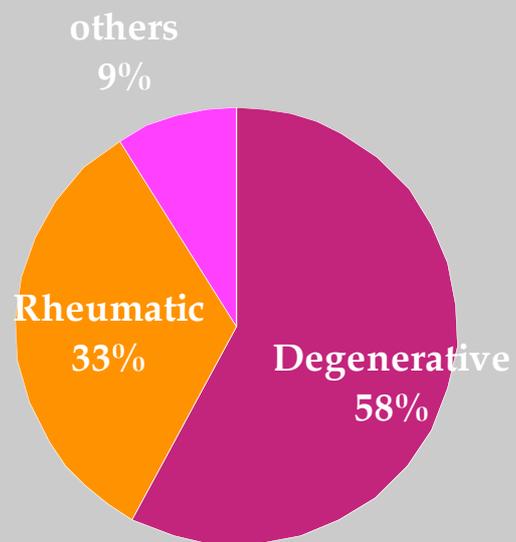
Deaths	1	0	1	0	0	0	2
Total no	20	29	4	10	10		73

## The pathological distribution of mitral valve disease

It is of note that the majority of mitral valve diseases are degenerative in nature which lends itself to repair rather than replacement

- 81.25 per cent (13 of 16) degenerative Mitral Regurgitation were repaired

### Pathology in Isolated Mitral Valve Disease



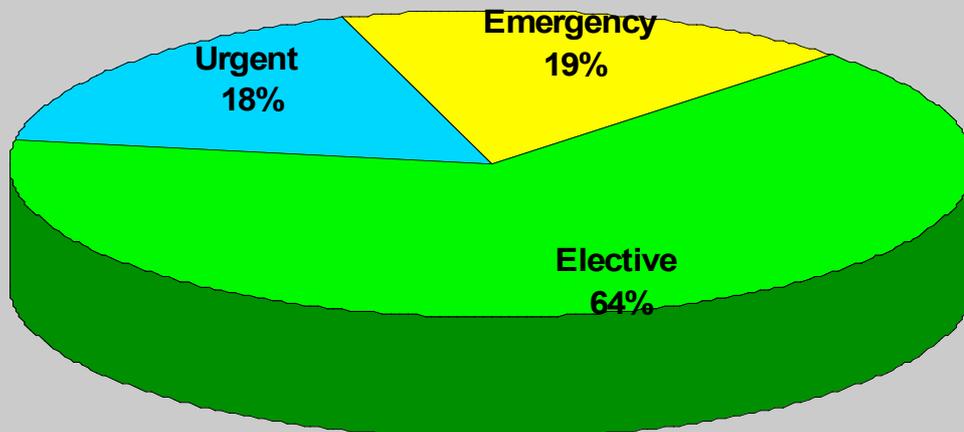
Outcomes no mortality in mitral valve surgery repair or replacement as a single valve

## Aortic Surgery

Five per cent of the work load presents it self as major aortic replacement procedure in a variety of operations; root replacement, ascending aorta replacement, and arch replacement,.

All aortic dissection cases survived, elective root surgery mortality is four per cent which is half than UK mortality nine per cent figure.

### *Timina of Suraery for Thoracic Aortic*



n = 34, elective (21), emergency (7), urgent (6)  
Deaths, elective (1), emergency (0), urgent (1)

Some new procedure have started however the numbers are too small and early to make a statement, however the service is available

Atrial Fibrillation ablation six cases performed as a combined procedure patients will be followed up as a separate registry

Septal Myomectomy five cases done only, death in re-do case again long term follow up and special interest registry will be established

## Morbidity

Although our mortality rate is good still, as a service improvement is required pertaining to morbidity, in particular wound infection.

An integrated improvement program has been developed to improve and reduce SSI and to be reported every three months.

Re-exploration rate for tamponade reflects the increase work load with valve patients and those with multiple pathology.

Patients with severe coronary disease are prescribed protective drugs such as aspirin and clopidogrel and although beneficial can cause problems with post-operative bleeding by interfering with the coagulation cascade in patients undergoing surgery.

Ideally, these medications should be stopped prior to surgery, however the trend we have shown is a reflection of the increasing severity of coronary disease in the patients we are treating and in whom it is thought to be 'unsafe' to discontinue this medication despite the additional risks posed during revascularisation.

This is also demonstrated by the increasing numbers of patients who undergo surgery whilst being treated with intravenous nitrates or heparin either within one week of such treatment or even whilst such treatments are continuing which we have noted.

COMPLICATION	Observed %	UK & Ireland
Atrial fibrillation	19.2	20.1
Prolonged intubation	10.2	8.3
Re-opening for bleeding	4.8	4.7
Re-opening for tamponade	1.29	0.2
Stroke	0.3	1.2
TIA	0.9	0.4
Renal failure	3.0	3.9
Leg infection	3.5	0.6
Sternal wound infection	0.9	0.4
Pacemaker	0.48	0.9

## **Blood transfusion**

We are pleased to report that maintaining a focus and establishing an audit process, we have been able to increase the number of patients undergoing cardiac surgery who do NOT receive a blood transfusion from 26 per cent to 42 per cent ( $p < 0.002$ ) when analysing comparative time periods.

Stroke is a cause of major postoperative morbidity following CABG and the risk is increased in patients with a history of neurological disease.

## **Quality of care for cardiac surgical patients**

Overall provision of quality care for cardiac surgical patients extends beyond mortality.

In 2011 the focus will start with the population of patients undergoing coronary surgery, 'quality bundles' will be developed.

Focus for the groups:

- The percentage prescription of aspirin or statins to patients following coronary artery surgery upon their discharge.
- The LOS and incidences of prolonged LOS will be measured as a quality indicator.
- Although current median length of stay for all patients is 6 days, this requires examination in context of discharge facility within our local area.

Whilst we have some capability to transfer patients back to their referring centre, just fewer than 45 per cent of our patient group are referred locally and we have no other facility to discharge them to except home.

Discharge may be delayed as primary care facility for patients at home is limited in our region.

## **International 'Benchmarking'**

Has been defined as the identification of 'industry leaders' so that the leaders' practices may be understood and emulated.

Benchmarking' plays a central role in quality improvement and in the last year, we had opportunity to benchmark some outcomes using the UK Database as a reference.

The cardiac network in NZ is establishing a local database which will link with the Victorian data base in Australia to provide a benchmarking for the southern hemisphere. It is anticipated we will be a part of this network.

## Highlights of 2010

- Developing a robust quality assurance programme dedicated to providing the most effective and positive treatment journey for patients undergoing cardiac surgical treatment at Waikato Hospital.
- Ongoing collection of high-quality, validated data which can be used to measure and benchmark our performance against comparable cardiac surgical facilities.
- Formalised and documented multidisciplinary audit and mortality and morbidity meetings with a quality improvement focus and the establishment of preoperative assessment clinics.

## 2011 and beyond

We are looking forward to an increase in a fixed facility with our move to the new theatre and ICU later next year. However without an increase in absolute resource of four ICU and two recovery cardiac beds, and operative time to 20 cardiac sessions /week our reported levels of activity for 2010 will be impossible to sustain in 'safe' fashion.

With these changes there is an inherent risk of increases in mortality and morbidity.

We can be assured that all our outcomes fall well within 'international' norms and in most cases are actually better than expected.

- An automated web based data collection system, managed in real time and integrated with the hospital IS. It will have the ability to be accessed from anywhere to provide important and comprehensive data on an ongoing basis
- Minimally invasive surgery programme for the cardiac and thoracic patient. Its establishment will mean the service will be national leaders in procedures.
- Same day as surgery admission will reduce hospital stay and be part of a fast tract nurse lead cardiac recovery programme.
- Preadmission clinic will reduce the number of patients admitted to hospital pre-operatively by over 23 per cent and it will enable (on average) an additional three beds per month to be used for postoperative patient care.
- Streamlined out-patient service in conjunction with a proposed nurse-led patient satisfaction and cardiac education project,
- Same day transfer from ICU of the first post-op case to Ward 14 will reduce ICU stay and improve the patient flow and throughput to achieve a 700 patients target level
- Introducing of new technologies including expansion of the TAVI programme and sutureless valve technique and establish the unit as a leader in the field nationally.
- Recruitment of a research fellow to lead research and development in cardiac surgery and link basic science to bed side care

## **Acknowledgements:**

Thank you to all those who contributed to this report. In particular to Dr Kamaraj Radhakrishnan who worked long hours to produce the data.

Thank you to everyone who has worked to achieve these impressive results.

Thank you to everyone who has embraced the positive change and run with it.

*“There is nothing more certain that when we believe change is foisted upon or demanded of us that it challenges our practice, our beliefs, and sometimes our every moral fibre.*

*There is nothing more certain than if we do as we have always done, then we will always get what we have always got.*

*There is nothing more certain for us all, that 2010 has been a year of more change than we have ever thought would or even could happen.*

*There is nothing more certain that collegiality and robust discussion with the patient as the central focus is healthy.*

*There is nothing more certain than what the data presented shows.*

*And that is that our patients and community have benefited from the change.*

*And they deserve that.”*

*Diane Penney*

