



Health
Sydney
Local Health District

Cardiovascular Clinical Stream Position Paper

2013-2018

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Foreword by Clinical Director

Diseases of the heart, blood vessels and kidneys are among the most prevalent in the western world. They are also the most common reason for admission to hospital, contributing to a significant proportion of both emergency and planned admissions.

Delivery of clinical services to patients with cardiovascular disease is changing dramatically. Models of care today are different from five years ago. They are likely to be profoundly different in five years' time. The drivers of change are the changing epidemiology of the diseases we deal with and relentless progress of biomedical innovation, which yields new technologies to tackle old problems.

Ageing of the population and the epidemics of obesity and diabetes are increasing the prevalence of cardiovascular diseases in the community and therefore increasing patient presentations. We are also victims of our own success. Many patients who in the past would have died now survive but require ongoing and often intense care.

The new technologies are generally delivered to the clinical world with a strong evidence base for improvements in quality and duration of life. However they are generally expensive and while some reduce the complexity of existing interventions, others increase the complexity. Some new interventions such as Transcatheter Aortic Valve Implantation (TAVI) allow us to treat a group of patients who couldn't previously be treated. One feature all new interventions have is a high upfront cost. Paying these costs will prove a major challenge for the system.

Some of the more important changes in practice include the following examples. In Cardiology and Cardiothoracic Surgery, while coronary disease continues to be a major problem there is a growing burden of structural heart disease and arrhythmias and this is matched by a growing capacity to treat these problems. Operations on the aorta are now a significant proportion of total operations. TAVI is an exciting new procedure which is demanding of both clinical and procedural resources. The number of patients with problematic arrhythmias continues to grow. Procedures and operations to correct these problems are growing in parallel.

In Vascular Surgery, the transformation from operative intervention to endoluminal technologies continues with speed and will probably be complete within five years. The requirement for operating theatre facilities equipped to handle this transformation is immediate and financially challenging.

In Renal Medicine the number of patients requiring dialysis grows at around 6% per year. The focus of the specialty is now changing models of care to concentrate on patients with chronic kidney disease in an attempt to prevent them developing the need for dialysis.

One requirement that the changing models of care have in common across all departments is a dramatically enhanced requirement for imaging.

In Cardiology, the predicted increase in demand for echocardiography has occurred but has not been met. More importantly, Cardiac MRI has become the standard of care for a growing number of structural heart problems. Our ability to meet this standard requires a major enhancement of the LHD's cardiac MRI

capacity.

The change to endoluminal procedures in Vascular Surgery is placing greater demand on vascular ultrasound imaging and is also stretching the CT capacities of the LHD.

In Renal Medicine, the challenges of obtaining and maintaining vascular access for patients requiring dialysis, creates enhanced requirements for ultrasound and x-ray images.

Our strategic priorities for the Stream, detailed in the Priorities section, are:

1. Expanding and enhancing Imaging: Cardiac MRI, fixed gantry X-ray facilities for Vascular Surgery in Hybrid Suites, Cardiovascular CT, Echocardiography.
2. Funding and evaluating devices.
3. Improving governance of novel therapies and enhancing trans-disciplinary models of care.
4. Enhancing Information systems: Electronic databases, telemedicine.
5. Minimising hospital utilisation by enhancing coordinated primary, secondary and tertiary care across the Clinical Stream This includes designing specific strategies for diseases and illnesses where the prevalence is sharply increasing such as chronic kidney disease, atrial fibrillation, heart failure etc
6. Responding to model of care changes and increasing demand. This includes ensuring sufficient renal dialysis capacity across the District, ensuring sufficient cardiothoracic ICU capability and sufficient beds and clinics.

Professor Phillip J. Harris
Clinical Director
Cardiovascular Services

Our Organisation

Organisationally, the Stream comprises a Clinical Director, Deputy Clinical Director, Clinical Manager (*shared with Neuroscience Bone Joint Connective Tissue*) and an Executive Assistant.

The Cardiovascular Clinical Stream includes the following services:

- **Cardiology**
- **Cardio-thoracic Surgery**
- **Vascular Surgery**
- **Vascular Diagnostics**
- **Renal Medicine**

Cardiology

Cardiology is made up of a number of component services:

- Inpatient care
- Outpatient care which includes general cardiology outpatients and a number of specialized clinics
 - Valve clinic
 - Adult congenital heart disease clinic
 - Arrhythmia clinics
 - Hypertrophic cardiomyopathy clinic
 - Genetic heart disease clinic
 - Pulmonary hypertension clinics
 - Aboriginal health clinic
 - Chest pain clinic
 - High risk/family screening /lipid clinic
 - Implanted Defibrillator follow up clinic
- Ambulatory care which has the following components
 - Cardiac Rehabilitation
 - Heart failure management

- Chronic cardiac care
- Invasive Cardiology which includes
 - Diagnostic cardiac catheterization
 - Interventional coronary procedures
 - Interventional structural heart procedures
- Electrophysiology which includes:
 - Diagnostic EP procedures
 - Interventional therapeutic EP procedures
 - Device implantation
- Noninvasive Cardiology which includes;
 - Echocardiography
 - Trans oesophageal echocardiography
 - Exercise testing
 - Electrocardiography
 - Holter monitoring
 - Tilt testing

Cardiothoracic Surgery

Cardiothoracic surgery is performed predominantly at RPA and covers the whole range of cardiothoracic surgery except for cardiac transplantation including

- Valve Surgery,
- Device Implantation,
- Surgery of the aorta,
- Coronary artery surgery
- Left ventricular remodelling surgery
- Thromboembolectomy
- Participation with Cardiologists in interventional Structural Heart disease program
- ECMO retrieval service

Vascular Surgery

At RPAH, the Department of Vascular Surgery includes a vascular ultrasound imaging service. At Concord, vascular imaging is performed by an affiliated but distinct Department (Vascular Medicine) which is also a member of the cardiovascular stream.

Vascular Surgery performs major operative and endoluminal procedures in theatres. Peripheral

endoluminal procedures are performed on out-patients in the cardiac catheterization labs at RPAH, and in operating theatres only at Concord.

Across the two sites at RPA and Concord the Vascular Surgical Service provides a tertiary referral service to care for patients with:

- Peripheral vascular disease, including offering open surgery and endovascular intervention to patients with critical limb ischaemia, gangrene and ulceration
- Abdominal and thoracic aortic disease, including aneurysm and dissection pathologies
- Extracranial cerebrovascular disease, including providing consultation to the Stroke Service
- Venous disease, including the management of deep vein thrombosis, offering vena cava interruption procedures, and caring for patients with chronic venous insufficiency
- Renal failure requiring renal replacement therapy, including patients receiving peritoneal dialysis, haemodialysis and cases of access insufficiency
- Lower limb ulceration across diabetic, stasis and arterial insufficiency aetiologies

Renal Medicine

The components of Renal Medicine are:

- Inpatient care
- Outpatient care
- In-centre dialysis
- Satellite dialysis
- Home dialysis
- Renal Transplantation
- Specialist Renal Clinics

The Stream provides services for some of the most frequent medical presentations to the healthcare system. This includes, for example, those who suffer from acute chest pain, people with potentially lethal arrhythmias, people requiring invasive cardiac procedures such as coronary angiograms, people with chronic renal failure and those that require ongoing renal dialysis.

Our services are strongly networked to ensure that patients receive appropriate care regardless of which hospital in the SLHD they present to. Tertiary level care is provided to a large number of patients from outer metropolitan and rural LHDs. Our local district level services are networked with the tertiary facilities and services to ensure optimal care.

The following provides a broad summary of the cardiovascular services and their site availability:

Table 1 Overview of Cardiovascular and renal Services in SLHD

Hospital	Cardiology	CT Surgery	Cath Labs	EPS	Vascular Surgery	Renal Medicine	Renal Dialysis	Renal Transplantation
RPA	✓	✓	✓	✓	✓	✓	✓	✓
CRGH	✓	X	✓	✓	✓	✓	✓	
Canterbury	✓ (Level 4)	X	X	X	✓ (Level 1)	✓ (Level 3)	X	

Our Community

The SLHD comprises the eight local government areas of Ashfield, Burwood, Canterbury, City of Sydney (part), Canada Bay, Leichhardt, Marrickville and Strathfield. The District currently has a population of 582,100 (2011 erp).

By 2021, the local SLHD population is expected to reach 642,000 and almost reach 670,000 five years after that (Figure1). Significant planned urban developments include the new Green Square Development in Zetland and Beaconsfield in the City of Sydney, urban consolidation along the Parramatta Road corridor and new developments in Rhodes, Breakfast Point, the former Carlton United Brewery site, Redfern/Waterloo and the former Harold Park site at Glebe. Since 2001-2011, the population of Sydney LHD has grown by 16.7%, with some LGAs having growth in excess of 50%. Over the last five year intercensural period, the District population has increased by over 50,000 people. The growth in the aged and the “old old” population of SLHD is especially important for health care delivery over the forthcoming decade, with an increase of 29.2% and 28% in the 70-84 age group and the 85+ age group respectively predicted by 2021 (see Table 4). Of particular interest is the significant increase projected in the population of the City of Sydney, projected to exceed Canterbury LGA by 2031 (Table 3).

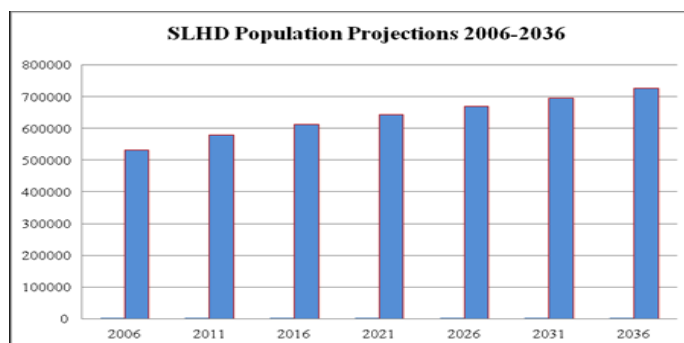
This population growth, together with its ageing is placing significant pressure on cardiovascular services across SLHD. The growth, since 2001, is shown in Table 2. Table 3 and Figure 1 shows the projected population increases to 2036.

Table 2: Current Estimated Residential Population, SLHD by LGA and SLA, 30th June, 2012

LGA	2011	Change		
		2001-2011		2001-11 %
		%	no.	
Ashfield	43,683	7.8	3,162	0.8
Burwood	34,305	12.2	3,725	1.2
Canada Bay	79,905	28.2	17,583	2.5
Canterbury	144,751	5.3	7,259	0.5
Leichhardt	55,651	10.3	5,195	1.0
Marrickville	81,489	6.2	4,746	0.6
Strathfield	37,141	26.2	7,708	2.4
Sydney South (SLA)	60,911	50.4	20,409	4.2
Sydney West (SLA)	44,264	44.4	13,610	3.7
TOTAL	582,100	16.7	83,397	

Source: The Picture of Health. SLHD Health Profile 2012

Figure 1: Projected population SLHD 2006 - 2036



Source: The Picture of Health. SLHD Health Profile 2012

Table 3: Projected population SLHD 2006 - 2036

LGA	2006	2011	2016	2021	2026	2031	2036
Ashfield	41,520	43,464	45,663	46,787	4,7630	48,607	49,671
Burwood	32,395	34,243	37,443	42,315	47,019	51,923	57,009
Canada Bay	68,725	79,664	87,497	90,149	91,736	93,513	95,419
Canterbury	135,605	140,355	144,875	147,901	151,159	154,736	158,538
Leichhardt	51,554	52,855	54,093	55,410	56,366	57,456	58,637
Marrickville	75,546	79,225	82,241	84,275	85,769	87,472	89,315
Strathfield	33,231	36,322	39,136	42,022	44,708	47,721	50,847
Sydney City (part)	93,048	112,035	121,964	133,150	143,702	154,784	166,315
TOTAL	531,624	578,162	612,914	642,009	668,090	696,211	725,751

Source: *The Picture of Health. SLHD Health Profile 2012*

Table 4 Projected population SLHD 2011-2021 by selected age groups

Age-Related Projections	0-15	16-44	45-69	70-84	85+	TOTAL
2011 (est) ¹	96,581	281,782	151,614	39,294	8,890	578,162
2016	104,382	290,291	164,529	43,324	10,388	612,914
2021	109,585	297,150	173,131	50,762	11,381	642,009
% Change 2011-2021	13.5%	5.5%	14.2%	29.2%	28.0%	11.0%

Source: Department of Planning, 2009

At the 2011 census, there were 4,875 people who identified as either Aboriginal or Torres Strait Islander living in SLHD. 941 persons aged over 50 years identify themselves as indigenous Australians i.e. 19% of the total SLHD indigenous population. Aboriginal and Torres Strait Islanders have known high rates of cardiovascular risk and disease. Targeted services are provided.

Across Sydney LHD, 43% of residents reported at the 2011 census that they speak a language other than English at home. The proportion and numbers of people speaking another language ranged from 64% (87,793 people) in Canterbury LGA to 15% (7,892 people) in Leichhardt LGA. Across the LHD, 7% of the population described themselves as not speaking English well, or not at all. The main languages spoken were Mandarin (28,712 people), Arabic (26,665 people), Greek (24,654 people) and Cantonese (22,881 people). Access to interpreters is integral to the care provided to non-English-speaking patients.

¹ Note: These numbers are estimates derived by the Department of Planning. Thus, they differ from actual populations counted at the 2011 census.

Our Patients Carers and Consumers

The safe, high quality, compassionate care of these patients and their families requires a strong commitment to the following:

- **Safety**

A safe clinical environment requires sufficient consultants, junior medical, nursing, technical and ancillary staff based on clinical need and consistent with hospital roles.

- **Equity**

In ensuring equity, the service must equitably meet the increasing demand from the local health district and the agreed quaternary and tertiary catchments. The service should minimize the need for patients to seek healthcare outside of the District and improve access to those highly vulnerable patients from outside of SLHD who require access to high level tertiary care.

- **Quality**

The service should ensure integrated care service provision supported by common protocols, District-wide databases, peer audit and review, academic leadership, research and education, clinical governance and a positive, compassionate culture committed to patient-centred care. The analysis of data, clinical performance and evidence-based medicine are essential.

Our Research and Education

The SLHD Cardiovascular Stream is distinguished by a culture of research and scholarly enquiry, which enhances all aspects of clinical care. The CV stream boasts a remarkable proportion of specialist clinicians with higher research degrees (the vast majority PhDs), and many of its clinical leaders are also leaders of major national scientific and clinical bodies. Research undertaken within the stream can be broadly divided into that which occurs within the SLHD cardiovascular clinical stream at RPAH, Concord and Canterbury Hospitals, and that which occurs in these facilities in conjunction with major affiliated institutions, including the Heart Research Institute, the Centenary Institute of Cancer and Cell Biology, the George Institute for Global Health, the NHMRC Clinical Trials Centre, the Baird Institute, and the ANZAC Research Institute. Research within the Cardiovascular Stream is supported by category 1 funding from bodies such as the NHMRC, ARC, and National Heart Foundation, as well as by funds from philanthropic donors and departmental contributions. The breadth of research is extraordinary, ranging from the molecular to the clinical and to the epidemiological. There is a strong emphasis on translational research. A defining characteristic of the research within our stream is its cross-disciplinary nature- whereby cardiac surgeons, cardiologists, nephrologists, vascular surgeons and basic scientists share research interests.

MAJOR AREAS OF RESEARCH:

Mechanisms of disease:

- Atherosclerosis – endothelial dysfunction and studies of early disease reversibility, cellular and animal studies into atherosclerosis and its prevention
- Coronary disease –behavior of the coronary vessels in health and disease, micro vascular measurement of functional disturbance, intracoronary shear stress and how it affects platelet activation
- Angiogenesis –new vessel formation and its role in treating ischemia and causing coronary disease

Population Medicine

- Developing World Medicine –in China, India, Indonesia and Africa, in projects related to atherosclerosis, rheumatic heart disease and malaria
- SLHD initiated National registries in acute coronary syndromes (Concordance) and in congenital heart disease and pulmonary hypertension
- Clinical outcomes after pulmonary embolism and infective endocarditis
- Preoperative screening in non-cardiac surgery

Cardiology Clinical studies

- Aortic disease – a multidisciplinary approach to the study of aortic disease, including genetic, medical and surgical care
- New clinics for Cardiovascular Genetics and inherited heart muscle diseases
- Structural heart disease – including research into the optimal strategies for non-operative valve replacement (aortic, pulmonary), establishing successful multidisciplinary TAVI program
- Leaders in the care of Congenital heart disease in adults
- Novel programs for the improved access to cardiac rehabilitation
- Clinical trials in cardiology include all major trials of novel antiplatelet agents in acute coronary syndromes, antithrombotics in atrial fibrillation, novel devices relevant to pacing and

electrophysiology, novel treatments for heart failure and for pulmonary hypertension, contrast nephropathy in conjunction with renal medicine

- Major multicentre studies originating in the SLHD include the Field Study, the Accord Study, the Lipid Study
- Novel imaging modalities in coronary disease, including OCT and IVUS imaging of coronary arteries, and novel applications of Cardiac MRI
- Multimodality evaluation of the Cardiac effects of compression by hiatus hernia

Cardiothoracic Surgery

- Mesothelioma - national tissue sampling and data collection, an international register of pleural and peritoneal mesothelioma and refining the role of multiple therapeutic disciplines - chemotherapy, surgery and radiation- in this condition
- Application of novel biomaterials to the manufacture of wholly synthetic blood vessels
- Defining and minimising the adverse inflammatory and thrombotic consequences of High Risk Cardiac Surgery
- Registries: Internationally recognised registries in outcomes after aortic root replacement and valve surgery, acute aortic disease, and registries of surgical patients treated for Heart Failure Surgery, and with mechanical valves
- Linkage with geneticists and cardiologists in developing models of care for inherited aortic disease
- Clinical trials include studies of antithrombotic agents in Coronary Artery Surgery, trials of Off or On pump revascularisation, Steroids in Cardiac Surgery and self-management of anticoagulation

Vascular Surgery

- Novel device development for hybrid percutaneous approaches to vascular disease including first in man approaches
- Development of new artificial blood vessels for use in vascular bypass surgery using new materials with improved biocompatibility
- Developing novel algorithms for the management of thoracic and abdominal aneurysms in conjunction with Cardiothoracic surgery
- Clinical trials include Tetherx Natural Vascular scaffolding procedure, Inferior Vena Cava Filters and evaluation of novel stent graft materials
- Clinical Registries include registries undertaking prospective prediction of outcomes following Endovascular AAA repair, a Global registry for Endovascular Aortic treatment and Drug eluting balloon for endovascular treatment of peripheral arterial disease.

Renal disease

- Major emphasis on Quality of Life studies in dialysis patients
- Vascular Access in renal failure patients- reducing variation and standardising access
- Transplantation : mechanisms of acute and chronic rejection, alloreactivity and graft outcomes, post-transplant diabetes and bone disease
- Treatment of ANCA-associated vasculitis
- Aspirin and fish oil in prevention of thrombosis in chronic kidney disease
- Clinical trials in the treatment of hypertension, polycystic kidney disease, extended dialysis, phosphate and calcium control, neuropathy and haemofiltration, immunosuppressive agents in transplantation.

Our Staff

The following table outlines the current staffing of the Cardiovascular Stream.

Table 5: SLHD Cardiovascular Services Staffing Count

Clinical Staff	TOTAL
Nursing	407
Medical Officer	44
Others	36
Staff Specialist	33
Admin Officer	32
Clinical Academic	8
Medical Technicians	8
Health Service Managers	3
Hospital Scientist	2
Biomedical Engineer	1
Health Education Officer	1
Information Technology	1
TOTAL	576

Note: This Table represents full time and part time staff and does not represent the FTE.

Workforce Projections

- There are major problems maintaining the echocardiography technical workforce. Remuneration in the private sector is significantly higher. The public hospitals bear the costs of training and have difficulty retaining staff.

Our Services

Cardiovascular Stream Overview

Cardiovascular activity in SLHD has remained reasonably steady over the past five years (Figure 1). For the stream as a whole, excluding renal dialysis, 59% of the bed days are for SLHD residents and 41% are for residents outside of the District, with Western NSW having the largest inflows and other metropolitan Districts and people living overseas also coming to the District, particularly for the tertiary and quaternary services. This data masks the significant changes in models of care and patient type within the Stream.

Figure 2: Cardiovascular Stream Separations by SRG 2005-2011

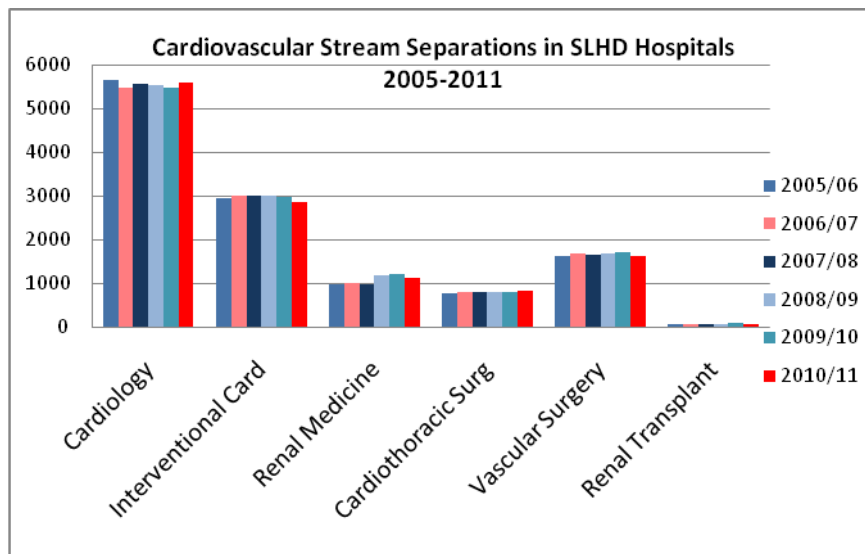
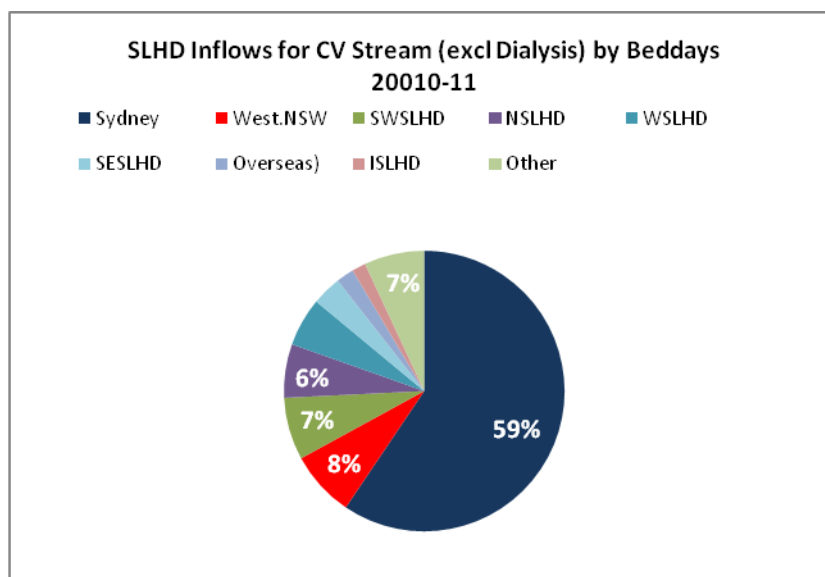


Figure 3: SLHD Inflows for Cardiovascular Stream Services by Beddays 2010-11



CARDIOLOGY

Inpatient Care

RPA Hospital

Cardiology Inpatients are based in CCU and 6E4. The majority of patients are admitted from the Emergency Department. Other routes of admissions are direct from other hospitals, direct from the Day Stay Unit or direct from rooms or clinics via the Cardiology Case Manager. The Inpatients encompass a full range of cardiac diagnoses including acute and chronic conditions. The department currently has 48 inpatient beds. The CCU has 18, Cardiology Ward, 30 with capacity to monitor 10 patients on telemetry. The 23 hour ward has 8 beds and a further 5 chairs.

Concord Hospital

Cardiology Inpatients are based in 3E (including CCU) and 3N. The majority of patients are admitted from the Emergency Department. Other routes of admission, as for RPA, are from rooms or clinics. The Inpatients encompass a full range of cardiac diagnoses including acute and chronic conditions. The demographic is older than the state average with implications for comorbidities and length of stay. The service includes an 8 bed Coronary Care Unit, a 16 monitored bed step-down (3East) and 10 monitored beds in the Cardiovascular ward (3North) with ability to 'flex up' as required.

Canterbury Hospital

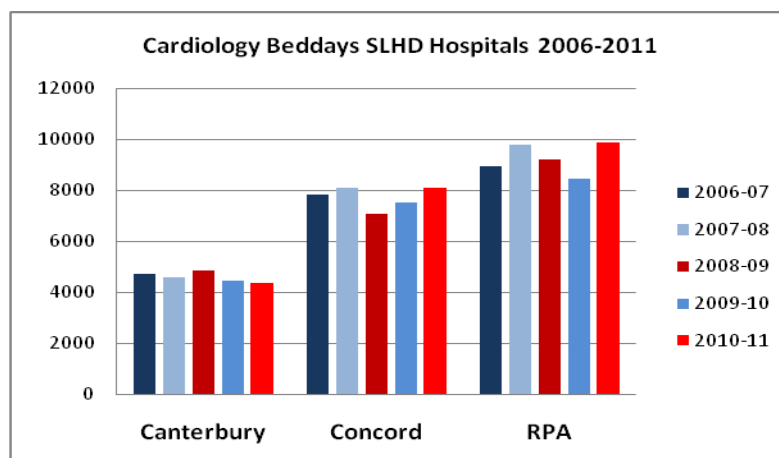
Cardiac services at Canterbury Hospital are provided by VMO Cardiologists. This is primarily a consultative service, reviewing patients prior to coronary angiography, consulting on an ad hoc basis, and providing some ambulatory care. Ambulatory care included stress testing, outpatients, and echocardiography is provided via rooms on site. There is no holter monitor service for inpatients- these are referred to Concord. Patients are admitted to the general medical wards.

Access to angiography for Canterbury patients is performed most commonly at Concord Hospital with established facilitated transfers.

Projection

- The proportion of patients with chronic cardiac conditions and multiple co-morbidities will increase. Length of stay is likely to increase and will require careful management.

Figure 4: Cardiology Beddays SLHD Hospitals 2006-11



Outpatient Care

RPA Hospital

Clinics providing follow up for previous in-patients and catering for a large number of specific heart problems (see our organisation) are conducted in the Sydney Heart Centre. The majority of these patients are seen as privately referred non inpatients. Many patients are also followed up in VMO rooms.

Clinics in which patients who have an implantable defibrillator in place are followed up are conducted in the ambulatory care section of the Cardiovascular Service with the largest number of patients.

Concord Hospital

Clinics providing follow up for previous in-patients and catering for a large number of specific heart problems (see our organisation) are conducted in the ambulatory care area of Cardiology in 3 West. The majority of these patients are seen as privately referred non-inpatients. Many patients are also followed up in VMO rooms. The ambulatory care area in 3W is inadequate for the clinic load (total of 5 consultation rooms with inadequate computer capacity to read X rays on PACS). Clinics in which patients who have an implantable defibrillator in place are followed up are conducted in the ambulatory care section of the department, at RPAH AICD clinic, and privately. Chest pain clinic sees patients at short notice on referral from the ED department to facilitate early discharge for low to intermediate risk patients.

Projection

- Clinics in which patients are seen at short notice (especially from Emergency Department) have been successfully established, but will need expansion and increased, stable staffing as the number of referrals increases. The ambulatory care area needs expansion and upgrading.

Invasive Cardiology

RPA Hospital

Diagnostic and interventional therapeutic procedures are performed in the cardiac catheterisation laboratories. The diagnostic procedures generally involve the techniques of cardiac catheterisation. The interventional procedures include: percutaneous coronary intervention (angioplasty), ASD and PFO closure, alcohol septal ablation and percutaneous balloon mitral valvuloplasty. Transcatheter aortic valve implantations are now performed in the hybrid operating theatre in the operating theatres.

Patients who undergo invasive cardiac procedures come from three major sources. A proportion of patients have been admitted via the Emergency Department. A proportion of patients are booked electively via the day stay unit. The remainders have been transferred to inpatient beds or beds in the Day Stay Unit from other hospitals to undergo invasive procedures.

The Department offers a 24 hour per day seven days a week services for urgent cardiac procedures. This service is specifically designed to perform PCIs on patients who present with ST elevation infarcts (STEMI).

Concord Hospital

Diagnostic and interventional therapeutic procedures are performed in the cardiac catheterisation laboratories. The diagnostic procedures generally involve the techniques of cardiac catheterisation.

The interventional procedures include: percutaneous coronary intervention (angioplasty), and interrogation of coronary lesions by Flow wire (FFR) , Intravascular Ultrasound (IVUS) and Optical Coherence Tomography (OCT). Structural heart disease is not treated in the catheterisation laboratories of Concord hospital. Pericardiocentesis is also performed in these laboratories.

Patients who undergo invasive cardiac procedures come from AMO rooms, outpatient clinics, inpatients, and via transfer from other hospitals. A large proportion of patients have been admitted via the Emergency Department. A proportion of patients are booked electively as day only procedures.

The Department offers a 24 hour per day seven days a week services for urgent cardiac procedures. This service is specifically designed to perform PCIs on patients who present with ST elevation infarcts (STEMI).

There are significant risks to the SLHD related to current patient data storage with concerns related to stability and servicing of current storage systems.

Projections:

- Demand for coronary interventions will remain stable in the future, but the number of patients requiring intensive interrogation of lesions (to ascertain appropriateness of intervention) will increase.
- Establishing stable data storage supportable by central IT services is a major priority.

Non invasive Cardiology Procedures

RPA Hospital

Non invasive cardiology procedures performed by the department include echocardiography (transthoracic, transoesophageal and exercise), exercise testing, holter monitoring, standard / 12 lead ECGs and tilt tables. The procedures are performed on inpatients of the cardiology department and inpatients of other department and non inpatients.

There are major problems maintaining the echocardiography technical workforce. Remuneration in the private sector is significantly higher. The public hospitals bear the costs of training and have difficulty retaining staff.

The department is heavily reliant on Radiology and Nuclear Medicine to provide CT, MRI and nuclear cardiac imaging. The demand for Cardiac MRI for both diagnosis and planning of surgical interventions is growing rapidly.

Concord Hospital

Non invasive cardiology procedures performed by the department include echocardiography (transthoracic, transoesophageal and exercise echo), exercise ECG testing, holter monitoring, standard / 12 lead ECGs, ambulatory blood pressure monitoring. The procedures are performed on inpatients of the cardiology department and inpatients of other department and outpatients.

The space allocated to each echo room is small, especially for inpatients transferred in beds. The number of echo rooms and the number of sonographers limits the department's capacity to service inpatient and outpatient echo needs. Although there are major problems maintaining the echocardiography technical workforce on the basis of remuneration, the opportunity to train staff

ensures vacancies created are filled.

The department is heavily reliant on Radiology and Nuclear Medicine to provide CT, MRI and nuclear cardiac imaging. The limited availability of Cardiac MRI (limited elective service and no emergency service) is a major problem as this provides unique diagnostic capacity for rare and common cardiac conditions, and limits speed of diagnosis and surgical intervention.

Canterbury Hospital

The capacity to expand the echo service to 5 days a week- from current Mon and Wed and Fri and establishing capacity for Holter Monitoring are key priorities.

Projections:

- The capacity to service echocardiography needs will need more space and personnel.
- The mismatch between the demand for cardiac MRI and its availability will become critical.

Table 6: Non-Invasive Diagnostic Tests 2011 and 2012

	Canterbury	Concord		RPA
	2012	2011	2012	2011-12
Transthoracic Echo	240	4922	4,957	5442
Transoesophageal Echo		247	271	430
Stress Echo		325	330	156
Exercise ECG		453	435	425
Holter		NA	262	400
ECG		NA	2,158	70,048*

* The RPAH introduced Powerchart ECG. The number includes inpatient and outpatient.

Arrhythmia Service

RPA and Concord

The incidence of supraventricular and ventricular arrhythmias is increasing dramatically with ageing of the population. Patients with arrhythmias may present to the emergency department or be referred for definitive treatment from rooms or clinics.

Diagnostic electrophysiology procedures and therapeutic interventional procedures involving ablation of areas of abnormal conduction are performed in the electrophysiology laboratory.

Pulmonary vein isolation to treat atrial fibrillation is becoming more common and the evidence base for its efficacy is growing.

Implantation of devices is a major growth area of the arrhythmia service. These devices include pacemakers, implantable defibrillators, biventricular pacing devices to treat heart failure and loop recorders. The capacity to insert pacemakers in emergency patients at short notice facilitates early

discharge and reduces the risk of infection and other complications which can follow temporary pacing wire implantation while awaiting elective implantation.

Follow up of patients with implanted devices is mandatory and requires clinics which are growing in size. In the future some patients will undergo remote monitoring and follow up.

Projection:

- The rate of device implantation and ablative procedures will increase with a parallel increase in relevant clinics.
- Provision of an accessible urgent pacemaker implantation service will be increasingly important with an ageing population.

Heart Failure Service

The prevalence of heart failure is continuing to grow because of the improved survival of patients with heart conditions and the ageing of the population. The heart failure service provides care across the spectrum of inpatient care, inpatient clinic, heart failure rehabilitation program and case management in the community. The capacity to offer more expensive, intensive treatments will need continual review. The program is heavily dependent on the role of chronic care nurses who prevent admissions by tending to patients in the community

Projection:

- Increasing prevalence of heart failure patients in the community and increasing role for ambulatory care will require high levels of coordination with the Inner West Sydney Medicare Local.

Ambulatory Cardiac Care

Provision of appropriate cardiac care in the community is an important component in the strategy for reducing hospital admissions. The ambulatory care group aims to enrol all patients who are discharged from hospital into a chronic care program. The services offered to patients range from community nurse liaison with GPs to ensure evidence based risk factor management to case management of the sickest patients. Other programs for patients between the extremes of illness severity include cardiac rehabilitation, heart failure rehabilitation and alternative models of care.

The challenge of the ambulatory care program is meeting the need of an overwhelming number of patients with limited resources. There is good evidence however that these programs are effective.

Projection:

- To meet the needs of ambulatory cardiac care, will require improved efficiency through the use of electronic medical records.

Models of care focused on multi-disease focused primary and secondary prevention with patients being treated in the community.

Cardiothoracic Surgery

Cardiothoracic surgical services are provided at RPA and Concord by a single medical unit operating across both sites. Cardiothoracic procedures performed at Concord Hospital are limited to device (e.g. pacemakers) implantation.

While coronary artery surgery remains the most common form of heart surgery, operations for structural heart problems, particularly cardiac valve lesions and operations on the aorta are growing in numbers and complexity.

Surgery for coronary artery disease has also evolved to provide more options than the standard bypass operation with the patient on heart by bypass.

The patients undergoing heart surgery are now older, sicker and have more co-morbidities than was the case five years ago. Preoperative planning involving anaesthetists, intensive care specialists and cardiologists are critically important in these patients.

RPA remains a major centre for lung cancer surgery. It is also a major centre for the treatment of chest and heart trauma. Together with the cardiac anaesthetists and intensive care specialists the cardiothoracic surgery has developed unique expertise in instituting and maintaining ECMO support in patients with a wide range of conditions which require circulatory including patients with severe viral respiratory infections. Patients are frequently commenced on ECMO in their local hospital and transported back to RPA.

The Baird Institute is closely integrated with the Department of Cardiothoracic Surgery. The research and training activities of the Institute firmly underpin the clinical cardiothoracic surgery models of care.

Activity

Table 7: Cardiothoracic Surgery Bed Days at RPA Hospital 2006-2011

Cardiothoracic Surgery Bed days at RPA Hospital 2006-2011					
	2006/07	2007/08	2008/09	2009/10	2010/11
421 Coronary Bypass	2874	3482	3867	3242	3176
429 Other Cardiothoracic Surgery	3717	3801	3852	4070	3850
Grand Total	6591	7283	7719	7312	7026

Projection:

- The requirements for high quality cardiac imaging particularly cardiac MRI will grow as the number and complexity of operations for structural heart disease increase.

Vascular Surgery

In recent years vascular surgery has undergone a dramatic transformation from employing traditional operative techniques to using endoluminal approaches to a wide range of vascular problems

Increasing endoluminal procedures translates into increasing use of consumables, particularly stents. The system for procuring these items will need to be continually upgraded to ensure that we obtain the best value for money.

RPA Hospital

The opening of the Hybrid Operating Theatre at RPAH has given the vascular surgeons access to state of the art imaging facilities for performing their most complex aortic procedures, less complex peripheral procedures continue to be performed on non inpatients in the cardiac catheterisation laboratory.

Vascular Surgery is also heavily dependent on high quality image for diagnosis and planning of procedures. Vascular surgery also relies heavily on the CT vascular imaging services of the Radiology Department.

Concord Hospital

The application of endoluminal approaches to a wide range of vascular problems is equally relevant to Concord Hospital. The lack of a Hybrid Operating Theatre at Concord has major implications for the quality of imaging and the complexity of procedures which can be safely undertaken. This also has implications for the retention and attraction of highly trained staff keen to remain at the leading edge of vascular Surgery. Less complex peripheral procedures continue to be performed in the operating theatres at Concord.

Outpatient review is an important part of Vascular Surgery care. This takes place in the 3W ambulatory care, shared with Cardiology. The access to rooms and adequate computing to view PACS images in this area is inadequate to keep up with current demand.

Imaging for Vascular Surgery

Vascular Surgery is heavily dependent on high quality images for diagnosis and planning of procedures. At RPA, the Vascular Ultrasound service is an integral part of the Vascular Surgery department. At Concord, the Vascular Ultrasound service is closely affiliated with the Vascular Surgery department. The Vascular Ultrasound service at Concord requires investment in upgrading and digitisation of ultrasound equipment.

Vascular Surgery also relies heavily on the CT vascular imaging services of the respective Radiology Departments.

Projections:

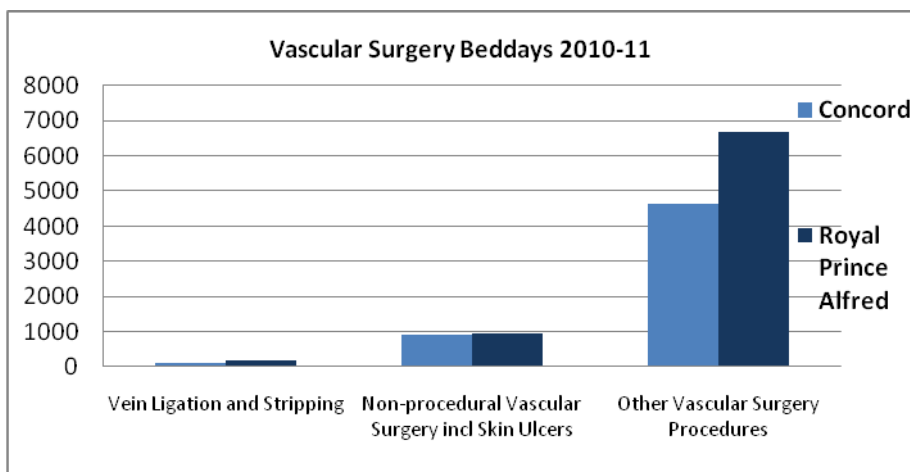
- The transformation of Vascular Surgery into an endoluminal specialty will continue with a growing use of consumables and stents and an increasing requirement for high quality imaging.
- Continuous upgrade of imaging and ambulatory care capacity will be an important aspect of chronic care of vascular patients.
- Upgrading of theatre facilities at Concord to include high-end imaging and Hybrid lab facilities will be critical to the delivery of care at this facility.

Activity

Vascular Surgery workload is described by the following ESRG's

- 531 Vein Ligation and Stripping
- 539 Other Vascular Surgery
- 532 Non-Procedural Vascular Surgery inc Skin Ulcers

Figure 5: Vascular Surgery Bed days x ESRG 2010-11



Statewide Renal Service (Renal Medicine)

The Statewide Renal Service operates as a single service across the LHD. Dialysis is performed at both RPA and Concord. Each hospital has an in-centre dialysis unit and satellite dialysis centre for non-inpatients. Home training for dialysis is also conducted through the Satellite Dialysis Centre. SLHD currently has 22 in-centre and 44 satellite chairs. In addition there are 220 patients treated in the District's home dialysis program. The Renal Service Activity data indicated that there were 434 renal dialysis patients during 2012.

Kidney transplantation is performed only at RPA.

It is widely acknowledged that the number of people on renal dialysis in NSW is increasing significantly each year; an experience reflected in the dialysis statistics within SLHD. Contributing factors include the population growth and ageing of the local inner west Sydney population, plateauing transplantation rates, increasing survival rates of patients with cardiovascular disease, escalating rates of diabetes (now the most common cause of End Stage Renal Failure in NSW) and growing health awareness among the local population. The SLHD has grown by 17% in the past decade. In the next decade, the population aged 70-84 is predicted to grow by 29.1% and the population aged 85+ is predicted to grow by 28%. Patients >70 years of age is the population in whom the incidence of ESRF dialysis therapy is growing at the fastest rate in Australia.

The prevailing clinical model of care is to detect kidney disease early and to prevent it progressing to end stage renal failure. This objective is pursued through inpatient care and an extensive network of clinics throughout the state. A clinical information system which permits the management of these patients and contains all their pathology results regardless of the pathology provider is being developed.

Preventative strategies which target control of vascular risk (in particular blood pressure, lipids and diabetes) have been demonstrated to retard the need for ESRF treatments. Many of the clinics including

a more recently established chronic kidney disease clinic target this approach whilst also serving to educate and inform the patient cohort to plan their course of renal failure therapy. When dialysis becomes inevitable, timely and appropriate vascular access is a standard of care. The renal service is developing its own ‘interventional nephrology’ service to implant ‘tunnelled Vascaths’ as a temporary method of vascular access prior to the elective creation of an A.V. shunt. if there is late presentation or acute deterioration enabling ambulatory rather than inpatient intervention.

The number of patients requiring dialysis is growing at about 5.8% per year. Until now, there have been regular enhancements. In future funding models under the ABF regime will need to be analysed to determine the most efficient way of providing this service.

Renal transplantation is available to only a small proportion of patients with end-stage renal disease (6% of dialysis patients in NSW are transplanted per year). Efforts to increase the availability of both live donors and cadaveric donors need to continue at an enhanced level. SWRS has targeted this by increasing living donor transplantation rates by initiatives such as the ABO incompatible transplant program. The following table shows the transplant numbers at RPA from 2006/07-2010/11.

Table 8: Kidney Transplants at RPA 2006-11

Kidney Transplants at RPA 2006-2011				
2006/07	2007/08	2008/09	2009/10	2010/11
68	67	77	85	75

Projections:

- The number of patients with end stage renal disease requiring dialysis and transplantation will continue to rise.
- The clinical information system to underpin the management of patients with chronic kidney disease and enable planning will require continuing development.
- An interventional nephrology service which provides timely vascular access for dialysis will continue to be developed.

Activity

Renal workload is described by the following ESRG's

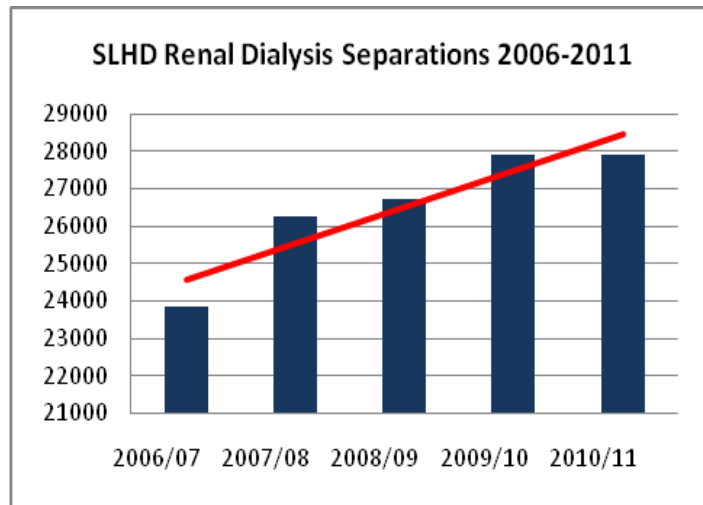
- 221 Renal Failure
- 229 Other Renal Medicine

Table 9: SLHD Hospital Renal Medicine Beddays by SRG and DRG 2010-11

SLHD Hospital Renal Medicine Beddays by SRG and DRG 2010-11	Canterbury	Concord	RPA
Renal Failure	204	1084	1125
Renal Failure W Catastrophic CC	99	786	631
Renal Failure W Severe CC	44	192	300
Renal Failure W/O Catastrophic or Severe CC	61	106	194
Other Renal Medicine	303	1312	1235
Hypertension W Catastrophic or Severe CC	27	44	39
Hypertension W/O Catastrophic or Severe CC	32	71	112
Operative Insertion of Peritoneal Catheter for Dialysis W Cat or Sev CC		372	79
Operative Insertion of Peritoneal Catheter for Dialysis W/O Cat or Sev CC		21	20
Other Procedures for Kidney and Urinary Tract Disorders W Cat CC		217	230
Other Kidney and Urinary Tract Diagnoses W Catastrophic or Severe CC	72	204	307
Other Kidney and Urinary Tract Diagnoses W/O Catastrophic or Severe CC	172	288	442
Other Factors		86	6
Grand Total	507	2396	2360

The following figure outlines the increasing demand for dialysis services in SLHD. Analysis of the 2006-2011 renal dialysis separations recorded for District facilities in FlowInfo v11.2 shows a growth rate of 5.8%.

Figure 6: Renal Dialysis Trends SLHD Hospitals 2006-11



The following table (Table 10) summarises the District’s projected renal dialysis patient numbers and facility requirements to 2016 and 2021 using the medium annual growth rate of 5.8%. However, it is considered that a growth rate of 7% could easily be realised, especially if no action or strategies were in place to intervene early to optimize prevention measures or to substantially increase the transplantation capacity. Should such strategies be vigorously pursued the growth in dialysis patients, over time, could be contained at the medium estimated level of 5.8% as per the following table.

Table 10: SLHD Current and Projected Renal Dialysis Need 2012, 2016, 2021 Based on Medium Growth Rate

Scenario: Medium annual growth rate of 5.8% to 2021*

SLHD Renal Patient and Chair Projections 2012-2021										
		Actual			Projected					
Modality	Facility and Service	2012			2016			2021		
		Patients	Chairs	Treatments	Patients	Chairs	Treatments	Patients	Chairs	Treatments
Facility-based	Concord in-centre	38	12	5938	48	13	7440	63	18	9863
	Concord satellite	36	14*	5604	45	11	7022	60	15	9308
	RPAH in-centre	25	10	3934	31	10	4929	42	12	6534
	RPAH satellite	122	33	17892	153	36**	22418	202	48	29719
	Sub-Total Facility	214	69		268	70		356	93	
Home-based	Concord	90	-	Var	113	-	Var	149	-	
	RPAH	130	-	Var	163	-	Var	216	-	
	Sub-Total Home	220	-	Var	276	-	Var	365	-	
Total SLHD Renal Dialysis		441	69		553	70		732	93	

**Concord satellite is currently operating at 75% capacity, with chairs not currently utilised during Tuesday, Thursday, Saturday afternoon shifts.

RPAH North West Precinct planning includes five extra satellite stations plumbed. Funding, staffing and resources for the commissioning of this expansion has not been secured.

+ The District's current ratio of in-centre/satellite to home-based dialysis at 107:110 is in line with NSW Health's recommendations, and therefore projections have assumed a continuation of this ratio into the future. Other projection assumptions include: SLHD renal dialysis unit distribution will remain as per current arrangements; chairs at SLHD facilities will continue to operate for 2 shifts each day, 6 days a week, 52 weeks a year; each haemodialysis patient requires an average of 156 treatments per annum (based on 3 treatments per week for 52 weeks); each In-Centre chair can provide 562 treatments p.a. (based on 2 shifts per day for 6 days per week at 90% occupancy); each satellite dialysis chair can provide 624 treatments p.a. (based on 2 shifts per day for 6 days per week at 100% occupancy) or dialyse 4 patients p.a..

It is estimated that SLHD will be operating at 90% in-centre capacity by 2015-16 and 100% of satellite capacity by 2017-18. By 2021, an additional 24 in-centre and satellite dialysis chairs will be required. Consequently, further investment in facilities is required to ensure renal dialysis services are adequate for the demand.

The Canterbury LGA currently lacks a dialysis facility and patients from this area, who are frequently of low socio-economic status and from a CALD background, have inadequate local access to dialysis services. Therefore, rather than increasing the built capacity at RPA or Concord, a dialysis facility should be established at Canterbury and opened in 2018.

Early intervention and prevention services are required in order to minimize the need for dialysis and transplantation, in line with NSW Health's key strategic priority of keeping people healthy and out of hospital. Such future strategies include enhanced Renal Preventative Clinics and enhancing support for training and extension of home dialysis services. Additional strategies supported by the District include initiatives to harness the 20% of patients estimated to be suitable for pre-emptive transplant, and developing an Ambulatory Day Stay model of care to prevent Emergency Department attendances.

The University of Sydney/SLHD collaborative research centre, the Clinical Research Facility of the Charles Perkins Centre offers a number of opportunities for research into effective strategies. This research facility is uniquely placed to develop, evaluate and research clinical innovations and initiatives in the area of renal disease prevention and early intervention. It provides an appropriate place for the development of new evidence and approaches in this important area of health care. This is a new venture which could yield, exciting opportunities to evaluate system approaches to contain the rapid growth of chronic renal disease and ESRF treatments. The patient care pathway (stages of chronic kidney disease through to dialysis, transplantation or conservative care) which is now established in theory can be evaluated well in this setting.

Cardiovascular Service Patient Flows

The SLHD had some outflows to South Eastern Sydney Local Health District, SWSLHD, St Vincent's Network and private hospitals which probably represents natural inter-area flow.

Table11: Self-Sufficiency of Cardiovascular Services by ESRG 2010-11

ESRG	% Self Sufficient	% to SESLHD	% to SWSLHD	% Private	% St Vincent's network	Other
111 Chest Pain	75.9	5.6	5.6	0.8	5.9	6.1
112 Unstable Angina	90.6	1.8	1.6	2.1	0.9	3.0
113 Heart Failure and Shock	85.4	6.8	3.5	1.2	2.5	0.6
114 Non-Major Arrhythmia and Conduction Disorders	75.9	5.0	7.5	5.6	3.4	2.6
115 AMI W/O Invasive Cardiac Inves Proc	84.3	3.2	5.2	1.2	2.3	3.8
116 Syncope and Collapse	82.5	5.7	4.1	0.2	4.3	3.3
119 Other Cardiology	72.6	4.7	3.4	5.4	9.7	4.1
121 Invasive Cardiac Inves Proc	76.1	3.5	1.3	11.7	4.5	3.0
122 Percutaneous Coronary Angioplasty	73.4	10.6	0.9	6.6	5.8	2.7
129 Other Interventional Cardiology	72.6	4.3	0.4	16.6	2.7	3.4
221 Renal Failure	79.9	11.1	3.1	0.8	2.5	2.6
229 Other Renal Medicine	66.7	7.8	6.3	14.0	3.3	1.9
421 Coronary Bypass	51.1	9.3	0.0	29.2	7.1	3.2
429 Other Cardiothoracic Surgery	53.5	7.3	0.7	30.1	5.0	3.5
531 Vein Ligation and Stripping	34.9	4.6	5.3	49.3	1.0	4.9
532 Non-procedural Vascular Surgery incl Skin Ulcers	75.2	8.5	2.4	5.8	4.0	3.9
539 Other Vascular Surgery Procedures	74.6	4.7	4.4	10.5	4.5	1.3
611 Transplantation	69.7	4.8	0.0	0.0	25.5	0.0
Grand Total	74.5	6.2	3.3	8.8	4.6	2.6

Issues in Clinical Service Provision

Imaging

- Gaining increased access to cardiac MRI for patients with structural heart disease. This involves building collaborative relationships between cardiologists trained in MRI and radiologists.
- Increasing access to CT for cardiac and vascular imaging. Future models of care may be based on CT coronary angiography for patients presenting to ED with chest pain.
- Coping with the increasing demand for cardiac and vascular ultrasound and in particular the training and retention issues in the technical workforce.
- Ability to perform interventional renal procedures (insertion and surveillance of dialysis access) to enable safer and more cost effective dialysis therapy as an outpatient service.
- Increasing the capacity to perform both open and complex endovascular intervention within a hybrid operating suite environment across the District.

Information Systems

- Adequate patient information systems in which test reports, imaging data, implanted device data, outside pathology results and follow up data are available in the patient's EMR.

Models of Care

- The need to develop a renal intervention service for securing vascular access for dialysis in a timely fashion. An increase in the renal dialysis capacity across the District in accordance with the rising demand. The dialysis built capacity will be utilised by 2017. An additional in-centre and satellite chairs are required by 2021.
- The vascular surgeons at Concord require a hybrid operating theatre to provide imaging of sufficient quality for endoluminal procedures.
- Access to ICU beds for cardiothoracic surgery patients to minimize surgery cancellation
- Enhanced utilization of the private sector to extend to role of the public sector without loss of revenue or manpower from LHD and with the capacity of the patient data including imaging and pathology data to move across the public/private boundary.
- Because of the increased complexity of patients and the increased complexity of procedures in cardiac catheterization laboratories, anaesthetic support for procedures is a limiting factor and there is increasing demand for an increase.
- Because of the issues surrounding implantation of pacemakers and defibrillators in patients with unplanned admissions, statutory length of stay requirements are not being adhered to. These issues include who will implant, surgeon or cardiologist, where will the device be implanted, cath lab or theatres, and the availability of radiographers when theatres are used.
- Process for approving funding and procuring new devices in ABF environment.

Hospital Avoidance

- The sickest cardiac, renal and vascular patients occupy a large number of bed days in re-admissions. The 5% of sickest patients require case management in the community. The number of these patients is challenging in relation to staffing levels. The next 10% of the sickest scale require carefully coordinated care to prevent readmission. The numbers in this group are also challenging.
- There is a need to design specific management strategies for diseases where the prevalence has risen sharply, including chronic kidney disease, atrial fibrillation, heart failure, adults with congenital heart disease etc. Further, the appropriate pathways for specific groups such as the very elderly and people with limited English require particular consideration.
- Referral to the emergency department and admission from the ED to the ward could often be avoided if access to specialist services in rooms or clinics was more readily available. The cost of visiting rooms is frequently an issue. More rapid access to clinics needs to be established.
- Establishment of ambulatory care facility would enable very significant reduction of A&E presentation and inpatient care in chronic renal failure patients. This currently exists partially for transplantation only.

Funding

- The traditional funding source for capital expenditure using staff specialist trust funds is no longer viable. So far alternative sources of revenue have not be established.

Many of the issues quoted above are impacting on length of stay. These issues include the imaging access, availability of anaesthetists, timeliness of device implantation and vascular access for renal patients.

Our Priorities

The overarching goals of the SLHD Cardiovascular Stream are: patient safety; quality of care; patient access and patient flow; retaining and attracting a high quality workforce; sustaining leadership in our fields. In order to achieve these goals, the recommended service priorities for the next 5 years (2013-2018) are as follows:

1. Imaging: Cardiac MRI, Hybrid Labs Cardiovascular CT, Echocardiography

Cardiac MRI represents the standard of care in the evaluation of cardiac muscle pathology and in many cases provides the only means to establish important diagnoses. Cardiovascular CT-both coronary and large vascular- has transformed the noninvasive evaluation of arterial anatomy, changing models of care in emergency departments and being mandatory for complex vascular and cardiothoracic procedures. Establishing hybrid imaging facilities for complex interventions where these are not yet established should be considered an essential part of this service. Echocardiography is an established mainstay, for which demand hopelessly exceeds demand. Substantially expanded access to Cardiac MRI and Cardiovascular CT and RPAH and CRGH, with partnerships between clinicians and Radiology services are urgently needed to retain high quality clinicians in our SLHD and to ensure our patients have timely and efficient optimal care. Substantial expansion of echocardiography capacity is required for maintenance of adequate inpatient care.

This is unresolved for renal patients and the establishment of an interventional nephrology service needs the imaging facility in order to be realised and optimise patient care

2. Funding and Introduction of Devices.

Defibrillators, pacemakers, valve prostheses, closure devices have revolutionised patient care, with improved survival (defibrillators and pacemakers and valve prostheses), quality of life (dual chamber pacemakers and percutaneous valves), and save millions of dollars relative to traditional open procedures (closure devices) or provide treatment not available to frail patients (percutaneous valves). In Vascular Surgery, it is necessary to manage the increasingly diverse and complex array of endovascular devices used to treat complex aortic pathology including fenestrated and branched stent grafts. These devices are effective but are expensive. Transparent, standardised, rigorous processes for their funding and evaluation need to be established within SLHD and throughout NSW. Improved adherence to tender-based products to minimise unnecessary expenditure should be linked to planned increased expenditure for new, but effective technologies, which are now mainstays of quaternary level care.

3. Governance of novel therapies and models of care.

New models of governance that transcend traditional disciplines are needed if we are to deliver high quality care affordably. Revising how conditions are treated, whether new devices replace traditional open heart or vascular surgery, and whether theatre time, catheter laboratory time or hybrid laboratory time are best used to deliver this care require new models of governance that cross departmental boundaries.

Availability of other disciplines- e.g. anaesthetists- in non-traditional environments such as catheter laboratories during complex ablation procedures, will limit optimal utilization of capital-intensive hybrid facilities and further emphasises the need for trans-disciplinary approaches. New models of governance will not replace the need for robust and transparent funding models for new care as indicated above, but will enhance the prospect such care will be delivered effectively.

4. Information systems: Electronic databases, telemedicine.

Current systems for storage of Cardiovascular Stream Specific data expose the SLHD to major legal risk of loss of patient information and the inability to access recall information (for failed devices) in a timely manner. The ability to efficiently coordinate care is closely linked to the quality of information systems both within the SLHD and statewide for referral hospitals and statewide services- such as Renal Medicine. Electronic access to patient information such as ECG, angiogram results, echocardiogram reports- are nonexistent outside host departments and are therefore below current standards delivered by PACS for Radiology. The capacity of the SLHD to service remote communities will be greatly enhanced by establishing telemedicine facilities. Resourcing information systems adequately, both in terms of capital outlay and in terms of ongoing IT maintenance is a priority.

5. Minimising hospital utilization by enhancing co-ordinated care.

Optimal use of hospital resources requires efficient post-acute transfer of care, and prevention of unnecessary admission. Substantial effort needs to be invested in enhancing the links between primary, secondary and tertiary level care. This includes designing specific strategies for diseases and illnesses where the prevalence is sharply increasing such as chronic kidney disease, atrial fibrillation, heart failure and adult congenital heart disease . There is little current accountability between levels of care, and little ongoing commitment from hospitals to provide adequate outpatient services to sustain outpatient chronic care. There is also a lack of engagement between hospitals and community health and primary health practitioners. Major efforts must be made to enhance patient discharge to intermediate level facilities to avoid unnecessary acute bed occupancy, and to markedly enhance the capacity of outpatient chronic care packages to be activated with the same acuity that transfers from ED are currently considered. Formal memoranda of understanding are likely to be needed between Divisions of General practice, Medicare Locals and SLHD Chronic Care Co-ordinators to ensure that all levels of health care share responsibility for ongoing patient care. New funding models are also likely to be needed.

6. Responding to model of care changes and increasing demand

Across the Clinical Stream's departments and services there are varied needs related to population growth and change, epidemiological changes and rising demand. Such challenges include, for example: ensuring sufficient renal dialysis capacity across the District, ensuring sufficient bed, exercise testing and clinic capacity; ensuring sufficient anaesthetic support and cardiothoracic ICU support.

We believe all of the above items 1-6 are required if we are to enhance equity of access, quality of care, safety, and maintain and enhance our clinical leadership in CV stream.

Appendixes

Table 12: SLHD Cardiovascular Activity 2005-2011

SLHD Supply Cardiovascular Services (SLHD hospitals) 2005-2011																		
	2005/06			2006/07			2007/08			2008/09			2009/10			2010/11		
	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Beddays
11 Cardiology	922	3423	17174	812	3295	16387	832	3339	16971	828	3334	15568	816	3213	15081	725	3372	16884
111 Chest Pain	469	901	1985	364	837	1713	337	841	1685	399	781	1516	378	796	1510	336	756	1631
112 Unstable Angina	31	247	951	30	185	662	38	175	654	15	121	420	22	122	368	11	109	385
113 Heart Failure and Shock	35	676	5572	33	753	6125	24	771	6614	37	843	6340	22	717	5939	27	877	7147
114 Non-Major Arrhythmia and Conduction Disorders	164	572	2790	138	598	2718	161	551	2465	160	573	2189	162	561	2446	159	549	2286
115 AMI W/O Invasive Cardiac Inves Proc	45	253	1978	58	236	1571	62	275	1931	36	242	1852	46	245	1405	41	221	1689
116 Syncope and Collapse	74	369	1553	95	289	1139	109	323	1274	107	400	1398	90	376	1339	65	403	1538
119 Other Cardiology	104	405	2345	94	397	2459	101	403	2348	74	374	1853	96	396	2074	86	457	2208
12 Interventional Cardiology	177	1135	6777	170	1240	6428	175	1124	6514	169	1176	6243	194	1085	5812	172	1131	6206
121 Invasive Cardiac Inves Proc	105	506	2916	114	559	2916	118	495	2900	109	524	2687	149	496	2590	117	540	2818
122 Percutaneous Coronary Angioplasty	52	388	1918	27	428	1961	20	344	1653	18	398	1766	15	334	1403	11	335	1713
129 Other Interventional Cardiology	20	241	1943	29	253	1551	37	285	1961	42	254	1790	30	255	1819	44	256	1675
22 Renal Medicine	188	408	3338	177	441	2787	204	382	2515	246	445	3084	289	433	2950	228	423	2806
221 Renal Failure	11	111	951	8	133	1115	6	116	844	18	130	1058	19	134	1176	6	172	1455
229 Other Renal Medicine	177	297	2387	169	308	1672	198	266	1671	228	315	2026	270	299	1774	222	251	1351
23 Renal Dialysis	15449	1	1	15521	4	7	17301	3	7	18624	1	1	19029	1	1	19926	5	35
42 Cardiothoracic Surgery	3	267	2644	3	237	2333	4	263	2680	1	265	3021	6	255	2698	5	264	2699
421 Coronary Bypass	1	127	1431		98	1015	1	111	1218		115	1492		99	1019		103	1075
429 Other Cardiothoracic Surgery	2	140	1213	3	139	1318	3	152	1462	1	150	1529	6	156	1679	5	161	1624
53 Vascular Surgery	89	755	7816	73	765	8028	72	748	7571	55	769	7858	68	766	7868	75	772	7719
531 Vein Ligation and Stripping	17	108	159	6	110	202	9	99	130	3	84	117	3	77	121	4	84	102
532 Non-procedural Vascular Surgery incl Skin Ulcers	46	164	1967	47	168	1940	39	172	1786	32	199	1854	47	225	1957	45	224	2138
539 Other Vascular Surgery Procedures	26	483	5690	20	487	5886	24	477	5655	20	486	5887	18	464	5790	26	464	5479
61 Transplantation	0	9	129	0	9	101	0	15	155	0	8	101	0	12	136	0	14	175
Grand Total	16828	5998	37879	16756	5991	36071	18588	5874	36413	19923	5998	35876	20402	5765	34546	21131	5981	36524

Table 13: SLHD Residents Demand for Cardiovascular Services 2005-2011

SLHD Resident Demand for Cardiovascular Services (inlc inside and outside SLHD hospitals) 2005-2011																		
	2005/06			2006/07			2007/08			2008/09			2009/10			2010/11		
	DO Seps	ON Seps	N Bedday	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Bedday	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Beddays	DO Seps	ON Seps	ON Bedday
11 Cardiology	1371	4308	20526	1296	4247	20414	1374	4388	21270	1302	4270	19268	1271	4160	18441	1137	4290	20664
111 Chest Pain	669	1169	2459	588	1128	2219	576	1170	2243	578	1083	2140	567	1111	2043	532	1012	2060
112 Unstable Angina	44	298	1129	43	216	744	55	222	808	25	165	553	31	166	504	18	127	419
Shock	45	813	6590	44	924	7536	37	935	7957	47	972	7227	33	865	6896	39	1027	8358
Arrhythmia and Conduction Disorders	245	721	3364	231	765	3424	271	703	3111	258	732	2745	258	724	3028	244	727	2977
115 AMI W/O Invasive Cardiac Inves Proc	61	310	2340	73	289	1824	74	359	2350	58	292	2138	63	301	1688	55	277	1997
Collapse	137	481	1861	146	389	1427	177	452	1687	178	518	1793	141	481	1639	114	521	1830
119 Other Cardiology	170	516	2783	171	536	3240	184	547	3114	158	508	2672	178	512	2643	135	599	3023
Cardiology	610	1825	9117	590	1912	8778	584	1777	8634	596	1856	8604	616	1726	7891	544	1723	8031
Inves Proc	493	743	3777	466	826	3760	448	749	3644	468	785	3561	506	769	3358	430	764	3428
122 Percutaneous Coronary Angioplasty	65	653	2615	49	662	2571	51	551	2174	47	622	2382	36	520	1899	25	538	2325
129 Other Interventional Cardiology	52	429	2725	75	424	2447	85	477	2816	81	449	2661	74	437	2634	89	421	2278
42 Cardiothoracic Surgery	6	512	5281	3	470	4857	6	506	5322	2	521	5520	9	510	5503	6	512	5142
421 Coronary Bypass	1	245	2727		206	2171	1	219	2531		214	2536		188	2028		195	2102
Cardiothoracic Surgery	5	267	2554	3	264	2686	5	287	2791	2	307	2984	9	322	3475	6	317	3040
22 Renal Medicine	366	568	4325	360	597	3885	433	558	3427	478	624	3946	526	614	3862	481	594	3706
221 Renal Failure	20	143	1243	15	172	1491	21	158	1228	21	193	1464	27	172	1411	13	221	1815
Medicine	346	425	3082	345	425	2394	412	400	2199	457	431	2482	499	442	2451	468	373	1891
61 Kidney Transplantation	0	14	187	0	16	168	0	18	186	0	12	143	0	18	233	0	17	209
23 Renal Dialysis	23029	3	13	23463	12	17	24847	70	75	26217	10	10	25945	2	25	26839	5	35
53 Vascular Surgery	294	1185	10626	278	1202	10634	271	1137	9844	231	1149	10258	274	1205	10078	369	1212	10215
Stripping	74	264	390	41	259	398	58	214	273	45	194	246	68	213	263	55	217	249
Vascular Surgery incl Skin Ulcers	158	216	2387	161	229	2489	136	219	2186	119	244	2204	135	277	2412	227	285	2674
539 Other Vascular Surgery Procedures	62	705	7849	76	714	7747	77	704	7385	67	711	7808	71	715	7403	87	710	7292
Grand Total	25677	8415	50075	25990	8456	48753	27515	8454	48758	28826	8442	47749	28641	8235	46033	29376	8353	48002

Table 14: SLHD Inflows for Cardiovascular

Inflows to SLHD Hospitals for Cardiovascular 2010-11																								
LHD Of Residence	11 Cardiology			12 Interventional Cardiology			22 Renal Medicine			23 Renal Dialysis			42 Cardiothoracic Surge			53 Vascular Surgery			61 Transplantation			Total	Total	Total
	DO Seps	ON Seps	N Bedda	DO Seps	ON Seps	N Bedda	DO Seps	ON Seps	N Bedda	DO Seps	ON Seps	N Bedda	DO Seps	ON Seps	N Bedda	DO Seps	ON Seps	N Bedda	DO Seps	ON Seps	N Bedda	DO Seps	ON Seps	N Bedda
Sydney	725	3372	16884	172	1131	6206	228	423	2806	19926	5	35	5	264	2699	75	772	7719		14	175	21131	5981	36524
Western	8	53	321	17	278	1377	7	17	195	77				130	1404	7	145	1450		4	36	116	627	4783
Sydney	31	232	935	136	289	1004	76	48	264	1882			1	110	954	7	124	912		18	204	2162	821	4273
Northern Sydney	81	269	1324	23	132	708	48	50	447	2011			4	44	356	9	103	866		4	52	2176	602	3753
Western Sydney	88	199	767	49	176	965	34	48	580	1669			1	60	491	5	68	549		2	29	1846	553	3381
Sydney	81	150	576	24	114	375	27	25	229	1407				29	223	10	62	635		1	19	1510	381	2057
Other(999)	31	59	256	10	44	260	7	13	99	425				17	191	3	13	413		3	28	476	149	1247
Shoalhaven	8	29	202	30	107	356	2	5	18	10				33	230	1	26	160				51	200	966
England	4	24	86	8	21	112	4	3	6	19				19	165	1	42	482				36	109	851
Murrumbidgee	5	6	60	1	8	39	4	10	69	101				31	237		30	210		6	99	111	91	714
Mountains	7	22	83	3	22	122	2	6	37	216				12	66	7	58	348				235	120	656
Mid North Coast	3	6	63	2	9	36	1	6	27	22				23	158	1	10	138		4	100	29	58	522
Southern	4	10	68	4	7	19		9	127	14				6	30	1	17	105		7	126	20	56	475
Central Coast	6	27	101	3	18	68	5	5	17	30				32	191	3	10	64		1	8	47	93	449
A.C.T.	2	6	20	1	3	37	2	1	15	2				2	21	1	4	26		10	117	8	26	236
Northern	0	4	10	2	4	33	1			37	1	5		4	59		3	38		1	10	40	17	155
Queensland	4	18	52	2	6	22		2	2	36				2	5		5	34				42	33	115
Victoria	4	8	22	1	6	42	1	1	1	11												17	15	65
South Australia	0	4	11		2	19				0				1	1		2	14					9	45
West. Australia	2	2	8		3	6				1												3	5	14
Far West	1				3	4				1												2	3	4
Tasmania	0	1	1					1	1	0													2	2
North. Territory	1	1	1							0												1	1	1
Grand Total	1083	4502	21851	488	2383	11810	449	673	4940	27897	6	40	11	819	7481	131	1494	14163	0	75	1003	30059	9952	61288