Bundaberg Hospital Commission of Inquiry

Statement of Michael Ian Cleary

Attachment MIC-4

FINAL MARK.

Queensland Government
Queensland Health

THE PRINCE CHARLES HOSPITAL HEALTH SERVICE DISTRICT

Implications of Transfer of Cardiac Activity from The Prince Charles Hospital to Princess Alexandra Hospital

Progressive Impact Analysis
Review of Specific Aspects of the
Cardiac Surgical and Cardiology Services and impact resulting from transfer of resource
Draft Version 01 – Confidential and invalid information)

TPCHHSD Working Group

Deb Podbury (District Manager)
Dr Michael Cleary (Executive Director Medical Services)
Dr Greg Stafford (Chair Cardiac Division)
Dr Andrew Galbraith (Acting Director Cardiology Services)
Cheryl Burns (Executive Director Nursing Services)
Mary Wheeldon (Nursing Director Critical Care Services)
Jon Roberts (Financial Controller)
Paul Winton (Business Manager, Cardiac and Critical Care)
Allan Rowe (Manager Transition and Clinical Costing)
Hayley Middleton (Senior Administration Officer, District Services)

In consultation with:

June Urquhart (Nurse Manager Operating Theatres)
Tony Shileds (Nurse Manager Cardiac Investigations Unit)
Bill Hunt (Perfusionist)
Dr John Murray (Director of Anaesthetics)
Caroline Zantis (Acting Nursing Director – Cardiology)
Michael Webke (Anaesthetic Technician)
Susan Boucaut (Cardiac Scientist in charge – Cardiac Investigation Unit)

Contact details:
Deb Podbury
District Manager
The Prince Charles Hospital Health Service District
Rode Road, CHERMSIDE Q 4032
Telephone: 3350 8224
Facsimile: 3350 8825

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Executive Summary

The Prince Charles Hospital supports growth in cardiac services at Princess Alexandra Hospital. Just not at the cost of existing services provided at The Prince Charles Hospital cardiac service.

Preference would be given to a model of growth whereby the current level of resourcing at TPCH was maintained in both cardiology and cardiac surgery, with new growth provided to Princess Alexandra Hospital. There are concerns that the transfer may result in a reduction in access to current levels of public cardiac surgery and cardiology service.

The demands of the superspecialty cardiac surgical service at The Prince Charles need to be recognised and acknowledged. The sustainability of these superspecialty services is linked to having the following surgeon infrastructure:

- 2 Heart Transplant surgeons
- 2 Lung Transplant surgeons
- 2-3 Paediatric surgeons

1 Adult + Admin.

Whilst the surgeons will also do adult routine cardiac caseload, the above is the infrastructure required to support the existing super-specialty surgical service.

Given the above infrastructure, that is achieved through a combination of workforce (full time staff specialists, part time or fractional appointments and VMO's), it is also proposed that many of the issues around workforce sustainability at PAH could also be achieved with changes to the current workforce structure. This is supported by the fact that across the 50 cardiac surgical units within Australia – there are only 76 surgeons. The flexibility created within the cardiac surgical units across Brisbane could then support after hours on-call, leave and other emergent complications around staffing. It is unclear as to whether these options have been further explored to create sustainability.

There is evidence Australia wide, as well as within Brisbane of increased demand for cardiology. There is changing and increasing demand on cardiology services, particularly in regard to management of acute coronary syndrome and acute myocardial infarction. The pressure on available cardiology resources will increase significantly as the benefits emerge from evolving clinical practice resulting in improved quality of life for cardiac patients, that also promised to be more cost effective (although the cost will be front end)

Service Planning is vital. There are concerns about access to growth over the coming years to meet demand and future service models to support improved revascularisation. Much of the cost is likely to be in the initial episode of care for future revascularisation, realising flow on savings in terms of health system costs through reduced readmissions. This is based on earlier interventions reaping greater health outcomes.

Overview

Cardiovascular disease is the major cause of morbidity and mortality in Australia. The most common forms of heart disease in Australia are coronary heart disease, acquired valve disease, conduction defects, congestive heart failure and congenital heart defects.

Cardiac Services encompasses a range of diagnostic, interventional, surgical and electrophysiological procedures. There are a wide range of treatments for heart disease including medical therapy, interventional procedures using catheterisation or electrophysiology and surgery.

Cardiac Surgery procedures include:

- Coronary Artery Bypass Grafting (CABG)
- Valve Surgery
- Congential Defect surgery
- Electrophysiology surgery
- Operation of the aorta, cardiac tumours, trauma and pericardectomy
- Heart (and Lung) Transplants

The pathway to cardiac surgery is only available following diagnostic investigation and review by cardiologists who determine, based on the clinical decision, whether the most appropriate care and best outcome is achievable through CABG (34%), PTCA or medical therapy.

Interventional cardiology is an integral part of a cardiac unit providing principally diagnostic cardiac catheterisation services, including non-invasive diagnostic cardiac services such as stress testing, nuclear medicine tests and echocardiography (Echo). This therapy has developed to enable treatment of coronary artery and valve disease without open-heart surgery by means of catheter-based procedures including:

- Percutaneous transluminal coronary angioplasty (PTCA)
- Valvuloplasty
- Stenting
- Atherectomy

Approximately 0.15% of patients undergoing PTCA were transferred to cardiac surgery operating theatre for emergency procedure (1 of 632 procedures). Therefore, back up facilities need to be in situ or readily accessible.

Services such as radiology, pathology, pharmacy, pulmonary function testing, blood transfusion services, biomedical engineering, haemodialysis, dietetic services, social work, physiotherapy and pastoral services are important adjunct services. Access to cardiac rehabilitation programs is also beneficial.

Electrophysiology is not included, but has been overviewed in light of it's increasing role in the management of acute cardiac presentations and pressures placed on elective interventions. Many patients undergoing cardiac surgery also require electrophysiology, and access to this service is viral for the cardiac program. These include:

- Electrophysiology (EP)
- Electrophysiology is primarily concerned with the management of cardiac arrythmias through:
- Pacemakers (PPM)
- Anti-tachycardia devices
- Electrophysiology studies (EPS)
- Anti-arrythmia drugs
- Radiofrequency catheter ablation (RFA)
- Implantable cardiac defibrillators (ICD)

This overview is focussed on adult cardiac surgery, diagnostic and interventional cardiology. The other significant drivers of supporting activity that cannot be discounted, but given the current role delineation are excluded from the analaysis are:

- Paediatric cardiac services
- Heart Failure Services
- Transplantation Services
- Thoracic surgical services

It is acknowledged that the practice of cardiology and cardiac surgery change rapidly.

The District supports that the role of cardiac imaging services are reliant on a number of modalities including MRI, CT, Echocardiography, Stress Testing, Angiography and Nuclear Medicine. The role of each modality is directed towards achieving diagnostic images that define diagnosis around structural assessment, screening, and functionality of the cardiovascular system to assist clinical staff in determining the most appropriate therapy (medical, interventional or surgical).

At the Prince Charles, significant research is being undertaken, particularly around coronary artery diagnostics through new imaging modalities including Cardiac Magnetic Resonance Imaging (CMRI) and it is hoped that this will also extend to Multi-detector Computed Tomography (MDCT) with cardiac application. It is projected that within the next five (5) these new non-invasive diagnostic procedures will significantly reduce the rate of diagnostic angiography in the future.

Emerging best practice, for patients at high risk of acute coronary syndromes is highlighting Percutaneous Coronary Investigation (PCI) whereby patients classified as having high risk acute coronary syndromes, who have troponin elevation indicating myocardial infarction with ongoing chest pain may have reduced reinfarction and readmissions by having **early angiography (within 48hours)** unless there are contraindications (Level I evidence). Patients classified as having intermediate risk coronary syndromes clinically will be risk stratified by **non-invasive testing** prior to discharge as this reduces readmission and adverse myocardial events (level I evidence). There is additional evidence that health-care costs are reduced by early Non-invasive testing. Furthermore, increasing clinical opinion is being supported by research that immediate transfer to catheterisation upon diagnosis of myocardial infarction results in improved health outcomes and reduced flow-on costs within the health system[1].

The evolving change in practice and the entire model of care around acute coronary syndromes and acute myocardial infarction will have significant impact on demand for emergency access to cardiologists and catheter laboratories. Following adoption of these guidelines in March 2002, there will be significant pressure for these care models to shift from translational research into everyday practice.

Working Party Activities

The Queensland Health working party's terms of reference restrict activities to the analysis of the impact following change/transfer in resource levels from The Prince Charles Hospital to Princess Alexandra Hospital. This context has been directed and subsequent analysis falls outside of consideration of population trends, existing service profiles, planned future service delivery, links between hospital and community services and rehabilitation services. It is understood that the direction for this cardiac service development has been considered in light of the existing resource environment.

Services that influence or impact on hospital demand were identified as being of critical importance. A local TPCH working group project adopted the following approach:

1) Identification of appropriate data-sets to capture patient activity
2) development of templates to determine fixed and marginal costs around the infrastructure of cardiac services;
3) review and analysis of available activity and flow data – particularly contextual information about the service system;
4) Exploration of the impact of access based on population rates.

The consultation process of the working group revealed a substantial number of issues being expressed by clinical staff with respect to the transfer. The Central Zone Manager is aware of these concerns, and has met with the medical staff on 27th March, 2003 to further discuss their concerns.

[1] ACC/AHA Guideline Update for the Management of Patiens with Unstable Angina and Non-ST-Segment Elevation Myocardial Infarction – Approved March 2002

Specifically, clinicians support the growth of services at PAH, but not at the expense of current activity levels at The Prince Charles Hospital. There is also significant concern that if the uptake of cases at PAH does not match those cases transferred, then there will be a net reduction in access to public cardiac services for Queenslanders.

Clinicians also recognise that the changing patterns in management of coronary disease, particularly the rapidly changing emergency management of acute cardiac presentations, will result in the need to re-establish service capacity to meet growth within 12 months. The sense of transferring resources, that then have to be reestablished is a question of logic. There is evidence that referral from regional hospitals is increasing at levels of growth that will result in the emergency demand challenging the capacity of the Cardiac service to meet elective obligations outside of Category 1 patients. The current rate for ADDON cases (interhospital transfers and non-elective emergency cases) is 39% of all catheter lab activity. Further demand from changing models of care will result in the current elective waiting lists lengthening outside of accepted guidelines.

Access to cardiac surgery is a significant measure, but only when taken into context of how patients arrive at this point in the continuum from cardiac event to therapy. It is considered that the waiting times and processes in between can influence the determination of 'success' to address the public demand. The diagrammatic below highlights the demand and flows from cardiology to cardiac surgery and why the transfer of any resources will impact on service response.

Access to Cardiology – from the acute continuum only – the District acknowledge the role of primary care in pre-acute and post-acute episode of care, but this is outside the scope of this exercise and is excluded for this purpose.

Entry

Inter-hospital transfers (Emergency Addons – non elective emergency)

Emergency Room (Emergency Addons – non elective emergency)

OPD (Elective waiting list management and private patients)

Clinical Units

Coronary care unit admissions for unstable patients (Chest Pain assessment supports low-risk assessment)

Cardiac Medical Ward for at-risk patients

Catheter Lab for emergency patients

Cardiac Investigations Unit (OPD Diagnostics) support both emergency and elective activity

Intervention

Cardiac Surgery - 34% of patients progress from angiography to CABG

Cardiology – interventional procedure - 24%

Cardiology – medical management – 42%

Historical Funding

In order to improve access to Cardiac Surgery in Queensland the PAH established its service in 1998/1999 and TPCH was also funded to address the extensive waiting list, which existed for cardiac surgery. TPCH was allocated elective surgery funding during the late 1990's. The funding was negotiated at a marginal cost, as the cost weights in the earlier casemix funding models did not accurately reflect the real cost of cardiac surgery. TPCH was funded at the rate of $8,300 for a CABG and $11,250 for a valve Procedure. The funding was only for the surgery episode and did not cover the diagnostic cardiology costs associated with the growth in cardiac surgery and these costs were absorbed by the District. The following table summaries the allocation of elective surgery funding from 1996 to 2002

Table 1: Funding and Activity History

	96-97		97-98		98-99		99-00		00-01		01-02	
	Rec	Non-Rec	Rec	Non-Rec	Rec	Non-Rec	Rec	Non-Rec	Rec	Non-Rec	Rec	Non-Rec
Cardiac												
Elective Surgery Maintenance Fund		1,464	2,340		2,340		2,340		2,340		2,340	
Elective Surgery Performance Fund			232	998	694		694		694		694	
Surgical Incentive Fund						1,900		2,085		2,350		2,350
Total Cardiac	-	1,464	2,572	998	3,034	1,900	3,034	2,085	3,034	2,350	3,034	2,350
Orthopaedics												
Elective Surgery Performance Fund			500	500	500		500		500		500	
Elective Surgery Performance Fund - Pathology			142		142		142		142		142	
Elective Surgery Perf[illegible]ance Fund - Capi[illegible]			382									
Surgical Incentive Fund										1,000		1,150
Elective Surgery Enhancement Initiative												1,100
Total Orthopaedic & Pathology	-	-	1,024	500	642	-	642	-	642	1,000	642	2,250
Total Elective Surgery	-	1,464	3,596	1,498	3,675	1,900	3,675	2,085	3,675	3,350	3,675	4,600

TPCH also received $1.0 M in Treasury New Initiative funding for cardiology services until the PAH Cardiac Service was established. This funding ceased in 1998/1999.

The Cardiac Services Division has been faced with significant cost pressures and has been the major contributor to the District's overall deficit. Increased costs have resulted from:

- Increased demand for interventional cardiology (angioplasty, pacemakers and AICD's);
- Marginal cost funding of elective surgery;
- Transplant services;
- Clinical supply cost increases which eventuated form the devaluation of the A$ in the last 5 years; and
- Increased clinical consumable costs due to the need to comply with non reuse of single use items.

The Divisions deficit for the last 3 years has been:

1999/2000 $2.45 M

2000/2001 $4.28 M

2001/2002 $4.53 M

TPCH has been implementing a number of budget strategies in 2002/2003 and has received additional funding for AICD services. However the forecast deficit for Cardiac Services is expected to be $2.2 M for 2002/2003.

As TPCH has a significant underlying budget deficit and only received marginal cost funding for additional elective surgery, the funding transfer to PAH for 300 surgical cases should be $2.82 M. This is based on funding 188 CABG procedures at $8,300 and 112 valve procedures at $11,250. This compares to $2.9 M for the current marginal cost build-up for the 300 surgical cases.

Capital Planning

Planning for the capital development of The Prince Charles Hospital (June 1997) was undertaken on the basis that by 2003 the following cardiac surgery service levels would be likely:

TPCH = 2800

PAH = 1000

TGH = 600

The above equates to a rate of 1,200 per million for Queenslanders.

The Hospital Redevelopment at TPCH was premised on activity growth which would deliver operational efficiency, as the additional activity would be performed at a marginal cost and would therefore reduce the average cost per weighted separation. This strategy is in keeping with the principle that additional resources be directed to optimal service models which maximise cost effectiveness.

The transfer of cases to PAH will result in an increased cost per case at TPCH as the fixed costs are now apportioned to a lower case volume. In the 2000/2001 National Hospital Cost Data Collection Study TPCH's average casemix adjusted cost per separation was 3% lower than the National average and 3% lower then our peer group of hospitals.

The fixed costs associated with the decrease of 300 cases will result in significant erosion of the 3% cost advantage TPCH has historically achieved.

Volume Analysis

TPCH has analysed adult activity levels for cardiac surgery and cardiology to ascertain the current level of patient flows.

During 2001/2002 TPCH performed 348 adult surgical cases and 649 Cath Lab procedures for patients residing in the Southern Zone and PAH performed 11 surgical cases on patients residing in the Central Zone. Based on the proposed level of 300 cases to be transferred to PAH this would necessitate 90% of net Southern Zone patient flow to be referred to PAH.

In terms of Cardiology support for surgery only 56% of the surgery cases had their angiogram performed at TPCH, the remaining 44% were referred privately or from RBH or PAH. The current surgical referral rate from angiography is approximately 34%. It is acknowledged that based on 300 surgical cases this would equate to approximately 880 angiograms being performed, of which PAH would be expected to perform 56% of the angiography workload, which would equate to 500 cases.

To accurately define the cost structures associated with the proposed transfer of 300 surgical cases, the ivity has been analyzed in terms of the following mix.:

Table 2: Projections on numbers for volume

	Cases	Wt Seps (Ph 8)	Public Mix %
Valve	112	924	86.92%
CABG	157	828	83.52%
Other	31	215	80.56%
	300	1,967	84.48%
Angioplasty	90	219	90.60%
Other Procedures	18	44	90.60%
Angiogram	500	532	90.60%
	608	795	90.60%

- No congenital procedures
- No change in current Electrophysiology resources.
- No paediatric cases.
- The national rate reflects that 6% (TPCH Rate = 9 %) of CABG are re-operations, and are therefore more complex resulting in increased theatre time. The issue of future management of congenital patients is one that needs to be further explored, given the increased resources for both medical and surgical management of this patient group. This patient group have long-term relationships with their cardiac team, and previous experience reflects their reluctance to transfer care away from their original surgeon.
- The DRG's included in the above activity groupings are set out in Appendix 3.

Data Synthesis

Using the service information, available data-sets, and expert knowledge, the working team undertook a review of the cost structures within cardiac services to identify the marginal cost impact the case reduction would have. The marginal cost is the component of the cost, which is directly related to a change in case volume. Each department was analysed for the impact a change in volume would have.

In some cases the change was insignificant and will not be capable of being realised as a cashable saving and these costs have therefore been treated as fixed costs. For example, the case reduction will have a direct effect on physiotherapy, but for other allied health disciplines like social work the occasion of service impact will be so small, it will not be feasible to reduce by 0.1 of an FTE.

The marginal cost build-up of $2.8 M for cardiac surgery is set out in Table 3 and the marginal cost build-up for cardiology of $0.9 M and is set out in table 4.

Superannuation has been excluded from the costings as state superannuation costs are funded separately to Districts and were excluded from elective surgery funding.

Based on the current private mix the Category B revenue for hospital accommodation charges is $150,000 and would require the TPCH target to be reduced by this amount.

Pathology costs have been included as a variable cost, however under the current pathology business rules TPCH pathology cost would only be reduced by 75% of the cost for usage decreases of greater than 2% of total usage. Under these rules TPCH would only receive a rebate of $106,000 for decreased pathology usage compared with the marginal cost of $260,000 included in the costing analysis for the transfer of activity to PAH.

It will need to be acknowledged that each budget component will need to be adjusted separately for elective surgery, superannuation, pathology and revenue.

The business rules around pathology cost allocations will need to be further discussed.

Table 3: Cardiac Surgery – Marginal cost structure

	Medical - Surgery	Anaesthetics	Outpatients	Pre-Admission	CSD	Theatre	Post Op ICU	Allied Health	Ward	Total
Admin Officer	0.50									0.50
Reg Nurse				0.25		2.25	3.79		4.11	10.39
Enrolled Nurse			0.15		0.34	1.10				1.59
Allied Health								1.18		1.18
Perfusionist		0.75								0.75
Operational						0.25				0.25
Anaesth Tech		0.75								0.75
Staff Specialist	1.00	1.00								2.00
Registrar	1.00									1.00
Resident	1.00									1.00
	3.50	2.50	0.15	0.25	0.34	3.60	3.79	1.18	4.11	19.41
Wages	243,069	188,728	4,940	11,020	11,179	143,717	167,038	56,905	180,958	1,007,554
Overtime - medical	24,307	18,873	494	1,102	1,118	14,372	16,704	5,691	18,096	100,757
Sick Leave	6,563	5,096	133	298	302	3,880	4,510	1,536	4,886	27,204
Penalties							16,704	5,691	18,096	40,491
Rec Lve	28,561	22,176	580	1,295	1,314	16,887	19,627	6,686	21,263	118,389
LSL	4,538	3,523	92	206	209	2,683	3,369	1,148	3,649	19,417
Workcover	4,011	3,114	82	182	184	2,371	2,756	939	2,986	16,625
	311,049	241,510	6,321	14,103	14,306	183,910	230,708	78,596	249,934	1,330,437
Clinical Supplies						546,000	51,000		93,900	690,900
Prosthetics						428,357				428,357
Drugs						135,000				135,000
Pathology										200,100
ering										20,345
	0	0	0	0	0	1,109,357	51,000	0	93,900	1,474,702
	311,049	241,510	6,321	14,103	14,306	1,293,267	281,708	78,596	343,834	2,805,139

Models of Care for the Cardiac Surgical Patient at The Prince Charles Hospital

The following concepts are integral to the construction of the costings associated with the infrastructure supporting the model of care and associated marginal cost assumptions.

PATIENT MANAGEMENT IN THE INTENSIVE CARE SETTING

There are two well-recognised models utilised for the medical management of cardiac surgical patients immediately post operatively. The models are based on which specialty of medical consultant (Surgeon or Intensivist) is accountable and responsible for the ongoing care and treatment of the cardiac surgical patients.

The Prince Charles Hospital utilises a surgeon lead model of care. This involves a Cardiac Surgical Registrar being rostered 24 hours a day in the CSICU. Any reduction of cardiac surgical case load will not lead to a reduction in cardiac surgical requirement in the CSICU as there will still be a need to provide medical care to all other patients.

ANAESTHETIC SUPPORT STAFF IN THE OPERATING THEATRES

Within Queensland Operating Theatres utilise either Anaesthetics Technicians or Registered Nurses to provide technical support for the Anaesthetists. At The Prince Charles Hospital an Anaesthetic Technician is assigned to assist the Anaesthetic Consultant for all cardiac surgical cases.

SURGICAL ASSISTANT ROLE IN CARDIAC SURGICAL THEATRES

There are many different models for the surgical assistant role utilised. Some hospitals utilise medical staff while others use nursing staff and others use both nursing and medical staff. For each cardiac surgical case at The Prince Charles Hospital a Senior Registered Nurse is assigned to assist the medical team with the use.

PERFUSION SERVICES FOR CIRCULATORY SUPPORT

There are two well-recognised models utilised for the management of cardio pulmonary bypass procedures intra-operatively. The models are based on whether a Perfusion Scientist or a Medical officer is accountable and has primary responsibility of the conduct of perfusion procedures intra-operatively.

For the vast majority of public cardiac surgical cases at The Prince Charles Hospital a Perfusion Scientist works collaboratively with the Cardiac Surgeon and Anaesthetist to provide perfusion procedures intra-operatively. Additionally there is a Perfusion Scientist on call 24 hours a day to provide support for patients at The Prince Charles Hospital requiring circulatory support eg. Intra Aortic Balloon Pumps and short term Ventricular Assist Devices. There will be potentially greater demand for Perfusion Scientist support with implementation on the long term, bridge to transplant Ventricular Assist Device Program that has been recently been funded by QLD Health.

OTHER CARDIAC INTERVENTIONAL AND THERAPEUTIC PROCEDURES IN THE OPERATING THEATRE SETTING.

The Prince Charles Hospital does not perform routinely any other adult cardiac interventional and therapeutic procedures such as pacemaker insertions and changes or, insertion and changing of ICDs in the Operating Theatres. These procedures are routinely performed in the Electrophysiology Laboratory located in the Cardiac Investigations Unit.

LINKS WITH OTHER SURGICAL UNITS

The cardiac surgical unit provides support to both Princess Alexandra and Townsville General Hospitals surgical services. This support has been ongoing since the inception of both units where TPCH surgeons assisted in the establishment of the unit, as well as ongoing support in addressing long wait Category 2 patients and leave relief during surgeon shortages (due to illness or leave). The flexibility of the large unit ensures the capacity for this back-up can be sustained.

It is noted that the average caseload for a cardiac surgical unit was 445 patients and that there were 76 cardiac surgeons operating in 50 units in 1998.[2]

Consideration of other options for surgeon sustainability may also be further explored with respect to creation of fractional or joint appointments across both cardiac units to enhance sustainability.

THE MUST-HAVE INFRASTRUCTURE ASSOCIATED WITH TRANSPLANTATIONAND PAEDIATRIC SUPER-SPECIALTY SERVICES

Recognition of the mandatory infrastructure associated with providing a transplant service will reflect resources beyond the marginal staffing requirements for a surgical service.

The demands of the superspecialty cardiac surgical service at The Prince Charles need to be recognised and acknowledged. The sustainability of these superspecialty services is linked to having the following surgeon infrastructure:

- 2 Heart Transplant surgeons
- 2 Lung Transplant surgeons
- 2-3 Paediatric surgeons
- 1 Clinical Director

The above surgical infrastructure equates to eight (8) surgeons. Whilst the surgeons will also do adult open heart caseload, the above is the infrastructure required to support the existing super-specialty surgical service.

CATHETER LAB

Post coronary angiography, patients with confirmed coronary artery disease are reviewed by cardiac surgeons, and this practice allows prioritization according to degree of clinical urgency. This initiative fast-tracks patient access to surgery without subsequent outpatient visit following angiogram.

[2] Cardiac Surgery in Australia – 1998 AIHW and National Heart Foundation of Australia – June 2001

Table 4: Cardiology - Marginal cost structure

	Medical	CSD	Cath Lab	CIU	Ward	Total
Admin Officer	0.50					0.50
Reg Nurse			0.93		0.09	1.02
Enrolled Nurse						0.00
Allied Health			0.25	2.50		2.75
Perfusionist						0.00
Operational						0.00
Anaesth Tech						0.00
Staff Specialist	0.50					0.50
Registrar	1.00					1.00
Resident						0.00
	2.00	0.00	1.18	2.50	0.09	5.77
Wages	139,044	0	53,602	126,776	3,935	323,357
Overtime - medical	13,904	0	5,360	12,678	394	32,336
Sick Leave	3,754	0	1,447	3,423	106	8,730
Penalties				12,678	394	13,072
Rec Lve	16,338	0	6,298	14,896	462	37,994
LSL	2,596	0	1,001	2,557	79	6,233
Workcover	2,294	0	884	2,092	65	5,335
	177,930	0	68,592	175,100	5,435	427,057
Clinical Supplies			136,800		42,600	179,400
Prosthetics			122,310			122,310
Drugs			66,880			66,880
Pathology						60,800
Catering						9,230
	0	0	325,990	0	42,600	438,620
	177,930	0	394,582	175,100	48,035	865,677

- No congenital or paediatric procedures
- No change in current Electrophysiology resources.
- Fixed and Marginal costs – logic of application
- Revenue Retention strategy to support the gap between the public rate and total case numbers.
- Outside of varying clinical practice in the EP service where implantable devices are performed in differing environments (TPCH is done in a lab, PAH in MOT), the models of care around angiography and progression to PTCA/Stent are considered similar in terms of patient pathway and resources in place to support this activity.

A national perspective

The prevalence of cardiovascular disease has resulted in the development of a National Health Priority area in 1998. There is an estimated 2.8 million people aged 18 years and over (21 per cent of the Australian population in that age group) who have had a recent and/or long-term cardiovascular condition
(ABS 1997a).

The National death rate from all cardiovascular disease in 2000 was:

- Nationally – all ages 2,679.6 per million
- Queensland – all ages 2,549.8 per million.

Previous attempts at quantifying many of the data sources for decision making around cardiac services and the difficulties in comparing data from different information sources has reduced the credibility of information provided to both clinicians and decision makers.

A request has been sent to AIHW to develop a customised dataset (refer email) to better inform the demand according to population demographics. The population data has been based on DRG not ICD procedures and therefore reflects separations rather than numbers of procedures. The deficit in this approach is the ambiguity in coding between CABG and other procedures (e.g. Valves).

The overall rate for PTCA in Queensland is low compared to the National rate. Whilst no detailed analysis has been undertaken at this point with respect to the insured/uninsured breakdown, the private sub-population which is based on the State uptake of private health insurance at the rate of 41.5%[3] (National rate = 44%) reflects significantly advantage in private access to cardiac services compared to the public sub-population rate which is 58.5%.

The key issue for service planning into the future is whether the total population rate or the public sub-population rate should be used in developing target rates for Queensland Health to determine the level of services provided to Queenslanders. Related issues as to whether limited access in the public sector contributes to the exceptionally high rate of private work undertaken could merit further exploration.

Whilst data comparisons are difficult due to differing data sources and the lack of a clinical validation process, it is important to have clearly defined data sets for the purpose of benchmarking. Similarly there are significant shortfalls in any comparison of data and activity that relate to establishing the cost of a particular service. Cost allocations may vary given the differing cost centre architectures in place that do not allow the capture of costs in a consistent manner to allow direct comparison between organisations.

[3] Source: Private Health Insurance Administration Council (http://www.phiac.gov.au/statistics/membershipcoverage/hosquar.htm)

Key policy documents and Reviews that have and will shape the Queensland health cardiac care systems are:

- 1994 Tertiary specialist services for Queensland
- 1997 Capital Planning Project Definition Plans for major redevelopments at The Prince Charles Hospital Health Service District and Princess Alexandra Hospital
- 1998 Clinical Advisory Group – Cardiac Services
- 2000 Central Zone Review of Cardiac Services
- 2001 Chief Health Officer Cardiac Surgical Audit
- 2002 Superspecialty services directional document (replaced 1994 – but remains in draft)
- 2002/2003 Review of Paediatric Cardiac Surgical Services (not finalised)
- 2002/2003 Review and planning for acute services in the northern suburbs of Brisbane.

- "Health 2020: a vision for the future (Directions Statement)" - The 2020 paper highlights the importance of chronic disease and ageing as key drivers of health system demand in the future.
- "Clinical Care Review – Cardiac Surgical Services" – October 2001
- "Specialist Cardiac Services Report" – February 2000. The recommendations based on 1998 activity and costs, and the recommendations made, but not accepted by Queensland Health.
- "Queensland Health Outcome Plan- Cardiovascular Health: Coronary Heart Disease" - 2000-2004

These strategies and discussions documents are directly relevant to the future development of cardiac care services in Queensland."Specialist Cardiac Services Report" – February 2000. The recommendations are based on 1998 activity and costs, and the recommendations made, but not accepted by Queensland Health. Some of the recommendations have been superseded by events, however the strategies detailed below remain contextual to the progression of the transfer of resources from TPCH to PAH:

- *Recommendation 4:* Fund PT CA from Elective Surgery Access pool should again be revisited in the future purchase of interventional cardiac services.
- *Recommendation 6 & 7 & 9 & 10:* Service planning to establish public and private acceptable access and service rates for Queenslanders who required cardiac surgery/intervention or therapy.
- *Recommendation 8:* Sustainability for independent units servicing respective zones (previously called zonal self-sufficiency) but now applied within the context of safe practice and unit sustainability.
- *Recommendation 14:* Development of statewide approach to the continuum of health care for cardiovascular disease and should support the QH Health Outcomes Plan that was developed in response to the National Health Priority Area: Cardiovascular Disease.

Methodology

This project involved investigation of cardiac care services at The Prince Charles Hospital to analyse the impact that a change in volume relating to transfer of cases would have on the cost infrastructure and efficiency of the current service, including flow on impact though cardiology and other clinical support services.

The terms of reference for this task are identified in the Queensland Health Working Party (Appendix 1) and timeline for the project required a review of services, discussions with key stakeholders and analysis of any readily available population or service use data.

A standard template was developed to identify the FTE impact of the target case reduction. This template was developed by Finance, but information collected and input by clinical and business management teams.

Consultation

A local working group was established to assist with data collection and validation (clinical and financial) of the components of care and their cost elements. The group discussed at length the data that would provide meaningful insight into the flow –on costs associated with cardiac surgery and angiography/plasty. The group have met weekly to discuss progress and direction, as well as in sub-groups to ensure that all aspects of the impact are included and identified, according to their relevant impact.

Population data

National and state rates for cardiac procedures were sourced from AIHW and the National Cost and Data Collection. The relevant DRG's have been grouped into 5 categories. It is acknowledged that this data set understates the CABG rate as we are using DRG data and not ICD procedure data. The same data set has been used for state, national, public and private splits for comparative purposes.

Table 5: Rates per million based on most current benchmarked data for the year 2000

Benchmark	National Rate	Qld Rate	Variance	National Public Rate	Qld Public Rate	Variance	National Private	Qld Private	Variance
CABG	685.67	708.69	-23.02	372.21	343.18	29.03	313.46	365.51	-52.05
Valves	218.58	307.07	-88.49	120.288	175.03	-54.742	99.29	132.03	-32.74
Other	46.99	59.26	-12.27	36.055	44.37	-8.315	10.93	14.88	-3.95
PTCA	976.54	859.74	116.80	499.1	340.37	158.73	477.44	519.59	-42.15
Angiography	2790.62	2,908.92	-118.30	1226.71	1110.31	116.4	1563.9	1798.61	-234.71

Growth according to AMWAC 2001 is projected at 2.1% per annum. CABG is three times more frequent in men than women (most marked in age range 35-45, but evident across all adult ages).

A request has been sent to AIHW to secure the following datasets provided by State Distribution in both public and private classifications by individual ICD codes within groups (600-638 & 667-693) by both procedure and separation data:

- CABG
- Valves
- Congenital
- Other
- PTCA
- Angiography
- Stenting
- Transplant

According to the Queensland Health business case for capital redevelopment of The Prince Charles Hospital, the angioplasty procedure rate was 466 per million overall for Qld with a public rate of 297 procedures per million. This rate is now a decade old, as planning was done on 93/94 and may not accurately reflect the current demand. There is also significant diagnostic angiography in the private sector, and there is concern that access to services for public patients may have contributed to the inflationary growth in the State private sector when compared to national private rates.

This information will have more context when the dataset from AIHW is received which will identify these rates in both weighted separations and procedures rates.

Role and function

Table 6: Queensland Cardiac Services Overview

In the context of Queensland Health Cardiac Services, services are provided by the following hospitals and directly managed by the respective Health Service Districts.

Surgery				Cardiology					Electrophysiology				Facility
CABG	Valves	Congenital	Other	Angiography	Angioplasty	Stent	Valvuloplasty	Echo	AICD	Pace	RFA	EPS	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TPCH (6)
✓	✓	x	✓	✓	✓	✓	x	✓	x	x	x	x	TGH
✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	PAH
x	x	x	x	✓	✓	✓	x	✓	x	✓	✓	✓	RBH

Notes:

For complex cases, there remains on-referral clinical transfer of care to TPCH, which remains the quaternary cardiac service for Queensland. This is projected to realise 15% of all cardiac services undertaken at PAH will require further investigation/therapy/surgery at TPCHHHSD due to the complex nature of disease and access to expertise and the current advanced diagnostic capacity on site.

There are concerns regarding potential underestimation around the timelines involved to achieve transition of referral practices, and realise altered patient flows. Whilst the new parameters can be applied, there remains significant marketing and education of referrers regarding both areas of change involving access to expanded services at PAH and the corresponding change at TPCH.

There are also concern in relation to the evolution of skills and knowledge for the expanded scope of cardiac sciences and investigations. These are sub-specialist clinical services and the current volumes of service at TPCH enable efficiencies that will not be immediately realisable at PAH until further maturity of the unit, through volume. Whilst the current staff capacity and skill is acknowledged, and that this impost will not be to the level of establishing new service, there will be educational and training linkages to sustaining services. (Eg. Tilt testing capacity, access to cardiologist staff, trained scientific staff etc and the impost that lengthy costly procedures have that is 'hidden' through volume).

The District strongly supports the development of a statewide cardiac services plan that articulates the current service profile and activity that provides access to cardiac care for Queenslanders. This process should be supported by a service planning process that articulates projected population demand, including changing models of care, particularly around cardiology and timing of catheterisation.

Until this overarching service framework is identified, the District has attempted to encapsulate all identified risks and confirm that the proposed impact recognises and addresses risk minimization strategies which will require further development for application during the transfer process.

CARDIAC SURGERY

The **physical infrastructure** in place includes:

Capital planning was undertaken to develop clinical clusters collocated on one level to effect clinical and physical interaction. On level 2 of the Main Acute building this collocation includes the Operating Suite including Day Procedure and same day admission, post-operative critical care, surgical inpatient units, allied health, paediatrics, surgical offices and heart valve bank.

Main Operating Theatre - Five (5) theatres doing two (2) routine cases per day along with two (2) orthopaedic theatres.

Cardiac Surgery Intensive Care unit - Facilities are available for 16 beds. Only an average of 11 beds are currently resourced.

Surgical wards located on the second floor in the main TPCH building. Facilities are available for 60 beds, however, only 44 beds are open currently based on current adult cardiothoracic surgical activity level.

Access to the inpatient service are from the following: :

- Patients progression to surgery following outpatient review. The nature of the patients' problems together with current workloads is used to determine consultant management.
- Patients transferred from other wards of TPCH;
- Inter-hospital transfers
- Patients who elect private care

Referrals for CABG have reportedly decreased since the introduction of coronary stenting in 1996. However, the activity for valve surgery has increased.

OPD sessions

Cardiac Surgery (Public)

- New Patients = 36 public and 11 private per month (February 2003) with waiting list of 31 (public and 18 private). There is minimal waiting for public patients (1 week) however there is a 5week wait for private patients (due to limited number of surgeons undertaking Option A/B and the majority as VMOs. The initiative to review post-coronary angiography patients at time of procedure has significantly reduced the waiting lists for cardiac surgery, as this is now done on confirmation of diagnosis.
- Review Patients = 380 (February 2003). There is a fifteen-(15) week wait for review of non-emergency or non-complicated public patients and ten (10) week wait for review of private patients. It needs to be recognised that a component of the waiting time is linked to phased review.

CARDIAC MEDICINE

CARDIOLOGY

Cardiac medical Wards. Facilities are available for 60 medical beds with telemetry and 15 coronary care beds The utilisation and resource allocations for available bed numbers are split between

Summer 56, Winter 60, Coronary 15.

Cardiology OPD have experienced significant growth from 250 to over 500 patients awaiting new patients. The waiting time is now 8 weeks for new appointment.

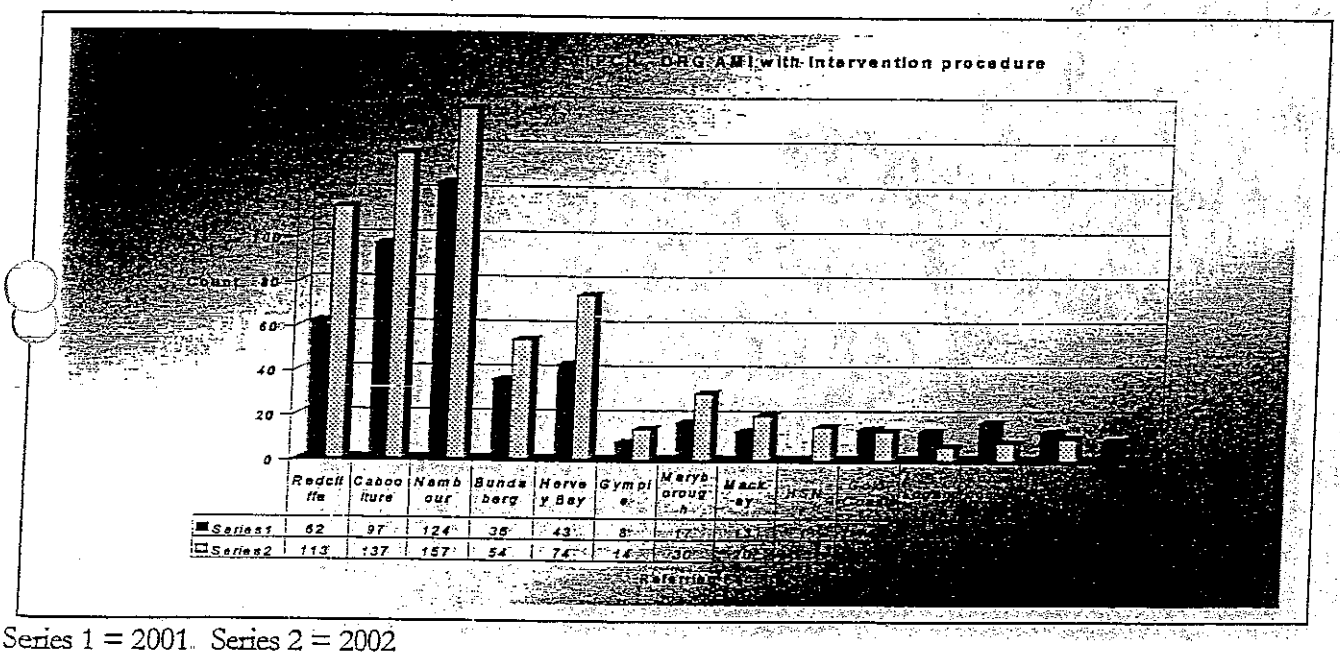
Access to the service are from the following:

- OPD
- Presentation to Emergency Department
- Inter-hospital transfer
- Private elected patients

Cardiology OPD has experienced significant growth over the last 12 months. The waiting list for new patient appointments has doubled.

There have been significant changes in interhospital transfer patterns from regional hospitals (detailed below) during the past 12 months that supports changing clinical practice and growth in demand.

ADDON/Non-elective emergency activity currently accounts for 39% of the Catheter Lab activity.



Series 1 = 2001. Series 2 = 2002

Source Transition II data

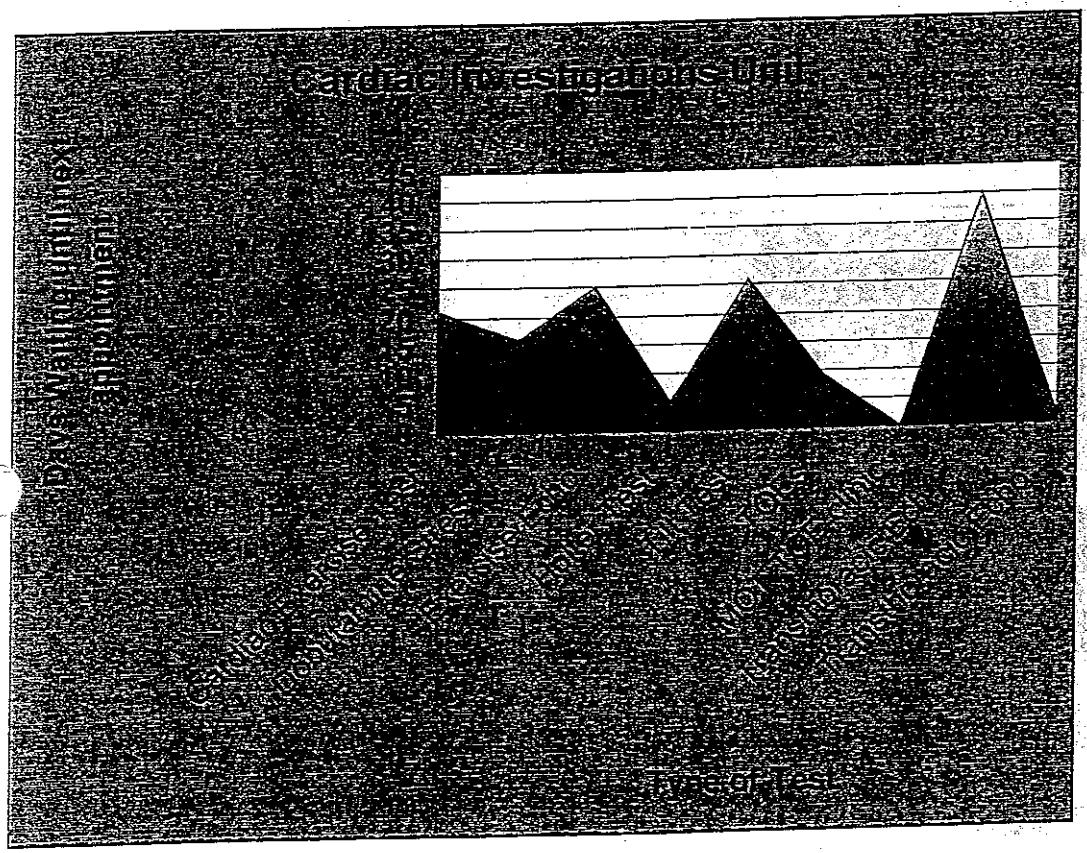
Note: Southern Zone activity has reduced in line with strategies that containment support transfer of these patients through PAH.

CARDIAC INVESTIGATION UNIT

2 Catheter Labs
1 Electrophysiology Lab
1 22 bed day only recovery unit

Access to the service are from the following:

- OPD
- Presentation to Emergency Department
- Inter-hospital transfers are direct to the CIU and not through ER
- Private elected patients
- Cardiac Investigation Activity is driven by Cardiology.



CONSULTATION SERVICES TO OTHER HOSPITALS

TPCH Cardiac Service offers consultant sessions per month to other hospitals including:

Paediatric OPD at Townsville, Rockhampton, Mackay and Cairns.

Cardiac Surgery OPD at Rockhampton and Nambour.

Cardiology – No adult OPD, but the reference site role for all Queensland facilities to access expertise and advice on patient management has been longstanding.

Telehealth is presently applied for professional development and education sessions in a structured format and on an adhoc basis for clinical consultation.

Echo Reporting for Rockhampton and Mt Isa Base Hospitals is supported through TPCH CIU unit.

These consultancy visits provide important specialist input in cardaic care to facilities that may otherwise have difficulty attracting permanent specialist staff. This is partly linked with the shortage of specialist and may also reflect issues of geographic isolation, challenging patient load and relatively low case numbers that require only fractional staff appointments in small and/or outlying facilities.

CHNOLOGICAL ADVANCEMENTS

TPCH have aggressively pursued technology that will reduce invasive procedures for the diagnostic and staging purposes of cardiac investigations.

- Cardiac MRI
- Multidetector CT with cardiac application

Surgical substitution is an ongoing challenge with a number of interventional procedures now taking the place of previous surgical activity and these include:

Stenting. Even within stenting the changes of prosthetics and technological advancement with the availability of drug eluting stents is challenging previously unsubstituted areas such as multi-vessel disease.

Atrial Septal Defect (ASD). The capacity to perform the closure of the Atrial septum without open heart gery, particulary for children and the potential for further application of this technology needs loration. Currently, there is an impost to public services undertaking this activity (refer to Health Technology Assessment: March 2002).

Cardiology practice is evolving at a rapid rate. The effect of translational research in this field cannot be underestimated and the impact on available resources balanced with health outcomes around the future management of coronary heart disease. The evidenced based model of care emerging around the early catheterisation through PCI for at risk AMI patients will have a significant resource impact on the current activity and operational hours for catheter laboratories. The complete picture of how this strategy is forecast to reduce further healthcare needs and improve quality of life will further inform clinical and health service decision makers with regard to the extent of the adoption of this new technology.

Commonly Identified Service Issues – the perspective of stakeholders

A broad range of issues was raised in the project interviews. These have been summarized below:

1. Physical environments

- The additional capital costs for PAH do not translate to capital savings that would be realised at TPCH through decommissing associated with activity.

2. The provision of resources to best meet service demand

- The model of care differences, particularly in the surgical model, affect presumptions around efficiencies.
- The recommendations for service growth to address waiting lists for cardiac procedures are unknown. The development of a statewide cardiac plan that articulates the service levels purchased by Queensland Health and what volumes of surgery for each cardiac unit according to efficiencies, access and specialist skills.

Table 7: Cardiac Services Waiting List – maybe this should be demand and growth not waiting lists

Type	Category 1	Category 2	Category 3	Total Numbers	Mean Wait
Cardiac Surgery	44	206	35	284	1 = 10.4 days 2 = 50.5 days 3 = 71.7 days
Angiography	121	200	8	329	1 = 23.4 days 2 = 53.46 days 3 = 112.5 days
PTCA: also included in Diagnostic Agniography as a +/- at time of procedure	15	7	0	22	1 =21.6 days 2 =64.9 days 3 = 0 days
Cardiac Exercise Test					21 days
Dobutamine					16 days

Stress Echo					
Exercise Echo					25 days
Holter Test					5 days
Tilt Test					26 days
TOEs					9 days
MOT TOE clinic					0
Transthoracic Echo – OPD					40 days
Transthoracic Echo - Inpatient					1 day

ucation and Training

3. The allocation of responsibilities

OPTIONS FOR CARDIAC SERVICE RESPONSIBILITIES

The following parameters have been taken into account when considering clinical service responsibilities. These have been derived from a combination of stakeholder opinion and expert advice from the surgeons and cardiologists.

- Alignment with the overarching district responsibilities;
- Variation from current role and function of the service and the Degree of change required to existing services or structures;
- Current capacity (assets and expertise);
- Projected growth in service demand;
- Relationship with provincial and other metropolitan health services.

4. The ability of the current services to meet future demand

Demand growth is likely to arise from several quarters:

- Benchmark with National rates (Combination of public and private in Qld)
- Changing rates of privately insured patients – or level of insurance available for private patients
- The change between elective and emergency (add-on and inter-hospital transfer rates) as the model of care around access to angiography and other interventions emerge. PTCA or PCI is seen to be the most significant concern with current access rates managed through containment strategies to align activity with resources.

Conclusions

- Sustainability could be achieved at PAH without the transfer of activity from TPCH, if supportive workforce strategies are adopted.
- Sustainability of the Superspecialty services at The Prince Charles Hospital needs to recognised in terms of the number of surgeons required for the cardiac surgical unit.
- Due to the increased demand and the future growth predicted
- Comparison of infrastructure at volume efficiency has suggested that the resources of funds would reflect most efficient transfer of resources from TPCH to PAH would reflect 300 cases (1,967 weighted separations Ph8). This is based on 90% of the current Southern Zone patient flow to TPCH. Based on previous experience with pacemaker and AICD services there will be a significant risk to TPCH in managing the patient flow during the transition period.
- The funding to support this transfer of 300 cases should be $2.8 M from elective surgery, which equates to the realistic marginal cost for this surgical caseload. Any additional transfer of resources from TPCH will place additional financial and demand pressure on the District.
- There are significant risks with the effective transfer of resources and activity transfer should remain target in nature, supported by risk minimisation strategies.
- There is a risk that could result in lower public activity being performed. This may occur during the wind down phase at TPCH to achieve the resource reduction and the gearing up phase at PAH with appropriate skill and staffing to assume the transferred level of activity.
- It has been acknowledged that growth in cardiac surgery activity at The Prince Charles Hospital over the preceding decade occurred through the Surgical Access Team that allocated growth in surgery activity through the marginal costs only. There has been a scarcity of funding applied directly to cardiology interventional activity. The growth in this service has been funded by incremental service efficiencies within the cardiac program, that were redirected toward this service. Unfortunately this was not enough to support this activity, and cardiology has been a contributing factor to the District's deficit for the last three (3) years.
- Revenue retention strategies to support 20% of the proposed activity transfer needs to be developed by PAH.

Appendix 1: Terms of Reference

To be included when finalised

Appendix 2: Data sets utilised and details of parameters

Staffing Related to 300 Cardiac Surgical cases		
	FTE	*Comments*
Elective Preadmission Centre	0.25	As most of the nursing time in EPAC is all patients attending related it is probable that this 0.23 FTE could not be realised.
Admission Ward	0.32	Assumption is that 2 cases would be DOSA. Night duty excluded due to minimum staffing levels having to be maintained
CSD	0.34	The time for processing of instruments is relative as the time taken to process is interrupted.
Perioperative	2.25	Based on staff directly involved in cases with 70% productivity
	1.10	Based on staff directly involved in cases with 70% productivity
Post Op ICU	3.79	Based on 1:1 care for an expected 24 hour length of stay in ICU.
Post Op Ward	3.79	Ward LOS of 6 days with a ration of 1 nurse to 4 patients on the day and evening shifts. Night duty excluded due to minimum staffing levels having to be maintained.
Surgeon	1.00	Average public case load per FTE surgeon at TPCH is 290 p.a. The 300 cases would equate to 255 public cases and 45 private cases.
Registrar	1.00	Based on the current staffing ratio of 2 registrars per surgeon, however due to the coverage required in Post-Op ICU it will not be feasible to decrease by 2.
Resident	1.00	Based on current staffing ratios at TPCH.
Consultant Anaesthetist	1.00	
Perfusion Technician	0.75	Based on pro-rata apportionment of FTE's based on the total cardiac surgery caseload at TPCH
Anaesthetic Technicians	0.75	Based on pro-rata apportionment of FTE's based on the total cardiac surgery caseload at TPCH
Theatre wardspersons	0.25	Based on patient transportation, positioning and cleaning duties of 1 hour per case.
Physiotherapy	1.18	Based on an average of 6 hours of treatment for inpatients and 80% productivity.
Dietetics		Estimated at 4 hours per week and would not be a cashable saving

Social Work		Estimated at 4-6 hours per week and would not be a cashable saving
Administration	0.50	Based on pro-rata apportionment of FTE's based on the total cardiac surgery caseload at TPCH
Outpatients		Estimated at 4-6 hours per week and would not be a cashable saving
Staffing Related to 500 Angio cases		
EPAC	0.13	300 inpatient angio patients/ year = 6 patients / week
CIU (Day only admission)		
Pre procedure	0.04	Based on staff directly involved in cases with 70% productivity
Procedure	0.28	Based on staff directly involved in cases with 70% productivity and an average case time of 45 min.
	0.28	
Post Procedure	0.20	
Cardiology Ward	0.09	60% of angiography would be day cases and for the 40% which are not done as a day case. Cardiology patients nurses on a 1 to 6-8 patient ratio. Night duty excluded due to minimum staffing levels having to be maintained. 200 inpatient angio patients/ year = 4 patients / week with an ALOS of 2 days.
Scientist	0.25	It should be noted that of all the procedures done in the Cath Lab, coronary angiograms are (as a general rule) the quickest and take much less time than a PCTA, right hearts, septal ablations, mitral valvularplasties etc.
CIU Infrastructure related to transfer of 300 surgical case & 500 Angiograms		
Scientist	2.50	Based on a review of current activity levels and time allocation per procedure.

Appendix 3: DRG Casemix

Group	DRG	DRG Description
Valve Replacement	F03Z	Cardiac Valve Proc W Pump W Invasive Cardiac Inves Procedure
	F04A	Cardiac Valve Proc W Pump W/O Invasive Cardiac Inves Proc W Cat or Sev CC
	F04B	Cardiac Valve Proc W Pump W/O Invasive Cardiac Inves Pr W/O Cat or Sev CC
CABG	F05A	Coronary Bypass W Invasive Cardiac Inves Procedure W Catastrophic CC
	F05B	Coronary Bypass W Invasive Cardiac Inves Procedure W/O Catastrophic CC
	F06A	Coronary Bypass W/O Invasive Cardiac Inves Procedure W Catastr or Severe CC
	F06B	Coronary Bypass W/O Invasive Cardiac Inves Procedure W/O Catastr or Severe CC
Other	F07Z	Other Cardiothoracic/Vascular Procedures W Pump
	F09Z	Other Cardiothoracic Procedures W/O Pump
	F14A	Vascular Procs Except Major Reconstruction W/O Pump W Catastrophic CC
	F14C	Vascular Procs Except Major Reconstruction W/O Pump W/O Catastr or Severe CC
Angioplasty	F10Z	Percutaneous Coronary Angioplasty W AMI
	F15Z	Percutaneous Coronary Angioplasty W/O AMI W Stent Implantation
	F16Z	Percutaneous Coronary Angioplasty W/O AMI W/O Stent Implantation
Angiogram	F03Z	Cardiac Valve Proc W Pump W Invasive Cardiac Inves Procedure
	F05A	Coronary Bypass W Invasive Cardiac Inves Procedure W Catastrophic CC
	F05B	Coronary Bypass W Invasive Cardiac Inves Procedure W/O Catastrophic CC
	F41B	Circulatory Disorders W AMI W Invasive Cardiac Inves Proc W/O Cat or Sev CC
	F42A	Circulatory Disorders W/O AMI W Invasive Cardiac Inves Proc W Complex DX/Pr
	F42B	Circulatory Disorders W/O AMI W Invasive Cardiac Inves Proc W/O Complex DX/Pr
Other procedures	F09Z	Other Cardiothoracic Procedures W/O Pump
	F42A	Circulatory Disorders W/O AMI W Invasive Cardiac Inves Proc W Complex DX/Pr
	F42B	Circulatory Disorders W/O AMI W Invasive Cardiac Inves Proc W/O Complex DX/Pr
	Z62Z	Follow Up After Completed Treatment W/O Endoscopy

Queensland Government
Queensland Health

The Princess Alexandra Hospital Health Service District

Transfer of Cardiac Activity from The Prince Charles Hospital to the Princess Alexandra Hospital

Costing Analysis of Transfer
Draft Version 06 – CONFIDENTIAL INFORMATION

Prepared by: **Phil Bettens – Project Officer**
Dr John Wakefield – Deputy Director of Medical Services

May 2003

Princess Alexandra Hospital Health Service District (PAHHSD)

Cardiac Services Expansion

PAHHSD Working Group

Dr Julie Mundy	(Director of Cardiac Surgery)
Dr Paul Garrahy	(Director of Cardiac Sciences)
Dr Rae Duffy	(Cardiac Anaethetist)
Dr Robert Barnett	(Director of Intensive Care)
Dr John Wakefield	(Deputy Director of Medical Services – Surgery)
Dr David Theile	(Chairman Division of Surgery)
Colleen Jen	(NPC Coronary Care Unit)
Karen Slater	(NPC Cardiac Catheter Laboratory)
Brock Yates	(NPC Cardiac Surgery Unit)
Carol Pound	(A/ADON Operating Theatres)
Sean Birgan	(A/DON Division of Surgery)
Nicky West	(NPC Intensive Care Unit)
Phillip Bettens	(Project Officer Division of Surgery)

CONTENTS

1. EXECUTIVE SUMMARY

The Princess Alexandra Hospital Health Service District (PAHHSD) has identified the need for growth in cardiac services in order to provide appropriate access to patients within Queensland Health's (QH) Southern Zone and to ensure a sustainable cardiac service at PAHHSD into the future. The evidence supporting this has been outlined in a business case previously presented to Queensland Health (February 2002)

Queensland Health made a decision in early 2003 to expand cardiac services at PAHHSD by the transfer of services from The Prince Charles Hospital (TPCH). A working party comprising representatives from PAH, TPCH and the Central and Southern Zone Management Units has convened to implement the transfer. This document has been prepared at the request of the working party to outline the impact of the transfer.

A local PAHHSD working party was commissioned and a project officer appointed to provide a detailed assessment of the recurrent and capital requirements of the service expansion. The report is based on the transfer of 300 cardiac surgical procedures, 700 coronary angiograms and 233 coronary angioplasty procedures.

The model of care for cardiac surgery differs between the two facilities. The costs at PAHHSD have been worked up using the PAH model of care. The main differences relate to medical perfusion staff, intensive care and use of anaesthetic nurses.

Where possible, a marginal cost basis has been used to determine the actual recurrent costs that will be incurred by the PAHHSD in providing the additional services. Examples include use of direct nursing costs only based upon a nursing hours per patient day model (NHPPD), and medical staff requirements. However, a significant portion of the claim relates to actual labour and non-labour costs. **The estimated total recurrent outlay will be $6,008,282 per annum.**

Despite the fact that infrastructure exists at PAHHSD as a result of the new facility there is a requirement to appropriately commission the operating theatre, ward, and intensive care. **The full cost is estimated to be $947,762**. However, it may be possible to reduce this cost by the transfer of some equipment from decommissioned infrastructure at TPCH.

This document outlines the realistic recurrent and non-recurrent costs of providing the additional cardiac services at the PAHHSD. Further work is required to identify how the transfer of resources would occur and what human and capital resources would actually be transferred. Due to the relationship between fixed and variable costs, it would not be practical to consider any fraction of the originally proposed caseload without seriously undermining the efficiency and effectiveness of the service

2. BACKGROUND

The Cardiac Surgical Unit at Princess Alexandra Hospital was established in 1998 to cater for patients from Queensland Health's Southern Zone and Northern New South Wales. The service was commenced in the previous hospital building with one designated cardiac theatre, which therefore limited the capacity of the unit to undertake more than 500 cardiac surgical procedures per annum. Whilst the Cardiac Surgical Unit was in it's infancy at Princess Alexandra Hospital, this number of procedures was seen as an adequate starting point to ensure that quality outcomes were produced for patients undergoing cardiac surgery. This view is consistent with the Australasian Society of Cardiac and Thoracic Surgeons (ASCTS) minimum requirements for a cardiac surgical facility.

Cardiac Services was relocated to the new facility at PAH in April 2001. The facility infrastructure now exists to support an expansion of cardiac services. The main issues relevant to the proposal to expand Cardiac Services were discussed in the original business case. For completeness, these issues are presented again below:

2.1 Cardio-Thoracic Surgeon to population ratio:

With a potential population catchment of 1.9 million residents (estimated 60% uninsured) in the Southern Zone of Queensland and Northern New South Wales, this represents a current ratio of one public Cardio-Thoracic surgeon per 495,652 public patients. The current Australian average ratio is 1:180,347 patients[1]. Furthermore, the current recommendation from the Australian Society of Cardiac and Thoracic Surgeons is for a ratio of between 1:150,000 to 1: 200,000[1].

Under this proposal, there would be an increase in the FTE Cardio-Thoracic surgeons from 2.3 to 3.3. Whilst this would not bring the ratio back to national benchmark level, it would improve the situation to 1:345,454.

2.2 Service Sustainability:

The ASCTS has recommended that each surgeon perform a minimum of 200 cases per year, preferably 250 cases. There is evidence that performance of greater than 200 cases per year is associated with a decrease in adjusted mortality. The Cardiac Surgery Unit at the Princess Alexandra Hospital is accredited for advanced training in Cardio-Thoracic Surgery (commenced January 2002). Maintaining sufficient case numbers for the surgeons and the trainee is essential to the survival of the Service. Failure to increase the numbers from 450 per annum will result in inadequate case numbers.

The British National Service Framework[7] suggests a minimum of four surgeons required to provide a safe and sustainable 24 hour service. It further recommends that at least five surgeons are required to meet requirements for training in Cardio-Thoracic surgery.

The current service supports 3 individuals and 2.3 FTE. This is seen as a significant risk to the current service. The burden of on-call is significantly higher than that recommended in a specialty which has been recognised as requiring greater than 60 hours of work per week[1]. Also, during periods of planned and unplanned absence of one of the surgeons, the burden on the other surgeons becomes unsustainable. Additionally, should one of the surgeons leave the Service, this could seriously jeopardize the viability of the Service in the short to medium term.

This proposal seeks to provide a third full-time Cardiac Surgeon to the establishment, which would significantly decrease the risk to the Service viability, should a Surgeon leave. Furthermore, this increase would meet the minimum standards recommended by the British National Service Framework on requirements for a 24 hour service.

2.3 Waiting Times for Cardiac Surgery:

Patients at the Princess Alexandra Hospital wait significantly longer for cardiac surgical procedures than both the national average and the patients from the other Zones in Queensland. There is evidence that increased waiting times for patients requiring cardiac surgery procedures, leads to an increase in mortality[3]. This is of particular concern for patients at the Princess Alexandra Hospital.

The national average wait in 2000 for category 1 surgery was 10.5 days and categories 2&3 of 48.1 days[1]. The average wait for category 2 patients at the Princess Alexandra Hospital is 63.4 days (June 2001[2]). This is significantly higher than the national benchmark and other Queensland Services. The CCNO[3] reports that the benchmark for waiting lists is to reduce the number of patients on a waiting list to the level of one months throughput.

Furthermore, there is evidence that the waiting times are increasing at the Princess Alexandra Hospital with current average waiting times for category 2 surgery being approximately 4 to 5 months and up to 20% long waits (>90 days). Nineteen patients were transferred to Prince Charles Hospital in September 2001 in order to expedite their surgery. This has a negative effect on morale on all the staff in the Service and although this short-term strategy was appropriate, it is not sustainable. In addition, it dislocates care of the surgical patient from the referring cardiologist.

2.4 Projected Requirements:

There is evidence that the demand for Cardiac Surgical Services will continue to grow at an annual rate ~~of 2.1%[1]. The accepted~~ targets for Queensland[8] are consistent with the guidelines of the Cardiac Care Network of Ontario and presented in the table below:

(Table 1) Projected Cardiac Surgical Requirements

Procedure	Current Rate* per 100,000 public patients	Proposed Rate** per 100,000 public patients	Recommended Rate***[8] per 100,000 public patients
Coronary Artery Bypass Grafts	31	51	110
Coronary Angiography	153	241	500-540
Coronary Angioplasty	39	70	140-160

Current rate based upon a catchment population of 1.14 million public patients (Total catchment of 1.9 million of which 60% uninsured)

****Proposed rate based upon increased activity associated with implementation of this proposal resulting in total 577 CABG's, 2750 Angiograms and 800 Angioplasties.***

*****Rates as recommended by the Cardiac Care Network of Ontario (CCNO).***

Further evidence of unmet demand can be found in looking at the Relative Utilisation for Adult Cardio-Thoracic Services[4]. This indicates a significant relative under-utilisation for patients in the Princess Alexandra Hospital catchment when compared to patients in other areas of Queensland. This provides compelling evidence of a need to increase access of Southern Zone patients to Cardiac Surgical Services.

Also, evidence from a recent review of cardiac services in Queensland[5] indicated that in the 2000/2001 financial year 288 CABG's and 243 valve procedures were performed on Southern Zone catchment patients at the Prince Charles Hospital.

2.5 Current Clinical Performance:

Despite the evidence of relatively poor patient access to Cardiac Services for Southern Zone patients, there is a significant amount of evidence to suggest that the current Cardiac Surgical Service outcomes achieved at the Princess Alexandra Hospital are consistent with national and international *Best Practice*.

The 30 day mortality for an isolated CABG at the Princess Alexandra Hospital is currently 0.7%, with an overall mortality of 1.1%[6]. These results compare favourably with national and international benchmarks eg. United Kingdom Cardiac Surgical Register 3.1% and 4.5 % respectively.

The Australian Council on Healthcare Standards (ACHS) clinical indicators for the Princess Alexandra Hospital Cardiac Service for 2001 were as follows:

CI. 5.1 Percentage of CABG patients who die during same admission as having CABG

0.67% (1/149)

CI. 5.2 Percentage of elective CABG patients who die in same admission as having CABG

0.97% (1/103)

CI. 5.3 Percentage of CABG patients over 71 years who die during same admission

0% (0/34)

Benchmarking with the other Queensland Cardiac Surgical Services has shown that the Princess Alexandra Hospital Service provides equal or superior clinical outcomes in such areas as mortality rates, adverse event rates and risk stratified outcomes[5]. Furthermore, it does so at a decreased cost when compared with the other Queensland Services[5].

Day of surgery admission rates (DOSA) for elective cardiac surgery at the Princess Alexandra Hospital is 28%, which is significantly higher than other Queensland Services. This has been achieved over a short time frame and the target DOSA rate is 40%.

It is clear that the Princess Alexandra Hospital Cardiac Surgical Service has provided an efficient and effective service by national and international standards. It has strived for, and continues to demonstrate excellence.

2.6 Transfer of Cardiac Services from The Prince Charles Hospital (TPCH)

In early 2003, Queensland Health made a decision to increase Cardiac Services at PAHHSD by transferring activity from TPCH. This document outlines the recurrent and capital investment required to support an increase in activity at PAHHSD of 300 cardiac surgical cases, 700 coronary angiograms and 233 coronary angioplasties. These volumes represent the approximate current workload of Southern Zone patients undertaken at TPCH.

3. CAPITAL PLANNING

The PAHHSD commenced planning increased cardiac services when designing the current facility. The hospital redevelopment allowed for increased infrastructure for Cardiac Sciences and for Cardiac Surgery.

3.1 Cardiac Sciences

Cardiac Sciences increased interventional procedure space from one (1) to three (3) catheter laboratories (the third laboratory is currently not commissioned).

3.2 Cardiac Operating Theatres

Cardiac Surgery similarly increased the Operating Theatre capacity from one (1) to three (3) theatres and at present only one (1) theatre is used for cardiac surgery. The second theatre is fitted out and used for thoracic surgery, however equipment such as anaesthetic machines and diathermy are rotated from other theatres when this theatre is in use.

3.3 Cardiac Surgery Ward

In line with these increases, the Cardiac Surgery Ward was designed with the potential to increase from the 12 beds currently utilized, to a maximum capacity of 28 beds. Only 18 beds in total would be required to cater for an increase of 300 cases with further beds opening as cardiac surgery expands beyond 800 cases per year. Total post ICU care is carried out within this ward. The cardiac surgery increase would equate to 2148 bed days for 300 cases and a total of 5728 bed days for the total service of 800 cases (ALOS 7.16 including ICU stay of 1.3 days).

3.4 Intensive Care Unit (ICU)

The ICU was also designed with increased cardiac surgery requirements foreshadowed. The unit has the capacity to increase from its current sixteen (16) weekday beds to a maximum of twenty (20) beds. Weekend capacity decreases to twelve (12) beds after patients are moved to the ward. Eighteen (18) weekday beds would be utilized under this proposal with five (5) of this total allocated as cardiac surgery beds. Weekend bed numbers in the Intensive care unit would not be affected. The five allocated beds would accommodate all cardiac surgical patients within the unit. The average length of stay of 1.3 days (for cardiac surgery patients) encompasses all long stay cardiac surgical patients within the unit. This equates to 390 OBD's in ICU for the increased patient load and a total of 1040 bed days for the cardiac surgery service in ICU.

A five bed postoperative cardiac surgery intensive care service for an 800 patient cardiac surgery caseload, is efficient by national and international benchmarks.

4. COST ANALYSIS

As outlined in the original business case, the PAHHSD provides existing Cardiac Services in a cost efficient manner when compared with the other Queensland providers, without compromising quality. This was outlined in a major review of Cardiac Services in Queensland[5]. Increasing throughput to a more sustainable level would provide opportunities for further efficiencies.

The table below outlines the current Transition II costs for a range of common DRG's within Cardiac Services. The data suggests that across this range of DRG's, PAHHSD delivers Cardiac Services below the Phase 8 Funding Model price. This data needs to be viewed with some caution given that presently, prosthetic costs are modelled within Transition II. However, it is included for completeness.

Inter hospital costing comparisons per procedure are also unreliable due to differences in feeder system structures within Transition II.

(Table 2) - Procedural Costing (Transition II) HIMS PAH

Discharges July 2001 to Feb 2003

DRG (Version 4.1)	Total Cases	Total Actual Cost	Average Actual Cost	TOTAL Length Stay	Average Length Stay	Phase 8 Cost per pt
F04A Cardiac Valve Proc W Pump W/O Invasive Cardiac Investigative Procedure	121	1,789,171.98	14,786.55	987	8.16	$ 21,631.00
F06A Coronary Bypass W/O Invasive Cardiac Investigative Procedure W Catastrophic or Severe CC	217	3,031,030.26	13,967.88	1,521.00	7.01	$ 14,532.00
F10Z Percutaneous Coronary Angioplasty W AMI	193	990,416.57	5,131.69	799	4.14	$ 8,634.00
F15Z Percutaneous Coronary Angioplasty W/O AMI W Stent Implantation	486	1,666,219.58	3,428.44	1,037.00	2.13	$ 5,253.00
F16Z Percutaneous Coronary Angioplasty W/O AMI W/O Stent Implantation	34	75,970.64	2,234.43	65	1.91	$ 3,550.00
F41A Circulatory Disorders W AMI W Invasive Cardiac Invest Proc W Cat or Sev CC	60	385,995.17	6,433.25	391	6.52	$ 8,182.00
F41B Circulatory Disorders W AMI W Invasive Cardiac Invest Proc W/O Cat or Sev CC	169	627,522.00	3,713.15	591	3.5	$ 4,999.00
F42A Circulatory Disorders W/O AMI W Invasive Cardiac Investigative Proc W Complex Dx/Pr	251	1,256,277.50	5,005.09	1,167.00	4.65	$ 4,572.00
F42B Circulatory Disorders W/O AMI W Invasive Cardiac Investigative Proc W/O Complex Dx/Pr	281	893,176.49	3,178.56	762	2.71	$ 1,900.00
	1,812	10,715,780.19	5,913.79	7,320.00	4.04	

5. MODEL OF CARE AT PAHHSD

There are differences in the *model of care* for the Cardiac Surgical component of Cardiac Services between PAHHSD and TPCH. This creates challenges when seeking to transfer personnel and equipment between the two facilities. Below is an outline of the care model and key differences have been noted:

5.1 Anaesthetic Support Staff in the Operating Theatres

The PAH allocates Registered Nurses rather than Anaesthetic Technicians to support the preparation and delivery of anaesthetics to patients. One Anaesthetic Registered Nurse is allocated per operating theatre as per Australian College of Operating Room Nurses Guidelines (ACORN). This is the practice across the Surgical Service at the PAHHSD and provides benefits in terms of flexibility and multi-tasking.

5.2 Surgical Assistant Role in Cardiac Surgical Theatres

At PAH, Registered Nurses assist the Cardiac Surgeon's in the operating theatres. Nursing staff are allocated to these theatres according to the ACORN guidelines of three point five (3.5) nurses per theatre with one (1) being an Anaesthetic Nurse.

5.3 Cardiac Perfusion

The PAH uses the *medical model* for the delivery of perfusion services rather than technicians as there is no requirement for supervision of practice. This leads arguably to a more medico legally defensible practice for practitioners and decreases the need for an Anaethetist supervisor to be available during operating times in and out of hours.

5.4 Intensive Care Unit

Whilst in ICU, the Intensive Care Medical Team with Cardiac Surgeon input treat cardiac surgical patients. The ICU medical team includes consultant, senior registrar and junior registrar care. Whole of ICU care is carried out for short and long stay patients within this unit. At the TPCH, the Cardiac Surgical Registrars are the allocated provider of medical services (under surgical consultant supervision) for the whole ICU stay. This however can change if complications arise and patients are transferred to the general ICU at TPCH where care is taken over by the general ICU medical team.

At PAH, immediate post-operative care is carried out in the Intensive Care Unit. Patients have an average length of stay in intensive care of 1.3 bed days. Patients are nursed on a 1:1 ratio whilst intubated, however, when patient acuity and physical environment allows, convert to a 1:2 staff to patient ratio.

The Intensive Care Unit is allocated 30 Nursing Hours Per Patient Day (NHPPD) to provide care to these patients. The NHPPD figure encompasses all direct nursing hours allocated to patient care. No claim for indirect nursing hours will be sought in this proposal, as this is a marginal cost issue.

5.5 Cardiac Surgical Ward (3C)

The ward environment of 3C at PAH is similar to TPCH. Patients in 3C have an average length of stay of 5.86 days (excluding ICU stay). The ward has high and low dependency areas and patients follow clinical pathways in care delivery. Ward 3C is allocated 6.3 NHPPD to provide direct care to patients. Cardiac surgical patients at PAH are all nursed within this unit post ICU care and no patient moves outside this unit. The NHPPD figure encompasses all direct nursing hours allocated to the patients. No claim for indirect nursing hours will be sought in this proposal, as this is a marginal cost issue.

5.6 Cardiology / CCU Ward (3E)

Day case angiography comprises of 60% of total workload, approximately 40% of all procedures are undertaken as inpatient procedures. Cardiology / CCU Ward is where these inpatients requiring angiogram and angioplasty are cared for both pre and post procedure. All angioplasty is treated are treated as inpatients. 3E is allocated 9.1 NHPPD for high care cardiac patients within the ward.

5.7 Cardiac Catheter Laboratories

All interventional cardiology now occurs within the cardiac catheter laboratories. Previously cardiac pacemaker and AICD insertion at PAH were undertaken within the operating theatres. This service has now been moved to the cardiac catheter laboratories in line with contemporary practice and will add some 300 extra procedures to the catheter lab workload this year. The cardiac catheter lab undertakes approximately 2400 diagnostic catheter procedures per year (including electrophysiology) with 9 nursing FTE. This compares favorably with any service nationally. Nursing hours are calculated using variables of procedure time and volume. Again, only direct clinical nursing hours have been used in the costing calculations.

6. COSTING METHODOLOGY

Increased throughput at PAH requires increased recurrent and capital investment. It is essential that the PAHHSD does not incur a recurrent deficit in agreeing to transfer activity/funding from TPCH.

In quantifying the additional resources required to fund the stated service expansion, PAHHSD has used a combination of marginal and full-cost methodologies where appropriate. Capital resource requirements are based upon actual requirements for commissioning and equipping operating theatre, ICU beds, ward beds and cardiology beds/lab. Recurrent labour costs are generally full-cost for nursing (minus non-direct nursing component), which reflects the NHPPD models currently used.

Marginal labour costs are generally used for medical, allied health staff operational and support staff. Actual costs have been used for recurrent non-labour costs as these are easily quantifiable and there is no opportunity for savings at the margins.

TPCH suggest that funding for a proportion of their Cardiac Service has been provided at marginal rates from the Elective Surgery Team of Queensland Health. This allegedly failed to account for the necessary cardiology activity feeding the surgical service, and also did not provide adequate funding for the surgical service. Whilst this may or may not be true, the PAHHSD cannot accept the transfer of under-funded activity, which essentially is a transfer of debt from one District to another.

Some marginal savings within the cardiology suite at PAH may be gained, as this area will be able to increase throughput within existing facilities. No increase in major / minor equipment within the cardiac catheter laboratory will be required to undertake the expected growth in patient numbers.

7. VOLUME ANALYSIS

7.1 Angiogram / PTCA

Table 3 - 2001/2002 financial year data (Southern Zone Management Unit)

Treating Hospital	SZMU Southern Zone Patients	SZMU Central Zone Patients	SZMU Northern Zone Patients	SZMU Total Patients	PAH Local Data
TPCH	711	2,451	98	3260	????
RBH	257	587	4	848	1013
PAH	757	48	1	806	2310

* Public patients undergoing Coronary Angiogram / Angioplasty by treating hospital.
** Private patients have been excluded from SZMU data.
*** Local data includes all public and private procedures.
****Local medical officers suggest the workload at PAH has been significantly underestimated and is underestimated at other facilities also.

As evidenced in table 3, TPCH and RBH last financial year treated 968 southern zone patients requiring Angiogram / Angioplasty (145 angioplasty patients). If these patients were redirected to the PAH the flow on effect to cardiac surgery at PAH would be approximately 300 surgical cases. These patients are however being surgically treated at TPCH as identified by the number of cardiac surgical patients treated from the Southern Zone by TPCH.

7.2 Cardiac Surgery

(Table 4). The cardiac surgery undertaken by TPCH on Southern Zone patients comprises of 172 cardiac valve procedures and 252 bypass grafts.

(Table 4) 2001/2002 financial year data (Southern Zone Management Unit)

Treating Hospital	SZMU Southern Zone Patients	SZMU Central Zone Patients	SZMU Northern Zone Patients	SZMU Total Patients	PAH Local Data
TPCH	424	1,160	65	1649	
PAH	378	12	2	392	452
RBH	1	2	0	1	
TGH old + new	0	1	252	253	

* Public patients undergoing Cardiac Surgery by treating hospital.
** Private patients have been excluded from SZMU data.
*** Local data includes all public and private procedures.
****Local medical officers suggest the workload at PAH has been significantly underestimated.

8. RECURRENT LABOUR EXPENDITURE

Table five (5) outlines the staffing requirements (FTE) to undertake the increased workload associated with the transfer of medical and surgical workloads to the PAH. FTE requirements for all nursing staff are based on current direct nursing hours per patient day as used to develop budget allocations in all PAH ward areas. Operating Theatre allocations are based on Australian

College of Operating Room Nurses (ACORN) guidelines that are also used for budget allocation at PAH. All medical, allied health, operational and support staff claims are based on current cardiac workload allocation, multiplied by the increased workload per area.

(Table 5) - FTE Requirement

	Cardiac Surgery Cost Centre	Anaesthetic cost centre	OPD / Rehab	Cardiac Cath Lab	CCU / 3E	Pre admission	CSSD	Theatre	ICU	CSU / 3C	Total
Data Administrator	1.00										1.00
Administration Officer			0.50								0.50
Clinical Nurse				1.00					1.00	1.00	3.00
Registered Nurse			0.90	2.20	4.00	0.10		3.30	6.22	7.65	24.37
Enrolled Nurse							0.10				0.10
N							0.20				0.20
Perfusionist		0.75									0.75
Operational Officer				0.50				1.00			1.50
Scientist				1.00							1.00
Anaesthetic Nurse / Tech								1.30			1.30
Senior Medical Officer	1.00	1.00		1.00					0.75		3.75
Registrar	2.00	1.00		2.00					1.00		6.00
Resident	1.00			1.00							2.00
Radiographer				1.20					0.10	0.10	1.40
Physiotherapy										1.00	1.00
Social Worker										0.40	0.40
Pharmacy										0.50	0.50
Occupational Therapy										0.30	0.30
Dietician										0.20	0.20
Support Staff (Meals, Porterage)										1.00	1.00
	5.00	2.75	1.40	9.90	4.00	0.10	0.30	5.60	9.07	12.15	50.27

Table 6 identifies salary and wage requirements by areas within the hospital. To allow comparisons and transparency of claims between areas and to isolate costs within each area it was decided to isolate rather than combine cost. Current pay rates, penalty rates, allowances and average overtime (where appropriate) have been used in these calculations.

EB5 (nursing) and **Superannuation** has been excluded from calculations. Pay rates for all other staff are based on current rates (May 2003) and will need to be adjusted to include EB5 (adjustment 2) as of 1 July 2003.

(Table 6) - Salaries and Wages

	Cardiac Surgery Cost Centre	Anaesthetic cost centre	OPD / Rehab	Cardiac Cath Lab	CCU / 3E	Pre admission	CSSD	Theatre	ICU	CSU / 3C	Total
Data Administrator	$ 46,058										$ 46,058
Administration Officer			$22,639								
Clinical Nurse				$62,113					$ 62,113	$ 62,113	$ 186,340
Registered Nurse			$51,452	$126,397	$228,719	$ 5,717		$194,134	$ 299,441	$ 436,371	$ 1,342,231
Enrolled Nurse							$ 8,392				$ 8,392
AIN							$ 3,523				$ 3,523
Perfusionist		$ 251,471									$ 251,471
Operational Officer				$ 18,069				$43,863			$ 61,932
Scientist				$ 68,174							
Anaesthetic Nurse / Tech								$76,571			$ 76,571
Senior Medical Officer	$ 257,847	$ 251,471		$ 242,529					$153,687		$ 905,534
Registrar	$ 239,269	$ 104,776		$ 218,968					$96,174		$ 659,187
Resident	$ 78,608			$ 78,608							$ 157,216
Radiographer				$ 78,377					$ 6,531	$ 6,531	$ 91,440
Physiotherapy										$ 64,346	$ 64,346
Social Worker										$ 27,091	$ 27,091
Pharmacy										$ 33,867	$ 33,867
Occupational Therapy										$ 27,091	$ 27,091
Dietician										$ 13,547	$ 13,547
Support Staff (Meals, Porterage)										$ 36,138	$ 36,138
	$ 621,782	$ 607,718	$74,090	$ 893,235	$ 228,719	$ 5,717	$11,915	$314,569	$ 617,947	$ 707,095	**$ 3,991,975**

9. RECURRENT NON-LABOUR EXPENDITURE

Clinical consumables are a major recurrent cost for all clinical units when treating patients. An increase of 950 Angiogram / PTCA and 300 extra cardiac surgery cases will increase recurrent

expenditure significantly. Prices per case or per bed day have been identified (table 7). The expenditure on clinical consumables and prosthetics continues to increase due to economic influences without growth in consumable budget. The units within the Divisions absorb these costs at PAH. If PAH is to undertake the increased workload within cardiac services this budget must be made available to the units undertaking this workload.

Table 7 - Clinical consumables

Consumables	Cost	Bed day / Number	Unit / Ward	Total
Coronary Angiogram consumables	$ 224.00	700	Cath Lab	$ 156,800.00
PTCA consumables	$ 2,360.00	233	Cath Lab	$ 549,880.00
Intensive Care Consumables	$ 250.00	300	ICU	$ 75,000.00
NOSS (food, linen, consumables)	$ 31.84	2546	NOSS	$ 81,064.64
Sterilizing Requirements	$ 43.50	300	CSSD	$ 13,050.00
Operating Theatre Requirements	$ 1,655.00	300	OT	$ 496,500.00
3E Ward Bed Cost	$ 117.00	513	3E	$ 60,021.00
3E Ward Clinical Supplies	$ 55.00	233	3E	$ 12,815.00
CSU Clinical Supplies (3C)	$ 339.00	300	3C	$ 101,700.00
TOE Contract	$ 25,000.00	1	Anaesthetics	$ 25,000.00
Drugs	$ 175.00	300	Anaesthetics	$ 52,500.00
BIS Sensors	$ 30.00	300	Anaesthetics	$ 9,000.00
Prosthetics	$ 426,000.00	1	OT	$ 426,000.00
Broken Instrumentation	$ 15,000.00	1	OT	$ 15,000.00
				$ 2,074,330.64

10. CAPITAL EXPENDITURE/TRANSFER

The PAH requires both major and minor equipment to undertake the increased workload associated with cardiac surgery and cardiology. These requirements are set out in table 8 below. The equipment may be in the form of new purchases or transfer from existing services. Any equipment that currently exists at the PAH that can be used for cardiology / cardiac surgery has been excluded from these requirements.

(Table 8) - Capital Equipment

ITEM	Cost per Item	Number required	Unit / Ward	Total
HP NIBP	$ 5,000.00	2	3E	$ 10,000.00
Beds	$ 3,000.00	2	3E	$ 6,000.00
TOE Machine	$ 250,000.00	1	Anaesthetics	$ 250,000.00
Anaesthetic Machine + Screen + modules	$ 160,000.00	1	Anaesthetics	$ 160,000.00
Cardioplegia Double Pump	$ 33,000.00	1	Anaesthetics	$ 33,000.00
BIS Monitor	$ 20,000.00	1	Anaesthetics	$ 20,000.00
IMED	$ 4,500.00	4	Anaesthetics	$ 18,000.00
Defibrillator	$ 16,000.00	1	Anaesthetics	$ 16,000.00
Pacemaker	$ 5,500.00	2	Anaesthetics	$ 11,000.00
Blood Warmer	$ 3,700.00	2	Anaesthetics	$ 7,400.00
Slave Monitor	$ 6,000.00	1	Anaesthetics	$ 6,000.00
Drip Poles	$ 1,350.00	3	Anaesthetics	$ 4,050.00
SvO2 Monitor	$ 3,000.00	1	Anaesthetics	$ 3,000.00
Flead Frame	$ 3,000.00	1	Anaesthetics	$ 3,000.00
Medium Block Trolley	$ 1,200.00	2	Anaesthetics	$ 2,400.00
Morgan Trolley	$ 1,840.00	1	Anaesthetics	$ 1,840.00
Pressure area protection	$ 1,800.00	1	Anaesthetics	$ 1,800.00
Teledyne O2 Analyser	$ 1,400.00	1	Anaesthetics	$ 1,400.00
Rapid Fluid Infusion	$ 1,250.00	1	Anaesthetics	$ 1,250.00
Chair Mobile	$ 421.00	2	Anaesthetics	$ 842.00
Procedure Trolley	$ 600.00	1	Anaesthetics	$ 600.00
Air Vivas	$ 300.00	2	Anaesthetics	$ 600.00
Stools Mobile	$ 220.00	2	Anaesthetics	$ 440.00
Table Mattress/Doonah	$ 320.00	1	Anaesthetics	$ 320.00
Laryngoscope Blades	$ 60.00	3	Anaesthetics	$ 180.00
Laryngoscope Handles	$ 50.00	2	Anaesthetics	$ 100.00
Beds	$ 5,500.00	6	CSU	$ 33,000.00
IMEDs	$ 4,500.00	4	CSU	$ 18,000.00
Dinamap	$ 5,000.00	2	CSU	$ 10,000.00
Patient High Back Chairs	$ 450.00	6	CSU	$ 2,700.00
Recliners	$ 800.00	2	CSU	$ 1,600.00
Beds side table	$ 250.00	6	CSU	$ 1,500.00
Low Pressure Wall Suction	$ 250.00	3	CSU	$ 750.00
Air Viva	$ 300.00	2	CSU	$ 600.00
Sphygmomanometer	$ 300.00	2	CSU	$ 600.00
Footstools	$ 100.00	4	CSU	$ 400.00
Beds (Joyce Centenary ICU)	$ 7,094.00	3	ICU	$ 21,282.00
Pressure modules (Model M1006B)	$ 1,672.00	10	ICU	$ 16,720.00
SpO2 module (Model M1020A)	$ 5,538.00	3	ICU	$ 16,614.00
NIBP module (Model M1008B)	$ 4,775.00	3	ICU	$ 14,325.00
Gemini pump (Imed PC-2)	$ 4,250.00	3	ICU	$ 12,750.00
ECG modules (Model M1001B)	$ 2,073.00	3	ICU	$ 6,219.00
Temp Module	$ 1,700.00	3	ICU	$ 5,100.00

CO2 module (model M1016A)	$ 4,602.00	1	ICU	$ 4,602.00
CO2 cables	$ 4,130.00	1	ICU	$ 4,130.00
Twin-o-vac	$ 1,000.00	3	ICU	$ 3,000.00
SpO2 cable (Model M1940A and M1191A)	$ 638.00	3	ICU	$ 1,914.00
Battery Charger (M1278A) for transport Monitors	$ 1,824.00	1	ICU	$ 1,824.00
ECG cables	$ 480.00	3	ICU	$ 1,440.00
Doppler	$ 992.00	1	ICU	$ 992.00
Low Pressure Wall Suction	$ 250.00	3	ICU	$ 750.00
NIBP cable	$ 125.00	3	ICU	$ 375.00
NIBP Bladder and cover	$ 95.00	3	ICU	$ 285.00
CO2 Adaptors	$ 161.00	1	ICU	$ 161.00
Operating table	$ 60,000.00	1	OT	$ 60,000.00
Diathermy machine	$ 16,500.00	2	OT	$ 33,000.00
CARDIAC SET	$ 8,200.00	3	OT	$ 24,600.00
Sternal Saw	$ 15,000.00	1	OT	$ 15,000.00
FINE GRAFT SET	$ 6,800.00	2	OT	$ 13,600.00
Headlight	$ 12,000.00	1	OT	$ 12,000.00
ST JUDE COSGROVE RETRACTOR	$ 9,280.00	1	OT	$ 9,280.00
STERNAL RETRACTOR FOR IMA DISSECTION	$ 6,900.00	1	OT	$ 6,900.00
Internal Paddles	$ 3,000.00	2	OT	$ 6,000.00
MISC INST	$ 5,000.00	1	OT	$ 5,000.00
Instrument trolleys (large & small)	$ 750.00	6	OT	$ 4,500.00
MORSE RETRACTOR	$ 1,500.00	2	OT	$ 3,000.00
AORTIC VAVLE SIZERS - St Judes	$ 3,000.00	1	OT	$ 3,000.00
VEIN TRAY	$ 1,300.00	2	OT	$ 2,600.00
VALVE TRAY	$ 2,000.00	1	OT	$ 2,000.00
Bowel Stands (high & low)	$ 500.00	4	OT	$ 2,000.00
FAVALORO-MORSE RETRACTOR	$ 1,606.51	1	OT	$ 1,606.51
Set up trolleys (large + small)	$ 600.00	2	OT	$ 1,200.00
Suction regulators (high & low)	$ 250.00	4	OT	$ 1,000.00
CSD return trolley	$ 550.00	1	OT	$ 550.00
Anaesthetic screen drapes	$ 70.00	1	OT	$ 70.00
			Total	**$ 947,761.51**

11. REVENUE

The PAH cardiology department undertakes approximately 50% of outpatient angiogram procedures as private consultations. Facility fees generated from this workload are kept by the facility as revenue. This decreases the overall cost per procedure for the remaining patients that attend the angiography suite. Table 9 sets out expected revenue growth from the increased patient load at PAH.

(Table 9) Generated Revenue

Angiography Private Patient Revenue

Item Number	Scheduled Fee	Facility Fee	Private Catheters (1/3 of OPD pts)	Rebate to PAH
59925	$ 381.55	$ 114.47	210	$ 24,037.65
38218	$ 539.45	$ 161.84	210	$ 33,985.35
110	$ 122.35	$ -	210	$ -
			Total Rebate	**$ 58,023.00**

12. CONCLUSION

- The PAHHSD is fully supportive of increasing Cardiac Services at the PAH. The increased throughput is essential to ensure sustainability of Cardiac Services within the Southern Zone of Queensland Health. Whilst it was not the intention of the original business case to transfer services from another Queensland provider, PAHHSD asserts there is substantial evidence to support the growth of its Cardiac Service.

- Whether the growth is resourced from transfer of budget, personnel, and equipment or budget only, the quantum must represent the *actual* cost of providing the increased service. PAHHSD has demonstrated the ability to deliver *Best Practice* outcomes at *Best Value* price. We are proud of our achievements and the dedication and quality of our clinical leadership and staff.

- The estimated recurrent cost of delivering the additional 300 surgical cases is $4,164M with an estimated output of 3,700 phase 7 weighted separations (This excludes all recurrent costs associated with the cardiology work but includes all allied health, operational and support staff). **This represents a cost per phase 7 weighted separation of $1,125 for the additional surgical throughput.**

- The estimated recurrent cost of the total cardiac service increase (surgical plus medical) is $6,008M.

- The estimated cost of necessary capital expenditure required is $950k.

Table 10 Final Cost Calculations of Increased Service

Capital Costs	**$**	**947,762**
Recurrent Labour Costs	**$**	**3,991,975**

Recurrent Non-Labour Costs	**$**	**2,074,331**
Recurrent Revenue	**$**	**-58,023**
Total Recurrent	**$**	**6,008,282**
Total Cost of Service	**$**	**6,956,044**

13. REFERENCES

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7. National Health Service Framework (2000) ***Coronary Heart Disease, Modern Standards and Service Models – Revascularisation*** – Ch 5; United Kingdom. Final Draft.

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