

Bundaberg Hospital Commission of Inquiry

Statement of Michael Ian Cleary

Attachment MIC-16



Report of Investigation into Circumstances Surrounding Deaths awaiting Cardiac Services at The Prince Charles Hospital

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1 INTRODUCTION

The District Manager, The Prince Charles Hospital Health Service District (TPCH) received an email from the Director of Electrophysiology, Dr Russell Denman on 29 August 2004. In his email, Dr Denman highlights the death of a young patient awaiting implantation of an Automatic Implantable Cardiac Defibrillator (AICD). Dr Denman identifies that this patient had a cardiac condition and history which predisposed him to sudden cardiac death and that he was assessed as requiring an AICD to prevent this outcome. The patient was categorised as a high priority for the operation, however died, apparently as a result of cardiac arrhythmia after 60 days on the waiting list.

Dr Denman alleged in his correspondence that at current rates of funding for AICDs and their current level of demand, it could be expected that more people would die waiting for this form of treatment.

In response to Dr Denman's email, Dr Darren Walters, Deputy Director of Cardiology, TPCH identified a case where a patient died as an inpatient of TPCH, awaiting urgent cardiac surgery.

Following from this trail of correspondence, the District Manager has initiated an investigation under Section 52 of the Health Services Act, with the particular aim of reviewing the care provided to these two patients and the systems and processes in place to manage waiting lists for AICDs and urgent cardiac surgery.

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2 TERMS OF REFERENCE

Pursuant to the Health Services Act, Terms of Reference (Appendix 1) were drafted by the Acting District Manager, TPCH, Dr Michael Cleary, and require review of:

- The circumstances surrounding the deaths of both patients;
- Whether acceptable systems and processes were in place throughout the management of these patients

And required further that the Investigation Officers report on:

- The management of the patients identified through the email allegations including their prioritisation; and
- The systems and processes used to manage waiting lists for AICDs and urgent cardiac surgery within this District (TPCH)

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3 INVESTIGATION PROCESS

The Investigation was conducted in Adelaide, Rotorua (NZ), Townsville and Brisbane and consisted of:

- an information gathering and planning phase in Adelaide, Rotorua, and Townsville from 29 September to 11 October 2004
- interviews in Brisbane on 11 and 12 October 2004
- interviews by teleconference on 12, 13, 18, 19 October and 3 November 2004.

Interviews were not tape recorded. At the end of each interview a record of interview was dictated, distilling the salient points from the interview to use as an aide memoir for the investigation officers.

All witnesses were advised of the provisions of the Whistleblowers Protection Act. All witnesses were afforded the opportunity to bring a support person if they so wished.

Where documentary material was perceived to have evidentiary value, it was either copied with the assent of the holder of the documents, or obtained pursuant to Part 6 of the *Health Services Act 1991*.

All witnesses proved very co-operative with the Investigation Team.

Every effort was taken to ensure that witnesses were identified and interviewed, where the Investigation Officers believed that they may be able to provide information with respect to the Terms of Reference. Many witnesses gave extensive evidence about their perceptions of the broader issues of cardiac services in Queensland. Wherever these views were of direct or indirect relevance to the terms of reference, they have been considered in the writing of this report.

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4 BACKGROUND

4.1 AUTOMATIC IMPLANTABLE CARDIAC DEFIBRILLATORS (AICDs)

AICD implantation has been occurring in Australia for several years. The technology has developed substantially in recent years and trials throughout the world have demonstrated the efficacy of this form of therapy. Initially utilised in survivors of life-threatening cardiac arrhythmia¹, the Devices have now attained broad use in other groups of patients. The evolving body of evidence demonstrates particular benefit in patients with Hypertrophic Cardiomyopathy², which sees the heart muscle thicken, and increases the risk of cardiac arrhythmia. Recent studies³ extend the indications for the Devices to patients who have Cardiac failure, with an Ejection Fraction of 35% or less.

That is, the therapeutic benefit of these devices is increasingly being demonstrated, with an ever increasing patient pool being seen to be potential beneficiaries.

Across Australasia however, there has been a significant dilemma with the application of this relatively new and evolving technology. That is, cost versus benefit. Each Device, even on the Queensland Health bulk purchasing arrangements costs in the order of

¹ Lehmann MH, Steinman RT, Schuger CD, Jackson K. The automatic implantable cardioverter defibrillator as antiarrhythmic treatment modality of choice for survivors of cardiac arrest unrelated to acute myocardial infarction. *Am J Cardiolipin* 1988;62:803-5

² Maron BJ, Shen WK, Link MS, et al. Efficacy of implantable cardioverter-defibrillators for the prevention of sudden death in patients with hypertrophic cardiomyopathy. *N Eng J Med* 2000; 342:365-73

³ Moss AJ, Zareba W, Hall WJ, et al. Prophylactic implantation of a defibrillator in patients with myocardial infarction and reduced ejection fraction. *NEng J Med* 2002;346: 877-83
Bristow MR, Leslie MD, Saxon A et al. For the Comparison of Medical Therapy, Pacing, and Defibrillation in Heart Failure (COMPANION) Investigators *NEng J Med* 2004;350:2140-2150

Moss AJ, Hall WJ, Cannom DS, et al. Improved survival with an implanted defibrillator in patients with prior myocardial infarctions, low ejection fraction and asymptomatic non-sustained ventricular tachycardia. *N Engl J Med* 1996;335: 1933-40

SCD – HeFT, presented at ACC 2004,
http://www.sicr.org/scdheft_results_acc_lbcc.pdf

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\$15,000 to \$18,000. Most states provide some limited access for public patients to this form of technology. However, the selection criteria and funding varies enormously across and within jurisdictions.

In NSW ⁴ there is no centralised position taken on the use of AICDs, with some Area Health Services having no access, while others have more open access to the Devices.

In Victoria⁵ a similar situation exists despite the presence of a centralised high cost procedure process.

New Zealand undertook a formal review of the technology in 1997 and has a devolved approach with each District Health Board determining its own priorities for expenditure and investment in healthcare, across the spectrum from primary healthcare to such quaternary services. That is, criteria for access are varied.

South Australia provides access to these devices in the public health system through the Royal Adelaide and Flinders Hospitals and The Queen Elizabeth Hospital, Tasmania has access through Royal Hobart Hospital whilst the Northern Territory does not offer the Devices in public hospitals. Patients in the ACT access Devices in NSW hospitals.

In Queensland, the access to AICDs has been managed with a budgetary allocation across the state based on historical usage patterns and allowance for growth. Initially the procedure was only available at TPCH; however, Princess Alexandra Hospital (PAH) now also offers the service. The funding at TPCH allows for 145 procedures to be conducted per annum. At PAH, additional funding has been provided, which will allow for 75 cases to be completed.

⁴ Personal contact with Departmental representatives and Health Service Representatives

⁵ Personal contact with Departmental representatives and Health Service Representatives

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4.2 CARDIAC SURGERY

Cardiac surgery in Queensland is provided at TPCH, PAH and The Townsville Hospital (TTH). The pattern of service for cardiac surgery has changed dramatically over recent years, as cardiologists have taken over a large part of coronary artery disease management through the uptake of stenting technology and Percutaneous Coronary Intervention (PCI). Widespread application of this technology has meant a reduction in the volumes of patients being referred for cardiac surgery, and at the same time, a significant change in the nature of the disease treated and the nature of presentation.

The management of Acute Coronary Syndrome (ACS) has changed over the last few years since the adoption of national guidelines mandating early coronary angiography and revascularisation of patients with a demonstrated Troponin leak. This has led to an increased demand for early coronary angiography and a consequent "back up" of patients waiting in peripheral centres for these investigations. In general after Coronary angiography, of those patients with ACS, one third will have PCI, one third Coronary Artery Bypass Grafting (CABG) and one third managed medically without procedural intervention.

All public cardiac surgery services in Queensland report a significant number of patients entering the system for acute surgical care, creating challenges for allocation of the available resources. That is reflected in the delays experienced for inpatients with Acute Coronary Syndromes awaiting surgery who are unable to be discharged home to be managed as an elective surgical case.

TPCH has, in the last 12 months, according to the administration, seen a mandated change in its referral pattern and a consequent reduction in drainage area for cardiac surgery, with a concurrent reduction in activity targets of 300 open heart cases, and a budget transfer to PAH of \$3.4M. There appears to be some confusion around this point as the Director of Cardiothoracic Surgery Dr Greg Stafford, later advised that the surgical

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targets had been reinstated to previous levels. Further shifts in activity targets and drainage areas have been seen in cardiology services, with a transfer of activity and budget for 500 angiograms to PAH. According to witness interviews, this situation has led to some tensions and organisational distress in TPCH. Of note, the Director of Cardiology has recently resigned his post, with no obvious successor.

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5 ACKNOWLEDGMENTS

The Investigation Officers wish to acknowledge the openness and support of all witnesses interviewed in the course of this Investigation and the services of Mr John Cartwright in facilitating all arrangements for interviews.

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6 KEY WITNESSES

Key witnesses identified for interview included:

- Dr Russell Denman, Director of Electrophysiology
- Dr Darren Walters, Deputy Director Cardiology
- Dr Andrew Galbraith, Director Cardiology
- Dr John Dunning, Deputy Director Cardiac Surgery
- Dr Michael Cleary, Executive Director Medical Services and Acting District Manager
- Dr John Atherton Director Cardiology Royal Brisbane and Women's Hospital
- Dr Paul Garrahy, Director Cardiology, Princess Alexandra Hospital
- Dr Con Aroney, Senior Cardiologist TPCH
- Dr Ken Hossack, President, Cardiac Society of Australia
- Dr John Hayes, Electrophysiologist, Brisbane
- Dr Greg Stafford, Director Cardiothoracic Surgery, TPCH

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7 DISCUSSION

7.1 PATIENT 1 – AICD INSERTION

7.1.1 Clinical Care

A review of the clinical documentation reveals a 44 year old man with hypertrophic cardiomyopathy, referred to TPCH from RBWH for insertion of an AICD. This referral was reviewed on 11 June 2004 by Dr Russell Denman. Given the nature of his condition, and the evidence of a strong family history of sudden cardiac death, it was agreed that the patient would benefit from access to an AICD. Given his age and condition, he was assessed as being a high priority and was booked onto the waiting list, with an expectation that the procedure would be performed within a six month timeframe due to the length of the waiting list.

The patient received appropriate medical therapy and advice prior to his planned definitive therapy. The patient suffered a sudden death on 20 August 2004, 70 days after being entered on the waiting list. The death was apparently a result of cardiac arrhythmia.

The delay to insertion of the AICD was longer than the period considered desirable by witnesses, who maintained that the patient should have had the device inserted within 30 days of the decision that such a treatment was warranted. The patient was considered to have a 3-4% chance of mortality each year, with no available mechanism of determining when such a sudden death may occur. That is, there is usually no predictability as to which patient or when any given patient may suffer a mortal outcome. Where a patient reports repeated syncopal episodes, or repeated symptomatic arrhythmias, or has a grossly thickened myocardium, greater than 30mm on echocardiography this may assist in identifying them to be at greater risk of sudden death. However, there is no antecedent deterioration in condition or other warning signs in the majority of patients.

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Given this waiting period was expected to be around six months, and the anticipated mortality was 3-4% per annum, the patient was exposed to a risk of 1.5 – 2 % of a mortal outcome at the time of his booking for AICD insertion.

There is no evidence to suggest that the patient was managed inappropriately in any way. His assessment was timely, he was placed on the waiting list without delay, and was accorded appropriate priority. The reality is that the longer he waited for his AICD, the greater was the risk of sudden death. That is, there is no question about appropriate clinical care, only the capacity of the system to deliver it in a timely fashion. It is likely that this death may have been prevented if an AICD had been inserted prior to what appears to have been a fatal arrhythmia.

There are a number of issues raised in consideration of this case which warrant further comment and review. These are:

- Selection criteria for AICD insertion;
- Mismatch between selection criteria and available funding;
- Selection criteria variability between Queensland Health facilities;
- Referral routes for AICDs;
- Access to AICD insertion; and
- Opportunity Cost of AICD Insertion

7.1.2 Selection Criteria for AICD Insertion

The selection criteria for AICD insertion in TPCH reflect the latest evidence which demonstrates that there is a significant reduction in all-cause mortality in patients with severe heart failure by insertion of an AICD. The specific criteria used by Dr Russell Denman, and the 4 specialist staff providing electrophysiology services, are derived from the SCD-Heft study⁶ combined with the ACC/AHA/NASPE Guidelines⁷:

⁶ SCD-Heft

Presented at ACC 2004

http://www.sicr.org/scdheft_results_acc_ibcc.pdf

⁷ <http://www.acc.org/clinical/guidelines/pacemaker/Pacemakerclean.pdf>

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- Patients who are resuscitated and survive an episode of fatal cardiac arrhythmia;
- Patients who suffer from Hypertrophic Obstructive Cardiomyopathy, with an interventricular septum of >30mm.
- Patients with cardiac failure and an ejection fraction demonstrated to be less than 35%.

That is, Dr Denman selects all patients who are demonstrated by the cardiological literature to have a statistically significant improvement in mortality.

7.1.3 AICD Selection Criteria Mismatch with Available Funding

From discussions with clinical service directors and administrators from across Australasia, and from review of the clinical and management literature, it is clear that the question of whether AICD technology should be made available, and if so, to whom, is a major issue of concern and debate worldwide. The selection criteria considered in the literature, as outlined above, are based upon those patients who are shown to have a reduction in mortality after insertion of these devices.

The most liberal of these indications suggests that patients with cardiac failure and an ejection fraction (a measure of the contractility of the cardiac muscle) of 35% or less may see a reduction in their "All-cause mortality" by 23% per annum, by use of these technologies, that is from approximately 7.2% to 5.5% per annum⁸.

The problem faced by administrators and clinicians is that this represents an enormous number of patients. It is not known how many Queenslanders would fit these criteria, as there is likely to be a large and under managed group of patients with cardiac failure in the community, who are not yet identified to the QH system. Some indication may be gained from the expert view related by Dr Denman, that approximately four times as many patients would benefit from an AICD as benefit from pacemakers. In

⁸ SCD-Heft
Presented at ACC 2004
http://www.sicr.org/scdheft_results_acc_ibcc.pdf

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correspondence, Dr Denman has commented that the current implantation rate of AICDs may represent as little as 5% of the actual demand based on current evidence. Based on this evidence, estimates would therefore identify a potential pool of recipients of over 4000 per annum. At \$15,000 per case, this would mean \$60,000,000 in prosthesis costs alone. Currently, TPCH is funded to perform 145 AICD insertions per annum, and PAH, approximately 75. That is, if all cases that fit current selection criteria in Queensland were identified, the number being booked for this therapy each year, would be up to twenty times greater than the funded capacity to provide for their care. This represents a shortfall in financial terms of some \$56 million. That is before one considers the ongoing costs of care, replacement of AICDs over time, the infrastructure required and the personnel required.

The infrastructure and personnel to provide for this level of service do not exist in Australia at present.⁹

Once a patient is identified as meeting the selection criteria for AICD insertion, they are entered onto a waiting list for their care. At TPCH, they are managed in a three tiered waiting list format, based around the waiting times for elective surgery, that is:

- Category 1, to be done within 30 days;
- Category 2, within 3 months;
- Category 3, within 12 months.

Accordingly, most patients listed for AICD insertion at TPCH sit in Category 1

At PAH, the waiting list structure is somewhat different:

- Category 1, to be done within 2 days;
- Category 2, to be done within 2 weeks;
- Category 3 can wait 4 weeks.

⁹ The issue of AICDs has been referred to the Medical Scientific Advisory Committee, a body set up under the auspices of the Australian Health Ministers' Advisory Council, to provide cost-effectiveness analysis and assessment of new technologies. The progress in their deliberations to date has been limited. There is no outcome expected in the near future.

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Unsurprisingly, most patients at PAH are in Category 3.

This variation in waiting list management makes the experience between the two facilities difficult to compare.

When one considers the purpose of a waiting list, it is usually as a mechanism to prioritise the timing of access to elective care.

In the case of AICD implantation, the rationale for maintaining a waiting list is difficult to establish.

According to Dr Denman, there is no evidence base to assist with risk stratification of patients considered to potentially benefit from AICDs. Given that the aim is not an improvement in quality of life, rather a reduction in the risk of sudden death, the stakes are fairly high, both for the patient and his/her cardiologist. The inevitable result of a mismatch between the funding base and the selection criteria is that the waiting list will grow, and on current trends, that will be an exponential growth. There will be a small leakage of patients to the private sector, and, with an untreated mortality of 3-4 %, it is inevitable that a significant number of patients will die awaiting their AICD insertion.

There are two ways of approaching this issue; either restrict the selection criteria, or expand the funding base.

Health funds in Australia are restricted by legislation from controlling the use of AICDs in members with appropriate levels of cover¹⁰. As a result, the rate of insertion of these devices is approximately 4 times higher in the private sector than in the public sector. The devices used in the private sector are also on average three times as expensive as the devices used in QH facilities, due to QH bulk purchasing power.

¹⁰ Personal Communication with Medical Director, MBF Australia

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The evidence provided by the clinicians interviewed, suggests that the devices provided by QH are technically acceptable.

7.1.4 Selection Criteria Variability between QH Facilities

The application of evidence to decision making is not as simple as following a list and deciding whether a patient meets the physiological criteria described therein. The use of the Device needs to be considered in the context of the whole patient, not simply the state of their heart muscle and electrical connections. That is, there will always be a level of subjectivity in the decision making. This is described by most with the simple phrase, "clinical judgement". There will inevitably be a level of variation between the judgements of one clinician against another.

This reality manifests in the AICD issue in that, for example, cardiologists at TPCH may make an evidence based decision that a patient should have an AICD insertion, based on their physiological state, with heart failure and an ejection fraction of 35%, which puts them at risk from sudden death from arrhythmia. This will confer an expected 23% reduction in the mortality rate for that patient.

At PAH, the same patient may be assessed as inappropriate for AICD insertion, due to their continuing tobacco habit.

The cardiologists at PAH, are also employing evidence which suggests that behavioural change and smoking cessation will confer an expected mortality reduction and that offering an AICD to this patient confers a similar benefit, but at greater cost to the community than the patient taking control of their own condition and self-managing the risk factors that are directly under their control. They maintain that the evidence supports the contention that if an AICD is implanted while the patient is still smoking tobacco, the incentive to manage their own risk factors is reduced.

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Thus, there are complex ethical and clinical questions at play, which are not answered solely through the application of clinical guidelines defining physiological selection criteria.

This is but one example of the difficult-to-define issue of clinical judgement. Evidence was provided to suggest that patients who may have been accepted onto the TPCCH waiting list for AICD insertion, from the PAH drainage area, who were subsequently to be transferred to the PAH waiting list, were assessed by the PAH cardiologists as inappropriate for AICD on the basis of their fitness, mental state, and other risk factors.

In reality, with some rivalry between services, there develops the potential for a perceived need to differentiate one service from the other. Cultural differences develop, which over time develop into marked differences in practice.

In relation to the assessment of patients and the clinical decision that they require an AICD, there is clinical variation how this decision is arrived at between the two Queensland Health facilities that perform these procedures,

7.1.5 Referral Pathways for AICD Insertion

At TPCCH, many of the patients waiting for AICD insertion are referred from the heart failure clinic, which in turn, grew from the transplant program at TPCCH. A similar referral pathway exists for PAH, where they also run a heart failure clinic. The selection of patients for AICD has, as a practical pre-requisite, optimal medical management of heart failure. There is reasonable evidence to suggest that the access to basic cardiological services will have some bearing on the level of care afforded the patient. According to the Cardiac Society report to the Director General QH, there is significant inequity in access to basic cardiological services, and therefore it follows that there is a disproportionate access for AICD referral to people living in South-East Queensland, while those living in North Queensland are unlikely to be referred for consideration of AICD implantation and are consequently under represented in AICD data.

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7.1.6 Opportunity Cost of AICD Insertion

It is difficult to consider cost-effectiveness of a primary prevention measure, when the outcome being prevented is sudden death. One approach would be to consider the amount that needs to be spent to have a reasonable expectation of preventing a death.

To assist with an analysis of cost effectiveness and opportunity cost relating to the use of AICD's, a simple economic model was developed. This is outlined below.

With an expected mortality rate of 7.2% per annum for patients with a cardiac ejection fraction of <35%, and a reduction in mortality of around 23% conferred by AICD insertion, we could predict a preventable death rate of 1.7% of those patients being offered the service, every year. That is, for every 1000 patients receiving an AICD for this indication, we would prevent 17 deaths from arrhythmia each year. This would come at a prosthesis cost of \$15M (based on single chamber devices at 2004 prices). To achieve this there would need to be an increase in capital infrastructure for EP labs, beds and staffing. A conservative estimate of the additional cost is \$10M per annum. Therefore, each death prevented would cost the public hospital system an additional \$1.47M.

Whilst it is a difficult discussion, the conventional wisdom with investment of public funds must be targeted at achieving the greatest good for the greatest number. One question for resource allocation is therefore, whether there could be a greater impact from investing those dollars in another area of health care or public infrastructure.

As stated previously, the exact scope of the potential demand for AICDs in Queensland is unknown. The paper presented to QH by the Cardiac Society suggests that current implantation rates may be as low as 5% of the actual demand, which would put the total potential demand on current evidence based criteria at around 4000 per annum. Some staff interviewed during the investigation suggest that the situation could be substantially improved with a relatively small injection of funding (quantum not specified), which would allow TPCCH to deal with the existing clinical demand of around 250 cases per annum.

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Unfortunately, this ignores the issue of limited access to referral sources, which has to a certain extent limited the current rate of referrals.

The investigation officers find no reason to take comfort in the current referral patterns representing potential demands for these services, based on experience in Queensland and the current turmoil over this issue nationally and internationally.

7.2 PATIENT 2 – URGENT CARDIAC SURGERY

The second case, was a 74 year old man who was admitted to the Nambour Hospital on 11 August 2004 with an apparent pneumonia. During the course of investigation, it was identified that the patient had suffered an Acute Myocardial Infarction, without the usual onset of pain. This was detected by a blood test which reveals markers of cardiac injury (Troponin).

The patient was transferred to TPCCH on 18 August 2004 under the care of the cardiologists. He had a coronary angiogram performed that day which revealed severe “triple vessel disease” with mitral valve regurgitation, and some suggestion of aortic valve regurgitation.

He was referred to and seen by the Cardiac Surgical team, and the surgeon has documented a comprehensive assessment on 19 August 2004. In order to fully assess the risk factors applicable to this patient, the cardiac surgeon requested some further investigation in the form of a transthoracic echocardiogram, which was booked for 23 August 2004. The clinical record indicates that the patient was symptom free in hospital, and that the echocardiography was not completed on the 23, or the 24th of August. The patient died overnight on the 24 August.

The waiting period from the time that the patient was referred for cardiac surgery to the time of death was six days, which included a weekend. The timeframe appears to have

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been largely due to waiting for investigations by the cardiology service, rather than a delay in the cardiac surgery team. The patient was given a provisional date for surgery on the HBCIS system of 30 August according to Dr Walters. In evidence provided by Dr Stafford, this is a common approach when a patient is not yet ready for surgery, in order to act as a "back stop" while awaiting complete cardiac assessment. By all assessment, the patient was clinically stable, was having regular review by the cardiology team, and whilst they were not fit for discharge home, did not appear to represent a clinical emergency, which would have warranted a more precipitous course to surgery.

The clinical care provided to the patient, who had severe underlying cardiac disease does appear to have been of an appropriate standard. There are however, certain issues raised in this investigation which warrant further review. These include:

- the distribution of cardiac surgical workloads;
- access to urgent cardiac surgery;
- management of cardiac surgical "take" and on call rotas;
- access to cardiological investigations, especially echocardiography;
- access for referral of patients in peripheral hospitals with acute coronary syndromes;
- co-ordination of services between providers;
- standard of referral for cardiac surgery;
- data management;
- Clinical Leadership.

7.2.1 The distribution of cardiac surgical workloads

Review of the documentation of Cardiac Surgical Waiting lists, and evidence provided at interviews, raises questions about the distribution of the cardiac surgical workload. Reference was made at interview to the disproportionate workload falling on staff specialists as opposed to visiting staff. Further it was noted the significant variation in numbers of long wait patients for those practitioners with extensive private commitments or combined adult and paediatric commitments.

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One approach offered to even out workload was to look at more active management of allocation of workload. At present, patients are allocated to the surgeon of the day as their referral arrives. This has contributed to the situation where there is a uneven spread of patients between surgeons. The two staff specialists have no long wait cases and 27 and 18 patients each on their waiting list, and are occasionally "struggling" to identify patients ready for elective surgery. At the same time, other surgeons, with a lesser time commitment to the service, have 59 and 77 patients on the waiting list, and one of those doctors has 7 patients waiting longer than 12 months for their surgery.

According to some interviewees, this maldistribution of workload has the potential to contribute to extended delays in surgery for acute cases.

7.2.2 Access to Urgent Cardiac Surgery

All cardiologists interviewed highlighted a concern that there were extensive delays in patients getting cardiac surgery from the time of their cardiac catheterisation. They identified that it was common to have ten inpatients too unstable to discharge who were waiting for surgical care. A quality audit conducted by Dr Darren Walters was quoted as documenting a median time to surgery for inpatients of 10 days. The maximum time of waiting during the period of the audit, January to June 2004, was said to be 23 days.

There is some evidence to suggest that not all cardiac surgeons are happy with the quality of the referral that they receive from the cardiologists, and that information is often limited to a description of the coronary arteries, without sufficient in depth clinical information to prioritise and risk stratify. There appears to be a fundamental philosophical difference between some of the surgeons and the cardiologists, with the view from cardiologists that the surgeons should "just get on and do the surgery", and that the surgeons are avoiding acceptance of high risk cases. The surgeons indicated that want to fully assess risk factors to make a considered decision about, and obtain proper informed consent for surgery.

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There appeared to be some breakdown in professional relationships, with an absence of cross-discipline clinical meetings to discuss patients and their investigations and treatment, and a difference in the expectations of each other's services.

There was some difference in view as to the impact that delayed access to inpatient investigation has on the progress to surgery, but acknowledgement that for whatever reason, there were times when patients waited for longer than optimal for their acute surgical needs to be addressed.

The picture became even more confusing, when all interviewees were asked whether there was sufficient cardiac surgery being conducted at TPCH to meet community needs. The Cardiac Surgeons interviewed stated that there was overall sufficient activity; however that it could be improved in its efficiency, whilst all the cardiologists stated that they were not satisfied with the volume that was being done. It appeared to the investigators that perhaps the referral criteria and hence expectations of the cardiologists as a group did not match the selection criteria and preparedness to operate, of at least some of the cardiac surgeons.

7.2.3 Management of Cardiac Surgical "Take" And On Call Rotas

The maldistribution of workload mentioned earlier appears to have its roots in a system of "take" which is not actively managed to reflect the caseload of each practitioner. That is, a surgeon with a number of acute inpatients awaiting surgery, and a long waiting list, may get a particularly bad take day which makes his caseload even worse. One viewpoint offered was that consideration could be given to "capping" the number of patients that any one surgeon may have on their books, acute and elective, in an effort to spread the workload more evenly. This would not require a change in on-call; rather the allocation of patients arriving during an on-call period to other surgeons, based on existing workload.

7.2.4 Access to Cardiological Investigations, Especially Echocardiography

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The evidence offered by TPCH cardiologists was that there is a long wait for cardiological assessment for an outpatient review and for cardiac investigations.

This is similar at PAH and RBWH. TPCH and RBWH had a system of prioritising referrals in an attempt to screen out those patients requiring more urgent review, however, routine waits of six months for first cardiologist assessment for low risk patients was normal. It can then take three months to obtain outpatient echocardiography and six months for cardiac catheterisation in low risk patients. The cardiologists considered these waiting times to be prolonged. The District has established a project to revise the echocardiography waiting list management processes.

PAH had recently introduced a programme of direct access angiography in an attempt to short circuit the waiting times. That is, where the referral could be assessed as definitely requiring a cardiac catheterisation, then this would be booked without prior outpatient attendance, thereby saving one outpatient appointment. A similar process is in place at TPCH and RBWH.

7.2.5 Access for Referral of Patients in Peripheral Hospitals with Acute Coronary Syndromes

Access for patients awaiting admission to a tertiary facility after receiving basic care in a peripheral hospital, was marked as the most important single issue for resolution by all cardiologists interviewed. Evidence provided by Dr Aroney, based on data from Nambour Base Hospital, demonstrates the increase in waiting times for transfer to a tertiary facility over recent years. National guidelines, recommending transfer within 48hrs, and early revascularisation, came into force in 2000, and were implemented by cardiologists across the state from that time. Paradoxically, the implementation of these guidelines, which recommend more patients are transferred to tertiary facilities has resulted in a "bottleneck" at the point of transfer to a tertiary facility.

Evidence from presentations prepared by Dr Coverdale, Director of Cardiology in Nambour, and provided to Investigation Officers by Dr Aroney, demonstrate that of those

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who are transferred from Nambour, approximately 1/3 have percutaneous revascularisation, 1/3 have coronary artery bypass surgery, and one third have medical therapy alone.

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Early access to this high level of revascularisation is strongly supported by the medical literature¹¹. Unfortunately, data from Nambour demonstrates a significant increase in those patients waiting for longer than 7 days for transfer over the last 4 years, with 34% of patients waiting longer than 5 days in January/February 2004.

This appears to be a fairly consistent experience across the state, with similar issues identified at RBWH, PAH and Townsville.

PAH claim to have an active programme of monitoring patients "held up" in peripheral centres to ensure that they are transferred more expeditiously if they become unstable. This system does not appear to be in place at TPCH.

7.2.6 Co-Ordination of Cardiac Services between Providers

The load of patients transferring into tertiary centres since the implementation of the national guidelines has been significant. The PAH and TPCH offer a comprehensive service with cardiac surgery and interventional cardiology, while RBWH offers cardiology without surgical cover.

Dr Walters outlined his efforts to improve the alignment of services across RBWH and TPCH, which he stated was detailed in a business case. This proposal if adopted would have seen the RBWH and TPCH share on-call duties for "take" from peripheral centres for ACS patients, and would have seen increased collaboration, at least at the cardiologist level across the two campuses. Dr Walters advised that the proposal had been unsuccessful as the RBWH administration had required that there be a transfer of resource from TPCH to cover the additional costs of service that would be entailed at RBWH.

¹¹ a) Braunwald E, Antman EM, Beasley JW, et al. ACC/APICAL HYPO-AKINESIS guidelines for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on the Management of Patients with Unstable Angina). *J Am Coll Cardiol* 2000;36:970-1062.

b) Bertrand MB, Simoons ML, Fox KAA, et al. Management of acute coronary syndromes: acute coronary syndromes without persistent ST segment elevation: recommendations of a Task Force of the European Society of Cardiology. *Eur Heart J* 2000;21:1406-1432.

c) Rosanio S, Iocchi M, Cutler D, Uretsky F, et al. Queuing for Coronary Angiography During Severe Supply-Demand Mismatch in a US Public Hospital: Analysis of a Waiting List Registry. *JAMA*: Jul 14, 1999;282, 2

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At present, according to Dr Atherton, Director of Cardiology at RBWH, there are around 250 patients transferred to TPCH from RBWH annually for cardiac surgery. The cardiac surgeons from TPCH visit and assess the patients in RBWH, and then the patients transfer to TPCH in time for their surgery. This was identified as taking a number of days to organise. The consultation was reported as prompt, however delays were experienced waiting for surgical access.

7.2.7 Standard of Referral for Cardiac Surgery

The Cardiac Surgeons interviewed identified that they have significant concerns about the standard of referrals for cardiac surgery. Specifically they are dissatisfied with the level of clinical information about patients to facilitate prioritisation and risk stratification. One cardiac surgeon commented that a standardised referral form, whilst being available, was not being utilised, and that referrals often constituted little more than a freehand cardiac catheterisation report.

The cardiac surgeons interviewed were concerned that from their perspective, this is an inadequate referral process and that they expected patients to be appropriately “worked up” by the cardiologists prior to being presented to the surgeons for consideration. This combined with the time taken to access inpatient or outpatient echocardiography was seen to add significant delay and inefficiency into the system.

Dr Dunning stated that he had attempted to organise a meeting with the cardiologists to address the issue of referral practices, and that there was a poor attendance from the cardiology staff. Both cardiac surgeons interviewed expressed frustration that there was no regular cross-discipline meeting between cardiac surgery and cardiology, which made the prioritisation of work quite difficult within the department.

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When asked about the perception that inpatient delays for cardiac surgery were contributed to by delays in accessing cardiological investigation, one Cardiologist stated that this was in his opinion incorrect and that if the surgeons required an echocardiogram, that it could be arranged in accordance with clinical need.

The investigating officers formed the view that communications between the Cardiac Surgeons and the Cardiologists could be improved. This was based on what appeared to be a lack of awareness of the needs and processes of clinical colleagues. The investigating officers formed the view that some Cardiologists did not appreciate the surgeons' concerns about risk stratification and its relationship to case selection and informed consent. Similarly, the investigating officers formed the impression that some Surgeons did not appreciate the magnitude of the concern that Cardiologists had for their patients. It was also apparent that a contributing factor was the considerable pressure that peripheral hospitals put on the Cardiology Department to ensure rapid patient throughput so that urgent patients in peripheral centres could access the services provided by TPCH.

7.2.8 Data Management

Dr Dunning highlighted in his interview the relevance of data management in high risk clinical practice. He stated that in preparing for his interview, he had attempted to pull information on deaths on cardiac surgery waiting lists. This was not available from any central source, for although the waiting list was held centrally, together with the AICD waiting lists, when a patient died on the list; their name was deleted from the waiting list. That is, there was no ready access to enable an assessment of deaths on the waiting list. Deaths of patients on the waiting list are now being monitored.

Whilst this issue was an annoyance to Dr Dunning, it was not his major concern. The capacity to record risk-adjusted outcomes for cardiac surgery is now regarded as a requirement in most jurisdictions. Dr Dunning had been working as a cardiac surgeon in the United Kingdom in the aftermath of the Bristol Royal Infirmary paediatric cardiac surgical public scandal, and reported on the extensive reviewing of individual cardiac surgical performance that had been put into place as a result.

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By way of contrast, Dr Dunning identified that there was no Queensland wide database, nor any contribution to a national data base to provide satisfactory indications as to the performance of individual surgeons or departments. This, he maintained, related back to patient selection, and an inability to advise whether the service was operating effectively on those patients who would benefit the most from cardiac surgery.

Dr Stafford reinforced the concerns expressed by Dr Dunning in this regard.

7.2.9 Clinical Leadership

One issue that came through repeatedly was the value of effective clinical leadership, and the danger of its absence.

Many interviewees identified that there was a leadership vacuum in cardiac services at TPCCH, and a lack of cohesive cardiac vision across facilities. The position of Director of Cardiology at TPCCH has been recently vacated and is now the subject of an international search. Any new incumbent will be entering a troubled environment and will need highly developed diplomatic skills to be able to work across all the areas of their brief. Specifically, he/she will need to:

- work with management to heal the fractured relationship, which demonstrates little trust in either direction;
- build bridges with other services;
- develop an outward looking department that focuses on its role in leading development of cardiac services across the state;
- work with cardiac surgeons to develop a model of collegiate support and mutual respect; and
- work with a demoralised department to set a direction with realisable goals and avoidance of victim mentality.

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8 CONCLUSIONS

8.1 CLINICAL CARE PROVIDED TO PATIENTS UNDER REVIEW

8.1.1 Patient 1 AICD Implantation

The referral, assessment and planning for care of this patient all took place in an appropriate timeframe. The decision to treat with an AICD appears appropriate and the categorisation on the waiting list for care is consistent with the presentation. There was no indication, beyond a recent syncopal episode of any increased risk of sudden death, beyond that conferred by the patient's primary condition, hypertrophic obstructive cardiomyopathy.

The expected waiting time for this patient to have his procedure from the time that he was booked on the waiting list was six months. On the basis of a 3-4% per annum rate of sudden death being predicted on the basis of the primary condition, there was a 1.5-2% risk that the patient may die over the period they were expected to remain on the waiting list. Earlier implantation of an AICD may well have prevented this death.

The principal factor preventing this patient receiving their AICD earlier was a mismatch between the selection criteria being applied for this form of care, and the funds available to make it possible.

8.1.2 Patient 2 – Urgent Cardiac Surgery

This patient was transferred acutely from Nambour Hospital to TPCH 7 days after suffering a silent myocardial infarction. He was given the appropriate diagnostic test to identify coronary artery disease and was referred to the cardiac surgeons for definitive management of triple vessel disease.

Assessment of the patient by the cardiac surgeons was timely and appropriate and he was listed for surgery. He was stable in hospital and demonstrated no signs or symptoms that

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should have alerted the clinical staff to impending death and need for greater urgency in definitive care. The patient died in hospital prior to completion of his work-up for consideration of cardiac surgery. Investigation Officers did not find sufficient evidence to suggest that the system problems referred to by Dr Walters contributed to this death.

8.2 THE SYSTEMS AND PROCESSES USED TO MANAGE WAITING LISTS FOR AICDS AND URGENT CARDIAC SURGERY

8.2.1 Cardiac Services Planning

The issues presented to the Investigation Officers represented a range of real and pressing concerns to the clinicians. It was apparent to the Investigation Officers, that the TPCCH cardiologists interviewed felt that they had attempted to raise genuine issues of concern regarding pressing needs for investment in cardiac services. Their level of distress was palpable, and whilst their requests appear at many levels to be extraordinarily expensive, they are also backed by significant evidence.

The demonstrated passion for their cause and demonstrated willingness to engage in debate may still be able to be harnessed into a planning framework which would allow the opportunity to balance any further investment in cardiac services in a planned and deliberate fashion.

A cardiac services plan for Queensland should identify disease groups, and resourced strategies for addressing them, commencing with urgent priorities, followed by a structured response over a five year timeframe. This may be targeted to address the burden of disease, for example in:

- Ischaemic Heart Disease
 - Acute Coronary Syndrome Management
- Heart Failure
- Electrophysiological Services
- Paediatric and Congenital Heart Disease
- Valvular Heart Disease

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Such a plan would take some time and consultation to generate, but should be undertaken within a defined timeframe, incorporating input from cardiologists, cardiac surgeons, general practitioners, Community groups, epidemiologists, health economists and administrators.

A central part of this plan would be the need to look strategically at the health workforce in cardiology, including succession planning, and mentoring of developing cardiologists with a view to public sector appointment as a part of their career plan.

8.3 ACCESS TO TERTIARY CARE FOR ACUTE CORONARY SYNDROMES

The highest priority accorded by most interviewees was addressing the issue of access of patients to definitive cardiological investigation and care in management of acute coronary syndromes.

Evidence suggested that at present Queensland Health was not able to routinely achieve best practice in this regard as tertiary hospitals were unable to accept their patients for care in a timely fashion due to either bed unavailability or capped activity in cardiac catheter laboratories. This investigation is not able to provide a definitive report on access to care for this group of patients across the state, however notes consistent evidence provided to support these claims. If the State is to provide for the acute needs of patients in this disease category with best practice care, there will be a requirement to lift activity in catheter laboratories and improve access to coronary care unit beds in tertiary facilities.

Given the evidence that there are variable "choke points" within the system militating against access to tertiary care, it is suggested that a review be conducted into cardiac bed management across the state as a precursor to a state-wide planning process. This would allow a clearer picture of the complex and dynamic environment, inextricably linked with access to lab time, theatre time, surgeons anaesthetists and non-invasive investigations.

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It is likely that a solution to this issue would be a combination of process improvement, targeted resource improvement and greater co-ordination across services.

8.3.1 Access to Cardiological Investigations

A common and undisputed theme from interviewees was the delay in accessing cardiological investigations either as inpatients or outpatients. Extensive waiting times for echocardiography were particularly emphasised. Whist germane to the Terms of Reference, this was seen as a somewhat peripheral issue which would need to be addressed as a part of a state-wide planning process for cardiac services, with good potential for technologically supported, networked solutions.

8.3.2 Approach to High Cost Therapies

The introduction of new therapies is regularly a challenge to healthcare administrators. This is so because they often "appear unannounced" when the first clinician seeks to introduce them into practice. On many occasions, evidence for new therapies and technologies will emerge overseas, and practitioners in Australia will seek to introduce their use, in line with evolving evidence.

Rarely if ever does this come with a cost saving.

Many new therapies are marketed on the basis that they reduce hospital stays, or dependency upon hospital beds. Often this is true, yet the savings identified are not realisable, as the costs associated with the hospital beds are largely fixed, and therefore savings cannot be achieved unless beds are closed. In the current era of high occupancy of beds, it would be unusual for a clinician to argue that they could afford to operate with fewer beds in the system.

Therefore, investment in new therapies needs to be seen in its real context, that is, new money required in the system.

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On this basis, particularly high cost interventions, such as AICD insertion, need to be carefully programmed, debated and guidelines established in agreement between providers and funders. This can work, and many interviewees identified the recent process around the introduction of "Drug Eluting Stents" into Queensland Health as a practical approach to the issue.

Given the level of expertise required in assessing new technologies and determining how they can be funded, it may be appropriate to consider creation of a standing committee to consider such issues in a robust and timely fashion.

8.3.3 Selection Criteria for AICD Insertion

The criteria for consideration of AICD implantation are similar at the two hospitals providing this service to public patients and are based around the ACC/AHA/NASPE guidelines and SCD – Heft trial¹² in the United States. Variation then occurs in the assessment of the patient put up for consideration of AICD. At PAH the approach considers the presence or absence of other risk factors and lifestyle factors, especially in heart failure patients. Evidence suggests that assessment of patients at TPCH uses a similar process but that the application of the clinical criteria is different.

This has led to a perception expressed by some interviewees that the PAH is reluctant to take on high risk patients, and that these patients need to go to TPCH.

This difference creates potential for division between services and has potential to create confusion for referring practitioners.

8.3.4 Funding For AICD Insertion

¹² SCD-Heft
Presented at ACC 2004

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The current funding for AICDs does not match the demand expected based on current selection criteria. The net result has been the increase in waiting lists for this procedure, which can only extend based on current funded activity levels and referral patterns.

This situation can be resolved by either increasing the funding base, or altering the selection criteria or referral pathways to reduce the demand. There appears to be broad agreement that patients who have been resuscitated from a fatal arrhythmia and those who have hypertrophic cardiac disease should have access to an AICD as soon as possible. The use of AICDs in some patients with heart failure appears more contentious, because the overall reduction of risk of death in this group is less profound.

8.3.5 Sustainable Services

The volume of services and number of practitioners able to support an on-call roster to an extent define the sustainability of the services provided. At TPCH, and RBWH there is significant evidence that the practitioners involved are under stress, both from a perception of daily workloads being too great to enable quality practice, and from extensive after hours on call commitments. It was beyond the scope of this investigation to determine appropriate resourcing of services and appropriate workloads for practitioners. However, the investigation officers consider that benchmarking of service volumes and workload may be appropriate in addressing the concerns of clinicians. This may be undertaken as a review of cardiac services in RBWH and TPCH, critically evaluating work practices and workloads, with a view to recommending sustainable practice across the range of cardiac services, including particularly diagnostic cardiology, interventional cardiology, paediatric cardiology and cardiac surgery.

8.3.6 Co-Ordination of Cardiac Services between Providers

The existence of a busy acute cardiac service at RBWH, with a high volume of acute cardiology through the Emergency Department, in close proximity to the less acute TPCH facility should provide the ideal opportunity for service collaboration with shared

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appointments and on-call rosters. This is an area for potentially improving the sustainability of public cardiac services.

8.3.7 Cardiac Surgical Workload Distribution

The mechanism of cardiac surgical on-take distribution at TPCH appears to militate against effective resource utilisation in cardiac surgery. Investigation officers were attracted to the suggestion of a pooled waiting list and greater flexibility for operating on acute patients already in hospital.

8.3.8 Standard of Referral for Cardiac Services

Rapid assessment, prioritisation and optimisation of care are not facilitated by an incomplete referral process and insufficient cross-discipline communication as is currently the case in TPCH. There needs to be a meeting of minds between the cardiologists on the one hand and the cardiac surgeons on the other, to ensure that this vital process is managed optimally in the patients' interests.

8.3.9 Clinical Leadership

The current search for a Director of Cardiology for TPCH is a major priority. The value of strong clinical leadership in an environment as challenging as is presently the case, is inestimable, and progress will be difficult without it. Given the current level of demonstrated conflict between management and clinicians, it may be most appropriate to seek external applicants as it is unlikely that any internal candidate would be acceptable to all parties.

8.3.10 Waiting List Management

It is essential when considering waiting lists, especially across hospitals, that the definitions used in the waiting lists are consistent and transparent. It appears that there has been significant confusion evolve around cardiology waiting lists due to significantly different definitions being applied between facilities.

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The effective management of waiting lists requires significant clinical input, flexibility and co-operation, within and between facilities. At this stage, there would appear to be little cross department discussion about waiting list management, and it may be that there is scope to improve clinical input into waiting list management processes.

8.3.11 Data Management

High risk healthcare, such as cardiac services is notoriously difficult to evaluate for quality of outcomes without a sophisticated and comprehensive approach to data management and clinical governance. This may be facilitated by effective application of data management and engagement with national and international clinical quality databases. This should be done in the context of a governance framework which can provide confidence to clinicians, administrators and the public that the quality of care and access to care is of an appropriate standard.

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9 RECOMMENDATIONS

9.1 CARDIAC SERVICES PLANNING

Urgent consideration is given to commencing a **cardiac services planning** process across Queensland with a view to defining a five year plan for the development and maintenance of comprehensive cardiac services.

9.2 ACCESS TO TERTIARY CARE FOR ACUTE CORONARY SYNDROMES

Consideration is given to a **review** of patients awaiting transfer to tertiary cardiac services, and those waiting for management of acute coronary syndromes in tertiary facilities in order to determine level of performance against national guidelines for management of Acute Coronary Syndromes.

9.3 APPROACH TO NEW HIGH COST THERAPIES

Consideration is given to the creation of a **standing committee** for horizon scanning, technology assessment and new service introduction be established within QH with a view to identifying directions of care nationally and internationally, and preparing QH to meet the challenge of selecting and introducing appropriate technologies and therapies in a planned manner with appropriate funding. The Committee would require strong clinical leadership, health economics expertise, engagement with the funding branch of QH and capacity to call on expert input depending upon the issue at hand.

9.4 MATCHING SELECTION CRITERIA AND FUNDING FOR AICDS

Consideration be given to convening a specialist panel to determine appropriate selection criteria for AICDs having regard to resources available and current medical evidence. The committee should be charged with determining:

- criteria to be eligible for consideration of AICD implantation;
- assessment processes to be undertaken for AICD implantation;

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- appropriate waiting time targets for AICD implantation, with specific consideration of whether some conditions require more urgent care;
- how to ensure equity of access to all Queenslanders; and
- the most appropriate mechanism for funding these devices across the State.

Some guidance for an interim set of selection criteria and prioritisation, required in order to protect the cardiologist from suggestion of inappropriate practice in the context of affordable activity, may be offered by reference to ACC/AHA/NASPE Practice Guidelines¹³. The Investigation Officers recommend as an interim measure that Category 1 and 11b patients receive implants within one month of being listed on the AICD waiting list.

9.5 SUSTAINABLE SERVICES AND CO-ORDINATION OF CARDIAC SERVICES BETWEEN PROVIDERS

Consideration is given to a review of cardiac services between **TPCH** and **RBWH**, benchmarking workloads and critically examining work flows and practices with a view to greater co-ordination and / or consolidation of services across the two campuses.

9.6 CARDIAC SURGICAL WORKLOAD DISTRIBUTION

Consideration is given to creation of pooled waiting lists for public patients referred to **TPCH** for cardiac surgery.

9.7 STANDARD OF REFERRAL FOR CARDIAC SERVICES

Renewed effort is applied to improving the referral and communication links between cardiologists and cardiac surgeons at **TPCH**.

¹³ <http://www.acc.org/clinical/guidelines/pacemaker/Pacemakerclean.pdf>

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9.8 CLINICAL LEADERSHIP

Every effort should be made and every flexibility should be exercised to **attract a world class clinical leader** to TPCCH to fill the vacant Directorship of Cardiology as soon as possible.

9.9 WAITING LIST MANAGEMENT

A specialist panel be convened to develop and implement guidelines including definition of **categorisation** for waiting lists for cardiological care across the State.

9.10 DATA MANAGEMENT

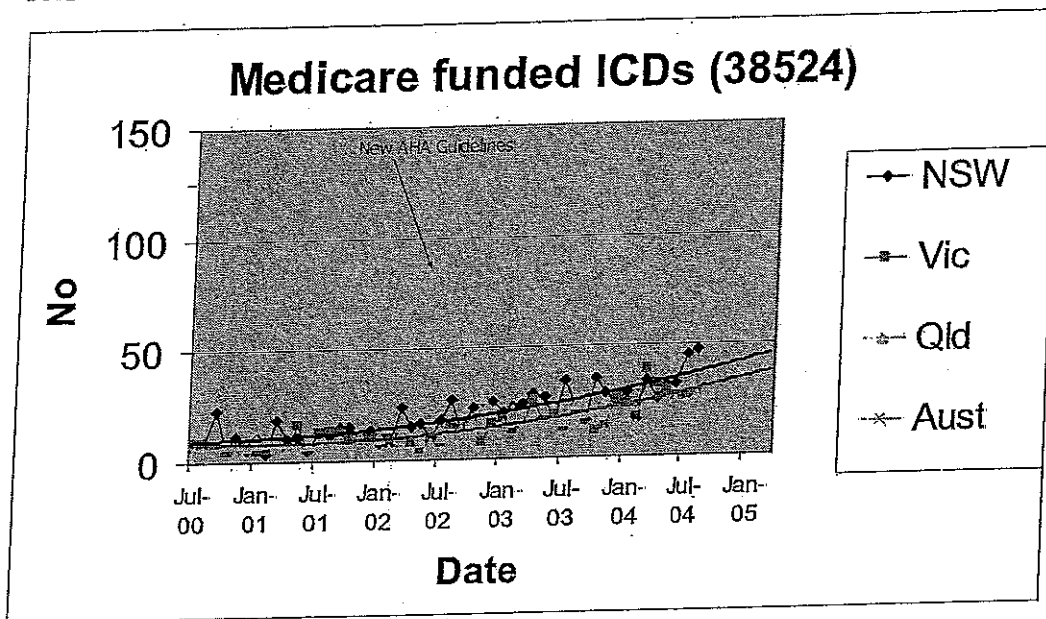
Identify and purchase an appropriate **data management system** for cardiac services to be implemented across the State.

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10 APPENDICES

10.1 SUPPORTING DOCUMENTATION PROVIDED BY DR RUSSELL DENMAN



Source: http://www.hic.gov.au/statistics/dyn_mbs/forms/mbs_tab4.shtml

This data reflects the number of medicare funded ICDs. (Item No 38524) It does not include those funded via the DVA system. This should represent the minimum number of ICDs implanted in the private sector for this period

Please note the effect of the AHA guidelines published in Oct 2002

**

Item Number 38524:

Automatic defibrillator generator, insertion or replacement of-not being a service associated with a service to which item 38213 applies (Assist.)

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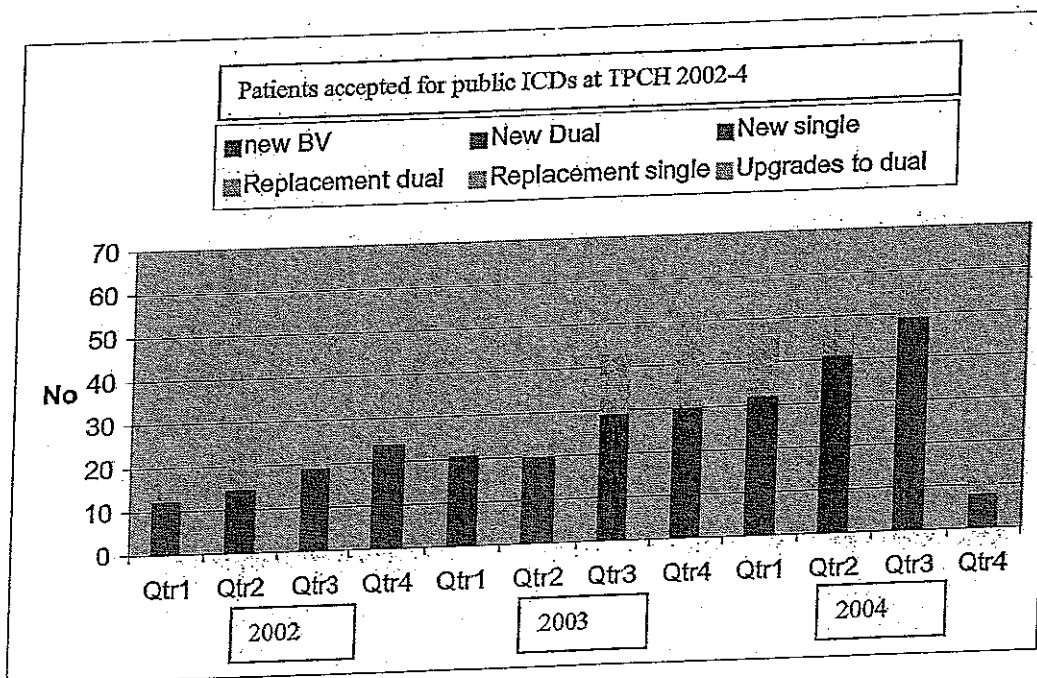
10.1.1 Demand for ICDs at TPCH

Patients referred for Public ICDs at TPCH

Financial years	Actual 2002/3	Actual 2003/4	Year to date 2004/5 **	Projected 2004/5
New BV	2	8	5	17.55
New Dual	28	29	10	35.10
New Single	54	95	42	147.40
Replacement dual	1	2	2	7.02
Replacement single	9	55	9	31.59
Upgrade to dual	2	2	1	3.51
Grand Total	96	191	69	242.16
	0			
New	84	132	57	200.05
Replacements	12	59	12	42.12

Actual and projected Number of ICDs added to the waiting list for last 3 years at TPCH.

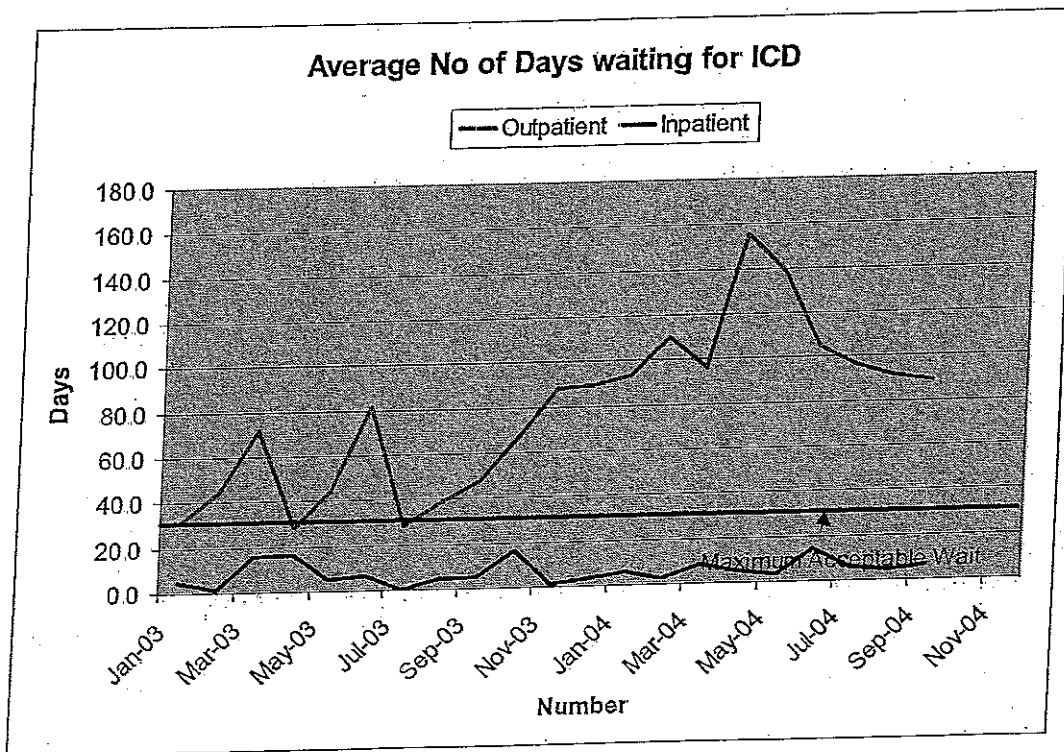
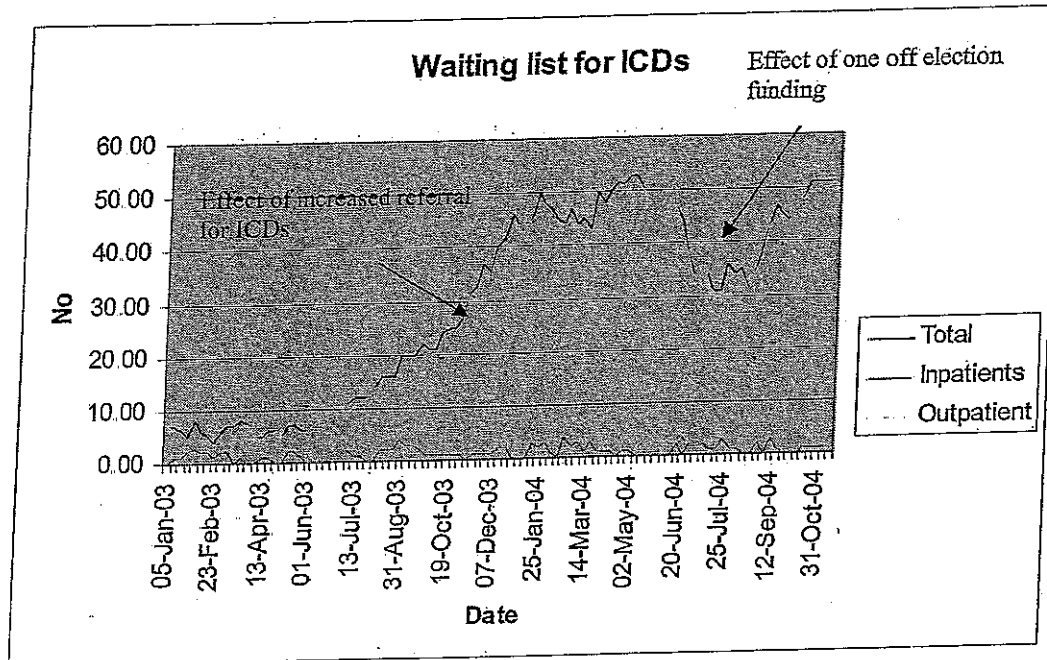
**Year to date =12/10/04



Patients added to the waiting list for ICDs at TPCH since 2002.

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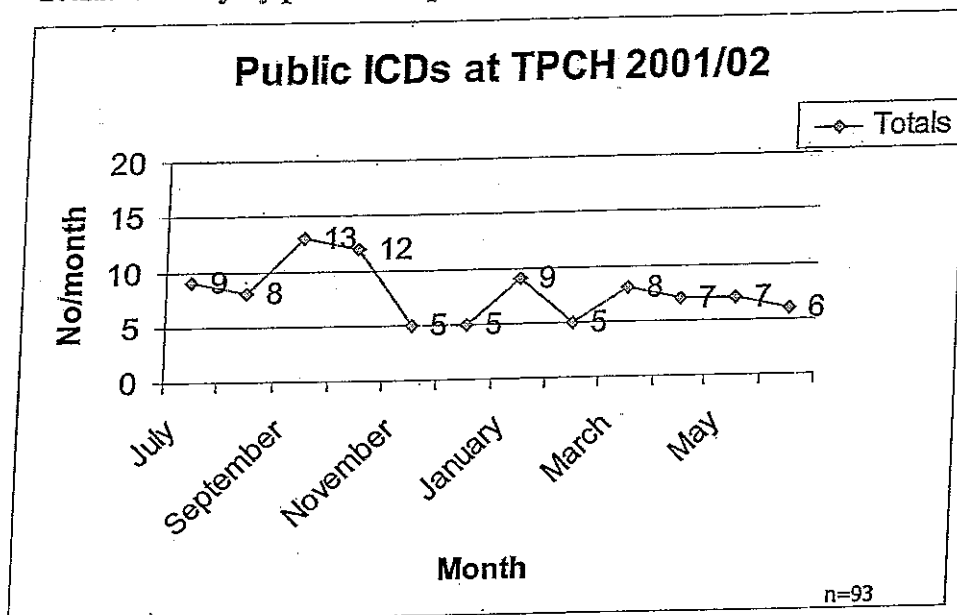
INVESTIGATION – The Prince Charles Hospital



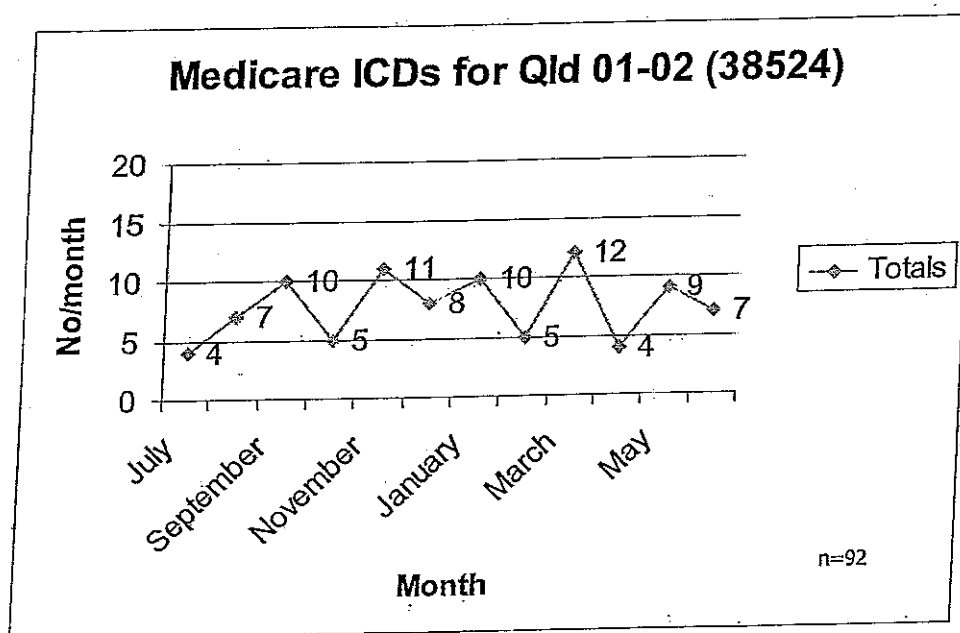
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10.1.2 Activity by public and private sector 2003-2004



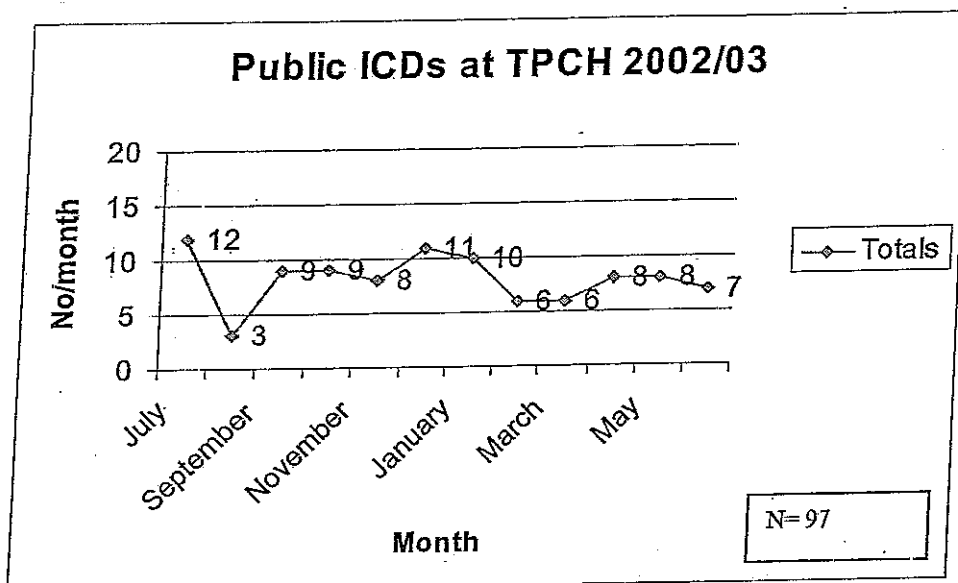
Source: TPCH Cardiac Electrophysiology and Pacing Service Financial Review 2001/02



This data reflects the number of medicare funded ICDs. (Item No 38524) It does not include those funded via the DVA system. This should represent the minimum number of ICDs implanted in the private sector for this period

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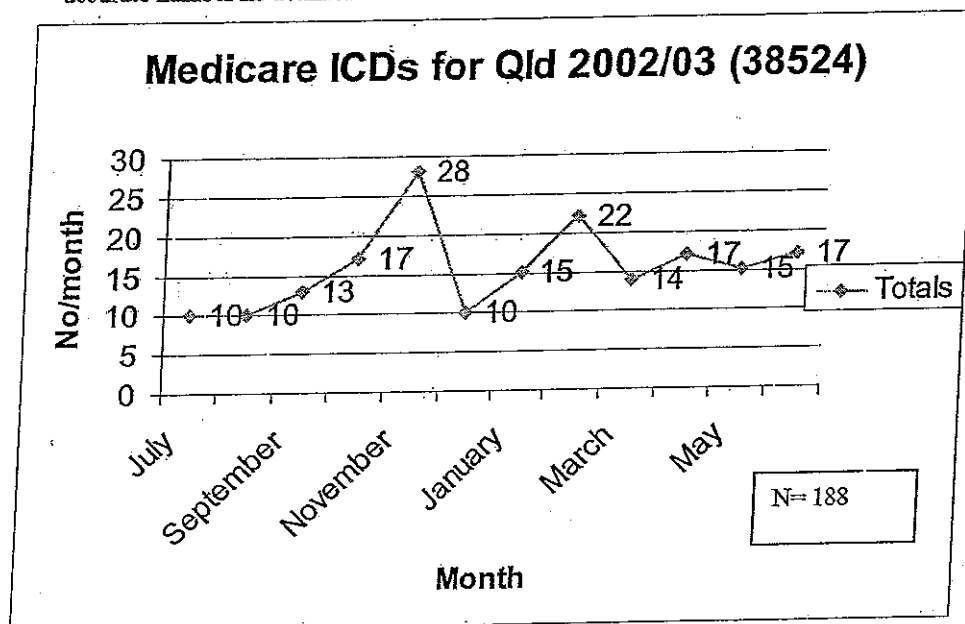
INVESTIGATION – The Prince Charles Hospital



ICDs implanted at TPCH for period 2002/03.

Source: TPCH Cardiac Electrophysiology and Pacing Service Financial Review 2002/03

Actual public number implanted in QLD is approximately 20-30 greater. Those implanted at PAH, but accurate number no available

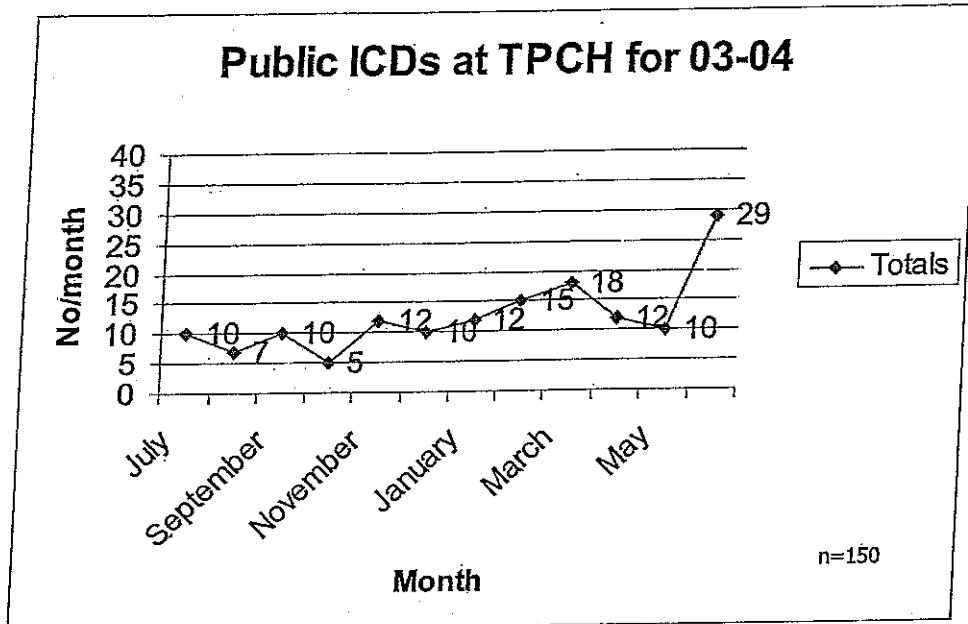


Source: http://www.hic.gov.au/statistics/dyn_mbs/forms/mbs_tab4.shtml

This data reflects the number of medicare funded ICDs. (Item No 38524) It does not include those funded via the DVA system. This should represent the minimum number of ICDs implanted in the private sector for this period

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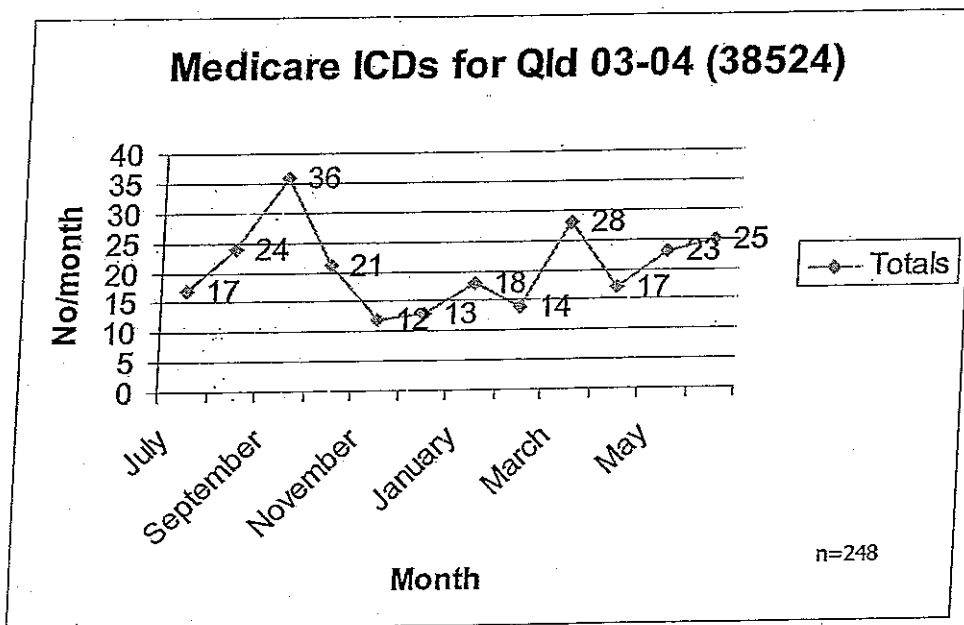


ICDs implanted at TPCH for period 2003-4.

Source: TPCH Cardiac Electrophysiology and Pacing Service Financial Review 2003

/4

Actual public number implanted in QLD will be greater. Those implanted at PAH are not accounted as accurate numbers are not available to date



This data reflects the number of medicare funded ICDs. (Item No 38524) It does not include those funded via the DVA system. This should represent the minimum number of ICDs implanted in the private sector for this period