2001

REVIEW OF CARDIAC SURGERY IN NORTHERN IRELAND

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EXECUTIVE SUMMARY

(i) Heart disease remains a major cause of death and illness in Northern Ireland, where rates are higher than almost all other places in Europe. For a proportion of patients with heart disease surgery provides a means to relieve symptoms and improve quality of life.

(ii) Developments in the field of cardiology and cardiac surgery now mean that much more can be done to treat people with heart disease. In turn, public expectations of successful treatments are now higher than before.

(iii) Cardiac surgery services at the Royal Victoria Hospital (the Royal) have, for the past few years, been under considerable pressure. Much of this pressure is due to an increased demand on intensive care facilities in the post-operative period. This has in turn resulted in fewer people being able to access surgery and consequently the waiting time for surgery has been increasing.

(iv) This report identifies the significant factors contributing to the decreased throughput in cardiac surgery. It recommends a number of measures that should be taken to improve services and to alleviate some of the current pressures. It also looks forward and anticipates the future demand for cardiac surgery over the forthcoming years.

(v) Cardiac surgery is provided by a dedicated and committed team of highly skilled professionals at the Royal Victoria Hospital. Without exception patients spoke highly of the care they received and commended staff for their hard work and dedication to the service. Building on the strengths of the current service is a key principle in striving for excellence within cardiac surgery.

IMPROVING CURRENT SERVICES

(vi) Cardiac surgery should be a patient-centred service. Measures to ensure that patients are well informed partners in the decision-making process are recommended. For example, patients referred for or awaiting surgery should be kept fully informed of waiting time and expected date for surgery. Clearly designated responsibility for the management of the waiting list, admission procedures and follow up is recommended.

(vii) A patient's pathway to cardiac surgery is relatively complex, typically involving a number of hospital visits and several investigations before they are placed on the waiting list for surgery. The referral mechanism needs to be simplified with direct referral from cardiologist to cardiac surgeon replacing current procedures. It is important that all patients are prioritised on agreed clinical criteria and undergo surgery within the waiting time appropriate to their clinical need.

(viii) No patient should wait longer than 8 weeks for a cardiac surgery outpatient appointment and by 2003 they should have had surgery within 12 months of attending outpatients. Regularly updated and accurate waiting times for each cardiac surgeon should be made available to referring cardiologists.

(ix) Following surgery, patients are transferred to the cardiac surgery intensive care unit (CSICU). A number of steps, some of which have already been initiated, are recommended that would improve both the efficiency and effectiveness of patient care in CSICU. These include the application of agreed clinical protocols for patient management the introduction of fast tracking for suitable patients and improving medical cover especially anaesthetic cover to the unit.

(x) Staffing levels, particularly nurse staffing, are the major underlying problem in the cardiac surgery unit and are directly responsible for the unit's difficulty in functioning at optimal capacity. Recruiting and retaining nurses presents a major challenge. Stressful work load, long working hours,

poor morale and inadequate levels of remuneration all contribute to recruitment and retention problems. This report recommends immediate action to enhance nurse staffing levels, review remuneration, and strengthen medical support to the cardiac surgery unit.

(xi) A multidisciplinary team (MDT) approach is critical in cardiac surgery. The MDT should meet regularly to provide the opportunity for staff to share information, discuss relevant issues and review practices and procedures.

(xii) Other factors will also play a role in strengthening the service. Integrating cardiac and thoracic surgery would provide opportunities to improve patient management and this should be actively pursued. Overcoming some of the physical obstacles such as having intensive care and high dependency care facilities adjacent to one another would make services more manageable.

FUTURE SERVICES

(xiii) Our cardiac surgery rates and in particular our rates of coronary artery bypassing (CABG) are close to the European average of 429 per million. However, in some regions, for example Scandinavia, the rates of CABG are significantly higher. This poses the question as to the appropriate level of surgery. In England the National Service Framework for Coronary Heart Disease (NSF) have proposed an increase in CABG to 750 per million. We will need to keep under constant review the surgical provision indicated for our population.

(xv) The rapid developments within cardiology will undoubtedly influence the demand for cardiac surgery. The percutaneous intervention (PCI) rate will continue to increase over the next few years with little change anticipated in the need for CABG surgery.

(xvi) As a priority the number of CABG procedures must be increased to the current target of 800 and waiting times for surgery must be decreased. While the Royal are increasing the number of CABG procedures there will remain a need to send patients elsewhere for surgery in the short to medium term if the waiting list is to be brought under control.

(xvii) This report does not address the provision of paediatric cardiac surgery in detail. Decisions regarding this will be deferred until the National Review of Paediatric and Congenital Cardiac Services has been completed. Any changes in the provision of PCS will have an impact on adult services, which will then need to be reassessed in light of developments. This will include the need to explore opportunities for North South collaboration in the delivery of care.

(xviii) Data collection, rigorous local audit and participation in national audit is essential in ensuring a high quality service. The results of audit should be made widely available.

(xix) A high quality of cardiac surgery is provided at the Royal. Recommendations contained in this report aim to strengthen the quality of current services and to ensure that, as a highly respected regional service, cardiac surgery will continue to meet the needs of the community.

INTRODUCTION

1.1 Heart disease is a major cause of death in Northern Ireland. While premature deaths have been falling over the past 15-20 years, rates of coronary artery disease remain higher here than in most European countries. With an ageing population and more people surviving early cardiac events, such as a heart attack, heart disease will remain a major health problem.

1.2 In Northern Ireland Cardiac surgery is carried out only at the Royal Victoria Hospital (also referred to as the Royal). Patients who have undergone surgery express high levels of satisfaction with the standard of service they receive and the professionalism of all staff involved in delivering the service. Despite the excellent quality of service provided, waiting lists for cardiac surgery have been growing and fewer procedures have been performed.

1.3 This review of cardiac surgery was commissioned in response to a number of specific issues.

- Recently, fewer patients have been able to undergo surgery because of pressures within the system and consequently waiting times for surgery have increased.

- Difficulties in recruiting and retaining nursing staff have resulted in staff shortages which at times have caused operations to be deferred.

- Significant medical and surgical advances have taken place since the last review, conducted in 1992. As a result of developments surgery can be offered to patients who previously may not have benefited. Consequently the demand for services has increased.

- The future demand for cardiac surgery needs to be identified so that service developments can be planned accordingly.

1.4 The review was conducted at a time when the importance of heart disease has been emphasised in regional, national and international forums. The regional strategy, *Health and Wellbeing into the Next Millennium*, identifies coronary heart disease as a priority and provides a number of targets focused on reducing premature deaths from heart disease. The NSF in England provides targets for prevention and treatment of heart disease. Similarly in the Republic of Ireland the Cardiovascular Strategy, *Building Healthier Hearts*, adopts a comprehensive approach to reducing the burden of heart disease. Also, the public health consultation document, *Investing for Health*, stresses the imperative of targeting the underlying causes of heart disease.

1.5 The purpose of this review is to assess current cardiac surgery services in Northern Ireland and to make recommendations on the development of these services to meet future need. In addressing this task, the review group adopted a number of key principles considered essential to the provision of a quality service:

A Patient Focused service

1.6 Cardiac surgery is major surgery with risks attached. It is stressful not only for patients but also for families. The specific needs of patients must be recognised and services tailored.

1.7 For patients, timely and accurate information can allay many of their fears and concerns regarding surgery. Information should not be restricted to describing heart disease and proposed treatment. It is equally important to provide information about the referral process, and expected waiting time**.** Providing timely and relevant information for patients and their families should be a priority and should be backed up by the provision of printed material.

1.8 A patient focused service will require adequate facilities, equipment and staff. Equally important, it will benefit from a culture of collaboration and partnership. The provision of a named individual with whom the patient can communicate at times during the course of their hospital treatment or rehabilitation would be advantageous.

Quality Outcomes

1.9 Maintaining a quality service is a priority, within a context of rising public expectation, advances in clinical knowledge and technology, and increasing workloads. Those treating patients must be well trained, highly competent and up to date in their practice. Both professionals and management play a critical role in maintaining and demonstrating a quality service.

1.10 Good data collection and rigorous audit of activities is an essential part of providing quality outcomes. Only by measuring what is done in an objective manner, and comparing it to best practice and outcomes elsewhere, can we assess the quality of the service provided.

Access to Services

1.11 The vast majority of patients who need cardiac surgery want to have their operation at the earliest possible opportunity. Waiting time is dependent upon the capacity of the cardiac surgery service and the number of patients being referred for surgery.

1.12 An individual's waiting time should be determined by the urgency of their condition. It is important that waiting times should be managed to ensure that they do not impact negatively on the outcome of treatment and that the best use is made of staff and theatre capacity. Within these parameters, it is important to strive for as short a waiting time as practicable. In cardiac surgery, as in other services, access to the service must be based on clinical need irrespective of gender, age and other factors.

1.13 The aim should be to provide a level of service within Northern Ireland for all those requiring surgery. Until that is achieved we will need to continue to rely on centres outside Northern Ireland in order to reduce waiting times.

Cardiac Surgery Team

1.14 Cardiac surgery is a complex specialty with many individuals providing an input. The many different professional groups that contribute to the service all play a critical role and need to work as a team. Each member of the cardiac surgery team needs to feel effective and valued. Team building and the development of leadership are important elements in the resourcing of the service.

1.15 The effective use of existing resources is fundamental to the future of our cardiac surgery services. The most precious resources are the skilled and committed individuals who work in the service and their contribution must be recognised and rewarded. Staff working in the specialty of cardiac surgery are often in a stressful environment as a consequence of the nature of their work and staff shortages will increase that burden. The well being of all staff must be recognised as a priority if morale is to be maintained and they are to provide the quality service expected of them.

1.16 Communication between and among professional groups is equally important. Regular discussions and exchange of information will facilitate an understanding of colleagues' perspectives and priorities. Regular and effective communication with Trust management and with commissioners will also be beneficial. In particular this will be essential if difficulties arise in meeting service contracts.

1.17 Continuous personal development and career progression must be structured in a manner that maximises the input of individuals while providing them with an environment in which they find the work fulfilling.

1.18 The physical facilities are also an important resource and must be utilised with due consideration to maximising both effectiveness and efficiency.

This may require careful planning and organisation of admission and the use of ICU and HDU beds. Equipment is clearly an important resource and should be repaired or replaced at appropriate intervals. Auditing the use of facilities and equipment may help to provide useful information that may inform a more efficient or effective utilisation of resources.

Method of working

1.19 The Review team gathered the information for this report in a variety of ways. They visited the cardiac surgery unit at the Royal and held several meetings with staff. Two clinical workshops were held involving cardiac surgery staff and cardiologists, physicians, general practitioners and nurses from throughout Northern Ireland. Analysis of routine data from hospital information systems together with a detailed examination of case notes was undertaken.

1.20 Seven public meetings, publicised widely, were facilitated by the Health and Social Services Councils. The Northern Ireland Chest, Heart and Stroke Association facilitated a patient focus group. Written submissions were invited from and meetings offered to a broad range of interested parties including General Practitioners, HPSS organisations, District Councils, professional associations and voluntary organisations. There were meetings with 4 District Councils and 1 voluntary organisation on request in order to facilitate their submissions.

1.21 Four other units providing cardiac surgery services were visited by members of the Review team and steering group accompanied by members of staff at the Royal: St James' Hospital and the Mater Hospital in Dublin, and St George's Hospital and the Royal Brompton in London. Information obtained from these visits helped identify best practice. The team have looked at guidelines and policy from elsewhere and current clinical and epidemiological research.

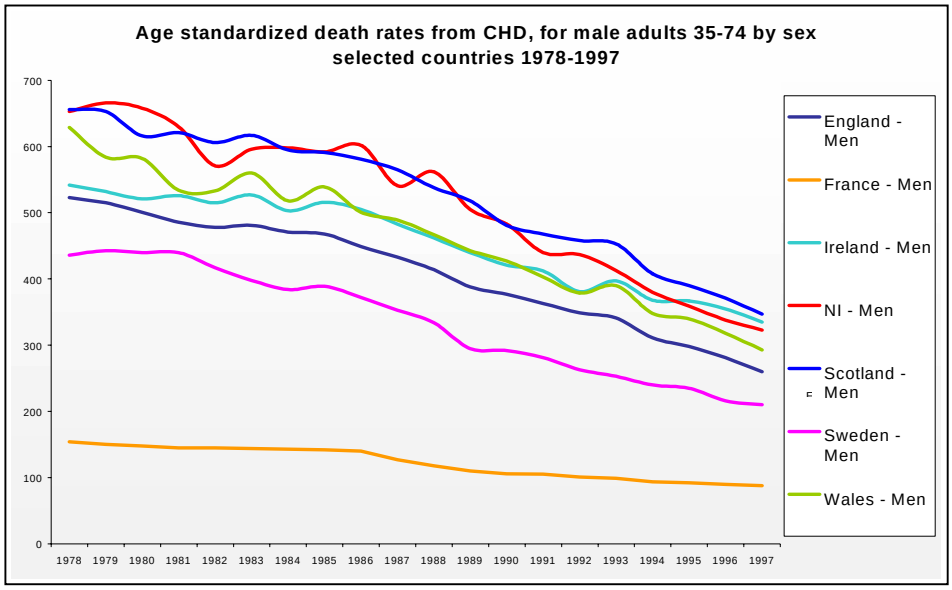
1.22 The Review has made demands on many people and the time and thought given is appreciated. The openness that clinical and other staff from the Royal have shown the Review Team, the commitment to participating in the Review process and willingness to consider means of improving current services must be commended.

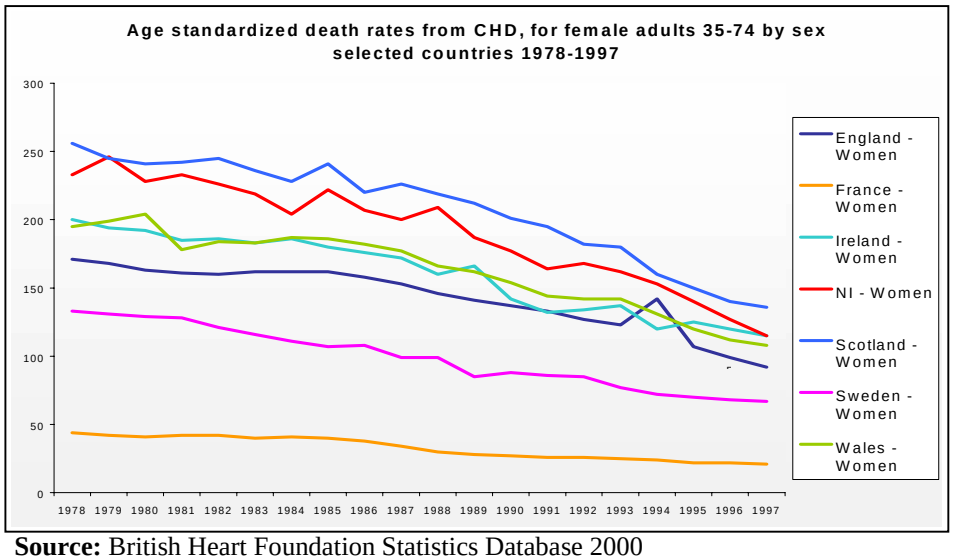
2 HEART DISEASE AND ITS TREATMENT

Pattern of Heart Disease in Northern Ireland

2.1 Most European countries have experienced a fall in cardiovascular mortality since the 1970s. In spite of this Northern Ireland still rivals Scotland for the highest death rate from coronary heart disease in western and northern European countries (Figure 1).

Figure 1: Age standardised death rates from CHD, for adults 35-74 by sex (selected countries 1978-1997)

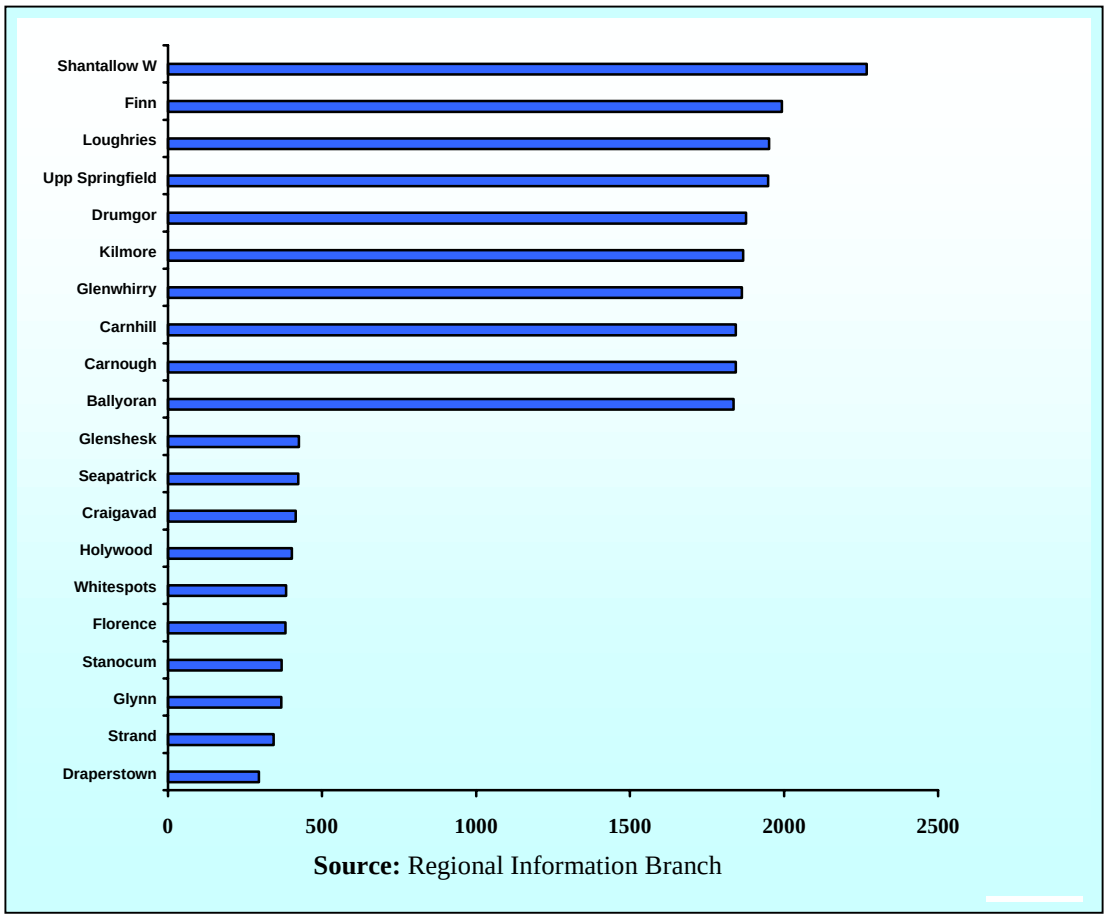




Source: British Heart Foundation Statistics Database 2000

2.2 Within Northern Ireland, mortality rates are higher in areas of socio-economic disadvantage (Figure 2).

Figure 2 Electoral Wards with Highest and Lowest Rates of Ischaemic Heart Disease (Deaths per 100,000 65-74 year olds 1991-1997)



Source: Regional Information Branch

2.3 Risk factors for heart disease include a poor family history, advancing age, smoking, sedentary lifestyle, hypertension and high cholesterol levels. While many of these can be modified, some such as age and family history cannot.

2.4 Declining death rates from coronary heart disease must be interpreted with caution. Heart disease shows a sharp rise with age, and population predictions show a large increase in the number of people over 75 by the year 2010. As heart disease predominately affects older people, levels are expected to rise in line with the ageing population. This will have a potentially significant impact on the need for services in the future.

2.5 Both prevention strategies and advances in treatment have contributed to the reduction in deaths for heart disease. Priorities for health promotion are a reduction in smoking and dietary fat, an increase in fruit and vegetable consumption and an increase in physical activity.

2.6 Despite prevention strategies and improved treatments, we can still expect heart disease to result in a major burden of illness in Northern Ireland over the next few decades.

Treating Heart Disease

2.7 In patients with coronary heart disease, the slowly progressive blockage of the coronary arteries, which supply blood to the heart muscle, causes angina (chest pain). This usually occurs initially during exercise but may be experienced even at rest if the blockage is severe. In a heart attack (acute myocardial infarction) a coronary artery becomes completely blocked. This stops the blood supply to part of the heart muscle, which may then die.

2.8 Despite the many recent advances, most treatments relieve symptoms but do not cure the disease. For every 100 people with coronary artery disease, 20 will die suddenly from the disease before they know that they have it.

2.9 For people diagnosed as having coronary heart disease, changes in lifestyle, particularly smoking cessation and an increase in physical activity can improve their condition. In addition, there are medical treatments available, such as drug treatments that can prevent or relieve angina in many patients.

2.10 Clot dissolving drugs (thrombolytics) can make a huge difference to the outcome of a heart attack. The treatment can dissolve the clot in a coronary artery and prevent the death of heart muscle. Over recent years this has been shown to be very effective. However, the treatment needs to be administered as early as possible, preferably within 1 hour of the patient calling for medical help.

2.11 Where drug treatments are no longer effective, other treatments such as balloon angioplasty and stenting can alleviate the blockage in a coronary

artery. Before treatment, a dye test (angiography) is conducted. This reveals the location and severity of blocked coronary arteries.

2.12 Balloon angioplasty permits patients to be treated without the need for invasive surgery. It involves a cardiac catheter being used to insert tiny balloons into narrowed arteries to open blockages. Many patients undergoing balloon angioplasty also have a coronary artery stent inserted. This is a tiny device, left in the coronary artery, which acts as a scaffold helping to keep the artery open and to prevent further blockage. Angioplasty and stenting procedures are now collectively known as percutaneous intervention (PCI).

2.13 The vast majority of treatments relieve symptoms but do not cure the disease. Prevention strategies will be the major means of reducing the rate of coronary heart disease. To impact on coronary heart disease in the 21st century it is necessary to identify the risks and promote necessary action to reduce them within the community.

Cardiac Surgery

2.14 Cardiac surgery primarily consists of coronary artery bypass grafting (CABG) for the treatment of coronary disease, valve surgery for the repair or replacement of valves and paediatric surgery for the treatment of congenital heart problems.

Coronary Artery Bypass Graft (CABG)

2.15 For patients with severely blocked coronary arteries that have not responded to other treatments, open heart surgery and coronary artery bypass graft (CABG) may be necessary. In this procedure, the blocked coronary arteries are 'bypassed' using a different, healthy artery to provide the blood supply to the heart muscle. Veins from the leg or small arteries from the chest wall are commonly used as grafts for bypass surgery.

2.16 For a minority of patients CABG may be a life saving operation and for some it will be life prolonging. For most, its major benefit is reducing

symptoms such as severe angina and consequently improving quality of life. It should be recognised that surgery carries a recognisable risk and a small number of patients will die or suffer significant complications as a result of undergoing an operation.

Cardiac Valve Surgery

2.17 Valve surgery is conducted to repair or replace heart valves. Valve disease may be congenital or can occur as a result of rheumatic heart disease. Although this disease is now uncommon, a significant number of older people who suffered from it in their youth may require surgery today. In addition, as people get older, their heart valves may degenerate and may require repair and replacement.

2.18 Valve surgery is complex, requires substantial theatre time, and is often accompanied by other medical conditions.

Other Types of Procedures

2.19 There is a wide range of other cardiac surgery operations undertaken in Northern Ireland, including aortic surgery, and operative management of myocardial tumours. Some very complex surgery, such as heart transplants, is undertaken in specialist units outside of Northern Ireland.

Paediatric and congenital heart surgery

2.20 Approximately one baby in a hundred will be born with a heart defect, for example a hole in the heart. Some of these will resolve spontaneously, but about 1 in 3 of will require heart surgery. For some infants one surgical procedure may be needed. For others, particularly those with complex abnormalities of the heart, repeated surgical procedures may be required throughout their lives.

2.21 The number of adults with congenital heart disease is increasing as people are living longer following the success of early cardiac surgery.

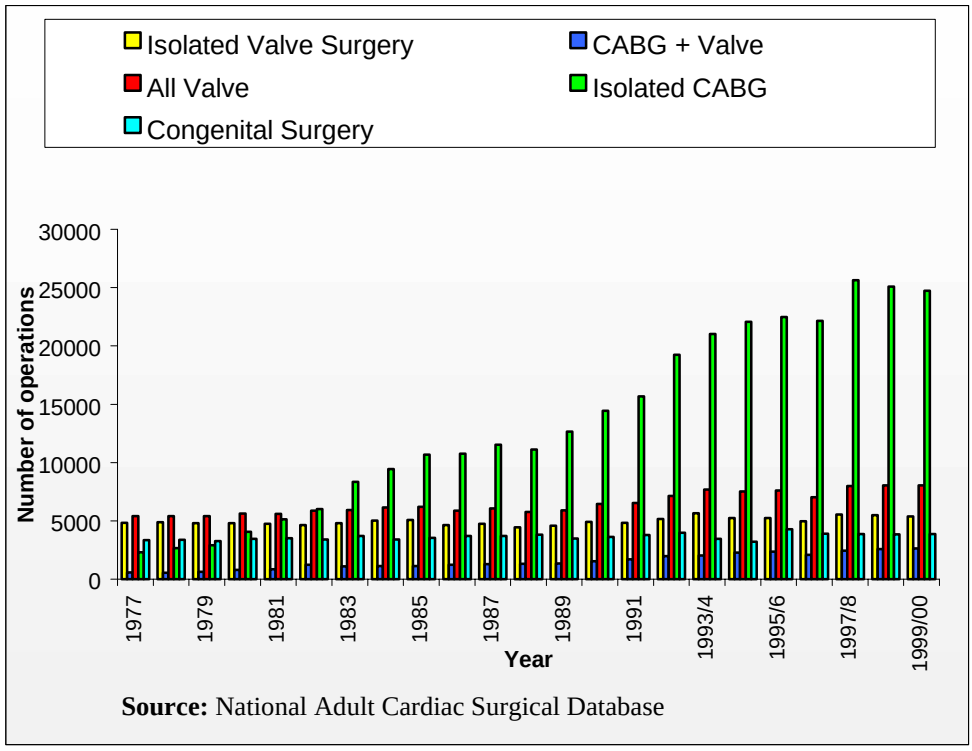
Rehabilitation

2.22 Rehabilitation is an essential component of treatment following cardiac surgery. It has, however, been included in the Review of Cardiology to be published soon. All patients who have had a heart attack or cardiac surgery should be offered the opportunity to participate in a multidisciplinary rehabilitation programme, ideally commencing in hospital and continuing within their local community.

Trends in Cardiac Surgery

2.23 The provision of cardiac surgery has grown steadily in the UK over the last 20 years as shown in Figure 3. This growth is largely made up of coronary artery bypass grafts (CABGs).

Figure 3 23 year growth in cardiac surgery in the UK

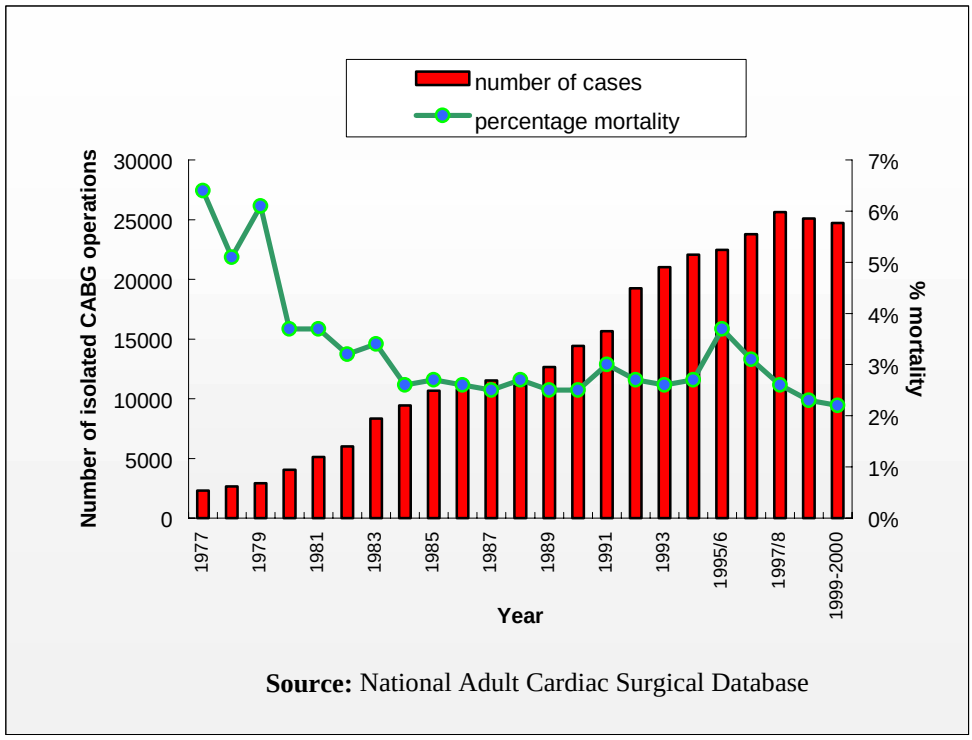


Source: National Adult Cardiac Surgical Database

2.24 Over the past two decades advances in technical capabilities have allowed a wider group of patients to be referred for surgery. Despite this, operative

mortality for all types of cardiac surgery has fallen over the years (Figure 4).

Figure 4 23 year activity and mortality trends for isolated coronary surgery

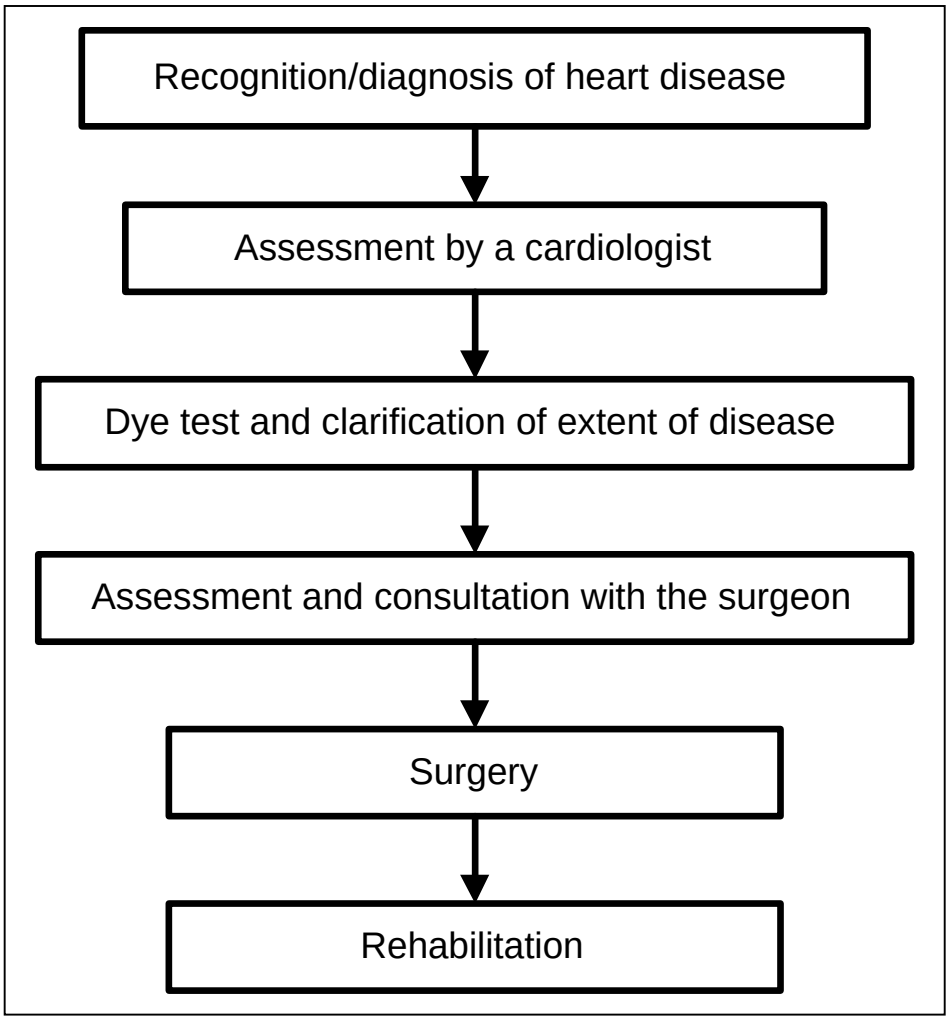


Source: National Adult Cardiac Surgical Database

3 THE PATIENTS' JOURNEY

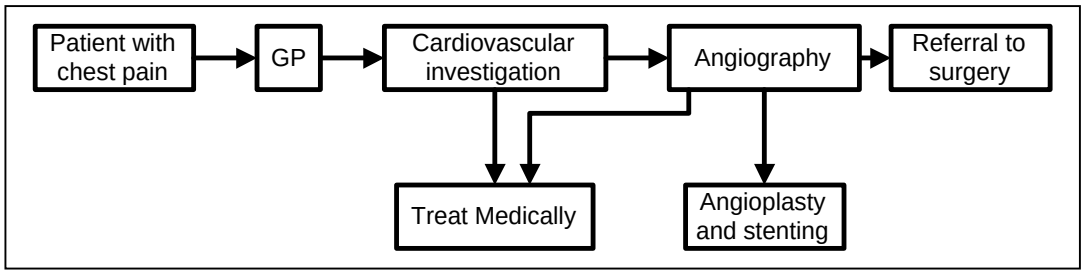
3.1 Although individual patient experiences differ in the detail (see boxes), it is possible to identify a number of key stages at which health care professionals are involved with patients and their carers in important decisions (fig. 5).

Figure 5 Pathway from recognition of heart disease to surgery



3.2 Patients who experience episodes of chest pain, or whose angina worsens, typically consult their general practitioner.

Figure 6



3.3 To confirm a diagnosis a general practitioner may refer the patient to a cardiologist or may have direct access to non-invasive investigations such as treadmill testing and/or echocardiography at local hospital. If invasive investigations such as angiography are required, the patient is referred to an interventional cardiologist. Cardiologists throughout Northern Ireland have angiography sessions in the BCH/RVH, and angiography is soon to be available at Altnagelvin hospital.

3.4 If a definitive diagnosis of severe coronary artery disease or cardiac valve disease is made the cardiologists will determine the best treatment option. This may involve medical management, angioplasty with or without stenting, or cardiac surgery. If surgery is appropriate, the patient will be referred to a cardiac surgeon. Patients are only referred to a cardiac surgeon following a thorough assessment and decision by a cardiologist. The referral mechanism involves a joint weekly meeting between referring cardiologists and the rotating duty cardiac surgeon. Apart from those urgent cases that cannot wait, all patients are discussed at this forum.

3.5 Those patients considered likely to benefit from surgery are normally assessed again, at the surgeon's outpatient clinic. Each cardiac surgeon holds his own waiting list, both for outpatients and for surgery. Information on waiting times for both outpatients and surgery for each surgeon is not routinely available to referring practitioners.

3.6 Patients are prioritised according to clinical need with each surgeon using their own criteria. The priority category dictates how soon the patient is likely to be offered surgery.

3.7 A small number of patients, usually those admitted to hospital with severe chest pain, are judged to be too unstable for discharge before their surgery. In these circumstances, they wait as cardiology inpatients, either in the Royal or their referring hospital. They may take precedence over patients on the waiting list who may have to have their surgery deferred.

3.8 Elective (non-emergency) patients are admitted for surgery by one of two routes. They may be admitted directly to the ward the day before surgery, when a pre-operative assessment is conducted. Alternatively if they have attended a pre-operative clinic, usually 1-2 weeks prior to admission, they are admitted on the evening before surgery.

3.9 Most patients have surgery conducted using a cardio-pulmonary pump. This allows the heart to be stopped so that surgery can be carried out. A small number of patients have 'beating heart' surgery, in which the heart is not bypassed. The average length of surgery is 5 hours and 20 minutes.

3.10 All patients are cared for in the immediate post-operative period in the cardiac surgery intensive care unit (CSICU). The length of time any patient spends in CSICU is dictated by their clinical condition but is usually between 1-2 days. The length of stay in CSICU has been lengthening over time and the small number of patients staying extending periods has grown significantly.

3.11 When discharged from CSICU, patients may be transferred to the High Dependence Unit (HDU) or the ward depending on clinical need.

3.12 Patients are typically discharged from hospital within 7 days. They are usually reviewed 6 weeks postoperatively and then discharged from cardiac surgery. Many will continue to be followed up by their cardiologist while

others will be reviewed by their general practitioner. Some but not all participate in cardiac rehabilitation.

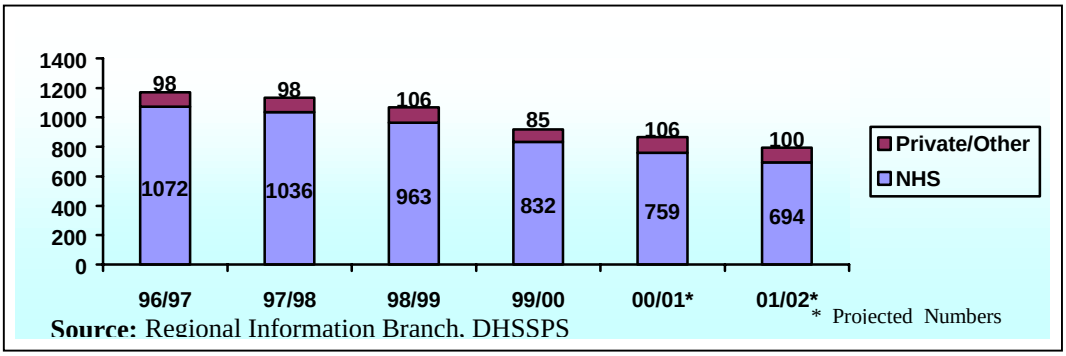
4 UTILISATION OF THE SERVICE

4.1 Cardiac Surgery was first carried out at the Royal in the 1940s, initially on congenital heart disease cases. Open-heart surgery began in 1968 with one surgeon performing about 3 cases weekly. By 1975, two surgeons were operating with two anaesthetists. At this time, repair of diseased or damaged valves was the commonest indication for surgery. In the late seventies, as techniques of bypass grafting developed, there was a dramatic increase in CABG, which has continued to this day.

4.2 The current size and configuration of the Cardiac Surgery unit is based on a report by the Chief Medical Officer, Dr. James McKenna, completed in 1992. He recommended that the unit should to provide a total of 1100 procedures per annum for the population of Northern Ireland.

4.3 Following the 1992 Review, the amount of cardiac surgery undertaken in Belfast increased steadily for a number of years reaching 1072 procedures in 1996-1997 (plus 98 private procedures). Since then, however, the number of procedures has declined. There has been some decrease in the level of congenital and valvular surgery, but the greatest decrease has been in CABG procedures. Several factors have contributed to the decline (Figure 7) in the number of procedures, including pressure on CSICU beds, staff shortages and the increased complexity of procedures being undertaken.

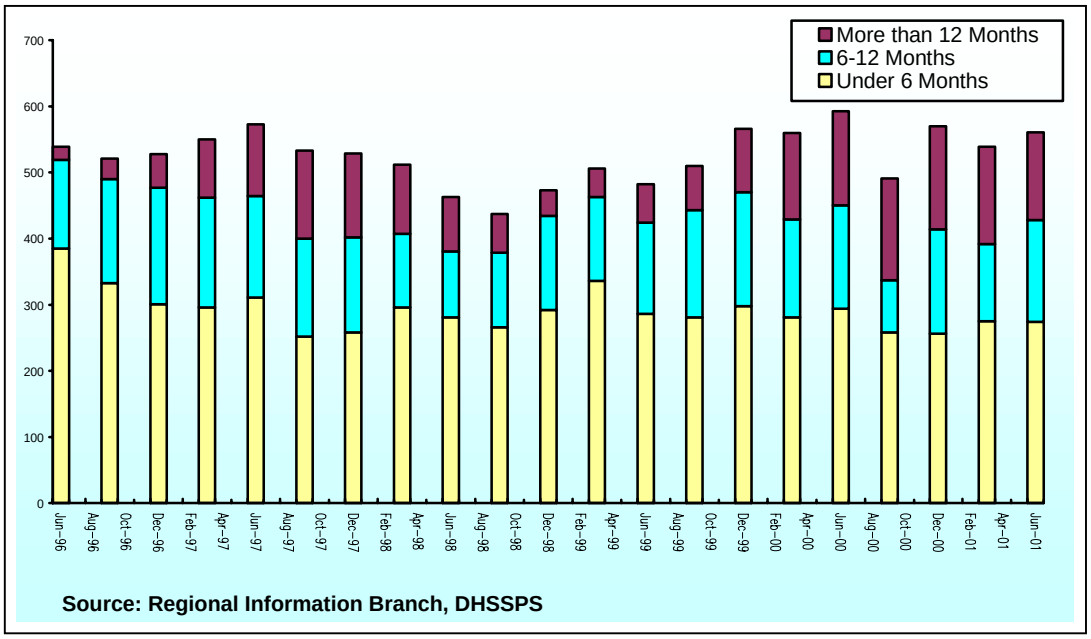
Figure 7 Number of cardiac surgery procedures undertaken at the Royal (1996/97-2001/02)



Source: Regional Information Branch, DHSSPS

* Projected Numbers

Figure 8 Waiting times for Surgery at the Royal 1996-01



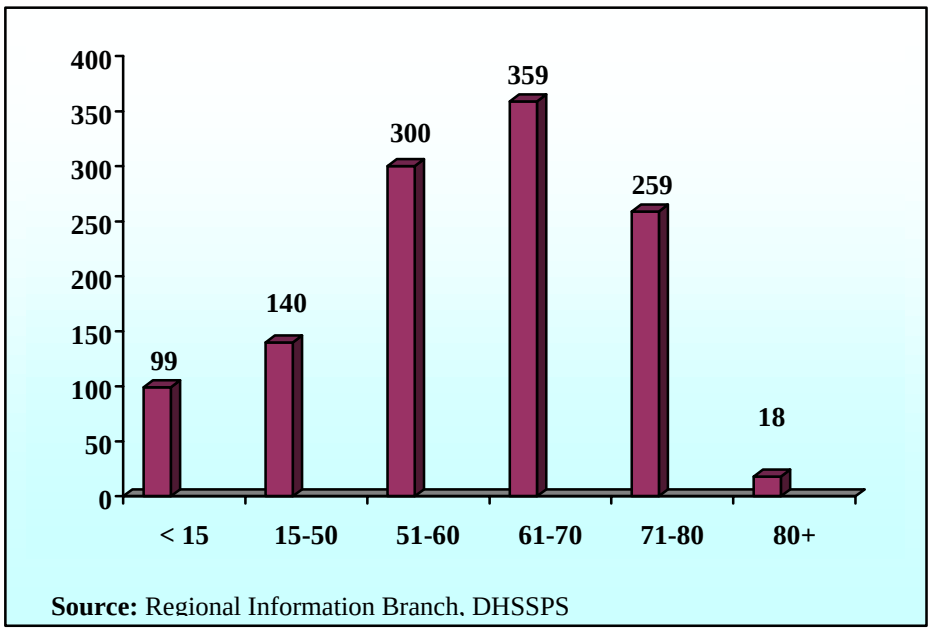
4.4 As the number of procedures undertaken in recent years decreased, there was a corresponding increase in waiting time for surgery. At the end of March 2001, there were 539 patients waiting for surgery of which 264 had been waiting longer than 6 months and 147 had been waiting longer than 12 months (Figure 8). The number of patients on individual surgeons waiting lists ranged from 75 to 171 at the end of March 2001. In addition to those waiting for surgery, a further 101 patients were waiting for their first cardiac surgery outpatient appointment.

4.5 The following observations are based on data provided by the Royal, primarily an analysis of a database of 15 months' activity between April 1999 and June 2000.

- About 1 in 3 patients going forward for surgery are female. This is lower than we might expect but this is not unique to Northern Ireland. Both nationally and internationally women are less likely to progress to cardiac surgery than men.

- The average age at which patients have their surgery has increased, age being the greatest single risk factor for coronary heart disease (figure 9).

Figure 9 Age Profile of patients in 1999/2000



Source: Regional Information Branch, DHSSPS

- There is variability in the number of patients per 1000 population in different areas undergoing cardiac surgery. Some of this variation may be linked to variation in prevalence of coronary heart disease in different parts of Northern Ireland and/or relative deprivation. It is difficult to draw firm conclusions from the maps due to the relatively small numbers undergoing cardiac surgery. Scrutiny at a more local level may help to provide additional information that may either confirm or refute a relationship.

- On average, 1 in 4 patients undergoing cardiac surgery are managed as urgent or emergency patients. These patients are not put on a waiting list but are treated as quickly as possible based on clinical priority. Patients awaiting urgent surgery may remain

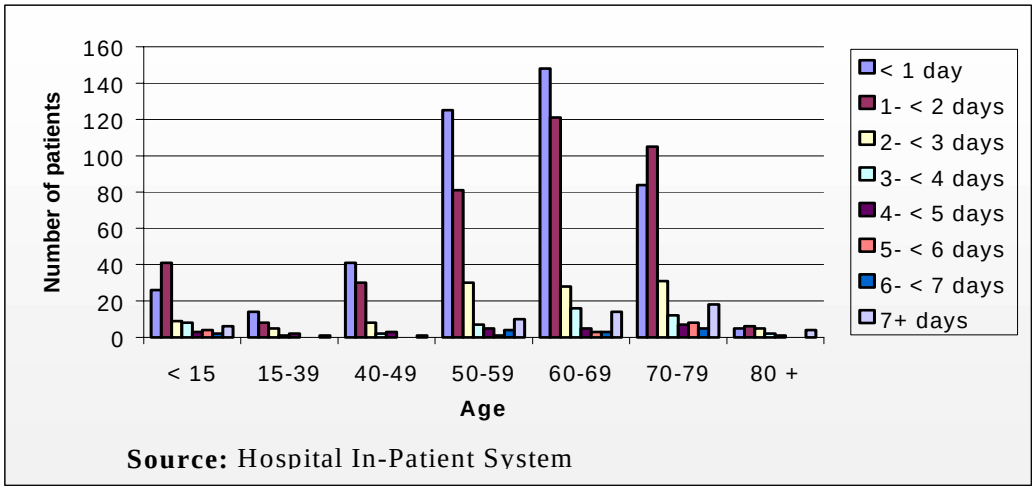
as inpatients in the Royal or other hospitals throughout Northern Ireland.

4.6 Equity of access on the basis of age, gender or social economic factors is an important issue to address. Equality issues for cardiac surgery services here are summarised in Appendix 5.

4.7 There has been a reported increase in the complexity of cases leading to longer lengths of stay and pressure on CSICU beds. From 1998/99 to 1999/00 the average length of stay in CSICU increased from 1.9 days to 2.4 days, with occupancy rates rising from 69% to 77% (based on 8 beds). Most (80%) patients are discharged from CSICU within 48 hours. About half of these will have been discharged within 24 hours. A small but significant number of patients require long-term care in CSICU (more than 7 days) and this has implications for throughput, as beds are unavailable for new patients. Although this only accounts for a very small proportion of patients, their impact on bed availability and staff resources is very significant.

4.8 The relationship between length of stay in CSICU and age is demonstrated in Figure 10. Children and older people represent a significant proportion of patients staying for protracted periods of time in CSICU.

Figure 10 Relationship between LOS and age in CSICU

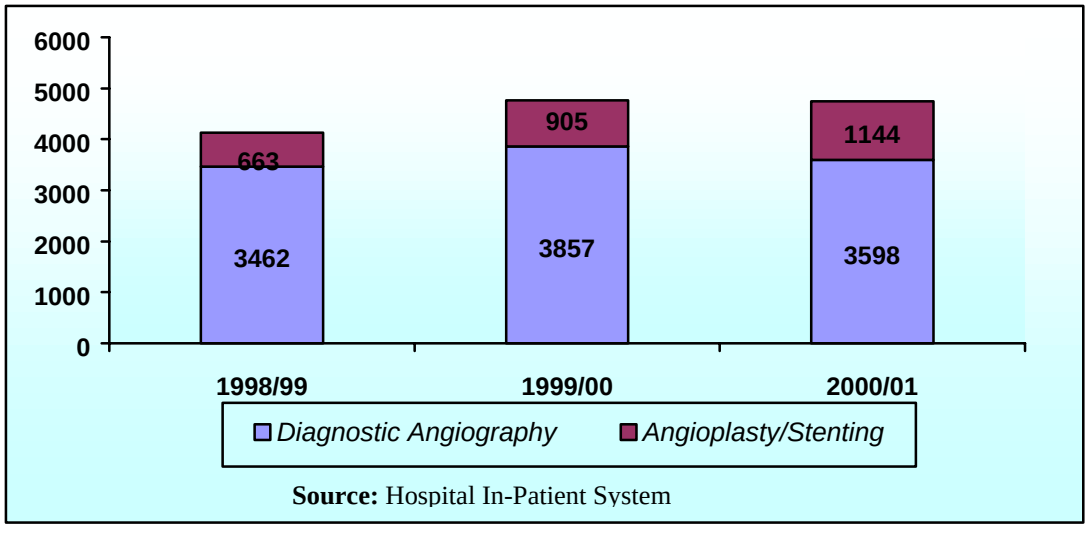


Source: Hospital In-Patient System

4.9 The numbers of patients who had diagnostic angiography and interventional cardiology over the last 3 years is shown in figure 11. The trend shows that about 3600 patients had diagnostic angiography in each of the past 3 years. There has been a dramatic increase in the proportion of those undergoing PCI. More than 70% of those who have PCI now have stents inserted and this has been rising over the last few years.

4.10 Both angiography and PCIs are conducted at the Royal. Altnagelvin Hospital now has an angiography suite which will be used for diagnostic purposes and a mobile facility is contemplated for Craigavon Hospital. These facilities will improve total capacity for cardiac catheterisations. **It will be important to utilise existing angiography facilities and those anticipated to become operational in the next year for investigative procedures so that additional capacity for PCIs is freed up at the RVH and BCH sites**

Figure. 11 Number of finished consultant episodes at both the Royal and Belfast City Hospitals.



Source: Hospital In-Patient System

4.11 Waiting times for diagnostic angiography can be lengthy. Consultant cardiologists who perform the investigations hold their own waiting lists at the hospitals where they are employed rather than at the hospital where the procedures will be conducted. This has created problems in determining the

number of patients waiting and the duration of their wait. **It is recommended that waiting lists for PCIs are held at the hospital where procedures are to be conducted and that information on waiting times by consultant are published regularly.**

4.12 The number of patients undergoing diagnostic angiography and the clinical decisions taken at this point dictate the number of patients coming forward for CABG. For patients who had angiography at the Royal during the calendar year 2000, the proposed management was medical for 37% of men and 53% of women, surgical for 25% of men and 19% of women and PCI for 34.5% of men and 24% of women (Figure 12). The proportion of patients for whom surgery is recommended appears to be decreasing as the techniques of PCI improve.

Figure 12 Proposed Management following diagnostic angiography at the Royal during the year 2000

TOTAL (patients)	**1385 Male (69%)**	**628 Female (31%)**
Diagnosis recorded	1149 Male	523 Female
- Normal	85 (7.4%)	113 (21.6%)
- IHD	984 (85.6%)	358 (57%)
Proposed management		
Medical	424 (37%)	277 (53%)
Surgical	288 (25%)	101 (19%)
PTCA	397 (34.5%)	126 (24%)

4.13 In 1999/00, 355 out of 1184 NHS cardiac surgery operating sessions were cancelled, with 201 (57%) of these being due to a lack of CSICU bed and a further 140 (38%) due to non-availability of either medical or nursing staff.

4.14 In common with other cardiac surgical units the cardiac surgeons at the Royal have been returning data to the Society of Cardiothoracic Surgeons to allow their performance to be monitored and national comparisons to be drawn up. The data includes mortality information for specific procedures but is not risk adjusted, and therefore does not make adjustments for the age of patients or severity of illness. Crude death rates, however, compare favourably with the national averages (Figure 13).

Figure 13 Mortality information for specific procedures

1999-2000	**NATIONAL**			**RVH**		
	Number	Died	%	Number	Died	%
Isolated coronary surgery	24728	547	**2.2**	534	12	**2.2**
Valve surgery only	5393	295	**5.5**	186	8	**4.3**
CABG & valve surgery	2641	207	**7.8**	65	4	**6.2**
Other operations for IHD	462	79	**17.1**	9	2	**22.2**
Congenital	3876	162	**4.2**	94	4	**4.3**
Miscellaneous	1479	220	**14.9**	34	6	**17.6**
TOTAL	**38579**	**1510**	**3.9**	**922**	**36**	**3.9**

Source: Regional Information Branch, DHSSPS

5 CORONARY ARTERY DISEASE – ASSESSMENT OF NEED

Determining future need for cardiac surgery

5.1 The future need for cardiac surgery and specifically for CABG procedures will be dictated by a number of factors. The ageing profile of our population will result in a greater number of people suffering from coronary heart disease, some of whom will require surgery. Many will be people who have had previous interventional cardiological procedures but because of disease progression they need further intervention or surgery to relieve symptoms and improve quality of life.

5.2 People who are overweight or who have diabetes present a high risk group. The rate of diabetes and obesity are increasing in our population and leading to an increased need for both surgery and interventional cardiology.

5.3 Thrombolysis has the potential to prevent the damage caused to the heart during a heart attack and can reduce patients' mortality rates from heart disease in both the short and medium term. By ensuring that thrombolytic drugs are used more effectively the need for CABG could be reduced.

5.4 Percutaneous coronary intervention (PCI), has demonstrated remarkable advances in recent years and may continue to do so as more advanced technology is developed. Stenting has improved patient outcomes and reduced the need for emergency CABG as a result of failed angioplasty. Many more patients can benefit from PCI, which can now be employed to treat disease in more than one coronary artery. However, it may result in an increasingly older population undergoing surgery, perhaps many years after their cardiological intervention, if disease progression indicates the need for further treatment.

5.5 The level of cardiac valve surgery is anticipated to remain fairly constant in the short term at around 200 procedures per year.

5.6 The incidence of congenital heart disease is constant in the population over time. At present about one in three of those born with a congenital defect require surgery. It is possible that this may change in the future if treatments other than surgery are able to correct congenital defects or if antenatal diagnosis offers the potential to treat before birth. For the foreseeable future it is anticipated that about 100 children will continue to require surgery per year.

5.7 The number of adolescents and adults with congenital heart disease is steadily increasing as a result of the successes of their earlier treatment. Many will require surgery, perhaps repeatedly throughout their lives. Provision for their specific and specialised needs must be considered.

5.8 New and developing areas of research may greatly influence the treatment of coronary heart disease in the future. In particular, research work into the genetics of heart disease may provide vital information and treatment options not currently available. Drug treatments may offer better alternatives to surgical intervention in the future.

Current demand for surgery

5.9 Our current needs assessment, based on the work of McKenna Report in 1992 indicated that the total activity level for cardiac surgery should be 1,100 procedures, of which it was anticipated that 750 would be CABG procedures. At today's population of 1.7 million, this approximates to 440 CABGs per million population. As activity over the past few years has fallen below the desired targets, current activity is probably lower than 400 CABGs per million.

5.10 In looking at the trend in referrals to cardiac surgery, there is no evidence that demand has changed in recent years. However, this may indicate that

the threshold for referral has changed because of the lengthening waiting lists.

5.11 If we consider the numbers of people (1) referred to outpatients; (2) treated as emergencies or urgent referrals; and (3) treated privately we can assess a level of need.

5.12 The number of patients referred to cardiac surgery outpatients at the Royal over the last three years ranged between 720-794 per year. Assuming that an additional 20% of patients receive urgent treatment, and another 10% were private patients, the total expressed need ranges from 950 to 1049. If the rate of urgent/emergency cases should increase from 20 to 30% the need for cardiac surgery is increased by 80-85 cases annually. (Figure 14)

Figure 14 Expressed need for cardiac surgery at the Royal 1998-2000

	Referrals to outpatients	Urgent at 20%	Urgent at 30%	Private at 10%	Total (20% urgent)	Total (30% urgent)
1998	794	160	237	95	1049	1134
1999	776	155	231	93	1024	1107
2000	720	144	217	86	950	1031

Source: Hospital In-patient System

5.13 The expressed need over the past three calendar years has not varied significantly from 1100, the agreed annual target number of total procedures for the cardiac surgery unit. If this target number had been achieved the expressed need would have been met and waiting times for surgery would have remained within acceptable limits.

Future need for cardiac surgery

5.14 The National Service Framework (NSF) which was published in 1999 and applies to England sets target levels for service provision relating to both

PCI and CABG procedures. The NSF recommends at least 750 per million population for PCI and 750 per million population for CABG, a total of 1500 interventions per million population. Applying these targets to the Northern Ireland population of 1.7 million we would expect to provide PCI for 1,275 people annually and CABG procedures for 1,275.

5.15 The Scottish target are published in the CHD/Stroke Task Force Report, for PCI and CABG procedures combined is 1400 procedures per million population of which it is anticipated 700 will be CABGs and 700 PCIs. This target would equate to 785 CABGs and 1595 PCIs for our population The Task Force recognised the PCI may well be a larger proportion and that this situation needs to be kept under close review.

5.16 Scotland has rates of heart disease similar to ours. It is worth noting that in Scotland where the capacity for cardiac surgery has been increased and consequently waiting times have decreased, early signs suggest that the demand for interventions has not increased as may have been expected. It may be that in the longer term capacity may actually exceed demand.

5.17 Rates of cardiac surgery across a number of European countries are higher than here and this poses the question of the appropriate level of surgical intervention both at national level as considered within the National Service Framework and at local level. Even if we decided to set targets for cardiac surgery procedures at the rates of those countries achieving the highest levels in Europe, it would be unlikely that the targets could be achieved within the next five years- primarily because of a shortage of trained staff.

5.18 In Northern Ireland our intervention rate will need to increase in response to need. Our cardiac surgery intervention rate, currently at around 400 per million population, must increase if we are to respond to need and reduce patients' waiting times. Our immediate priority must be to **increase the total number of cardiac surgery procedures to the agreed target level of**

1100, of which 800 will be CABGs, over the next twelve to eighteen months.

5.19 In the longer term we must keep under constant review the need for surgical intervention in light of clinical developments and experiences elsewhere, both national and international. **Potential and expressed need should be regularly reassessed in light of national and international intervention rates, advances in clinical practice and outcome based data**.

Impact of percutaneous interventions(PCI)

5.20 The need for CABG procedures cannot be considered in isolation of PCIs. The advances in PCI have resulted in this treatment being more widely available to many more patients who may previously have only had the option of CABG. It is anticipated that as developments continue, so will the increases in the numbers of patients undergoing PCI rather than CABG as their first-line interventional treatment. It is important for planning future service provision that the relative input of PCI and CABG for treating coronary heart disease is identified. Future levels of CABG and PCI will influence physical capacity and staffing for each of these interventions.

5.21 The NSF for coronary heart disease and the CHD/Stroke Task Force in Scotland have suggested that a ratio of 1:1 between CABG and PCI is appropriate. Anticipated levels of intervention in Northern Ireland for a number of target levels and several different ratios between CABG and PCI are considered in greater detail in Appendix 4.

5.22 Currently our PCI rate is about 673 per million, almost at the NSF and CHD/Stroke Task Force targets. This is anticipated to increase over the next few years. Cardiac catheterisation facilities at the Royal and City Hospitals are currently under strain as they accommodate both diagnostic

and intervention procedures and no other facilities are available in Northern Ireland. However, in the near future Altnagelvin Hospital will have an angiography suite and Craigavon Hospital may access a mobile angiography service. This will significantly increase our total capacity for diagnostic procedures. In turn it will release capacity at the Royal and City Hospitals to accommodate an increase in interventional procedures. **Developments in cardiology interventional procedures must be kept under review to ensure that the service retains sufficient flexibility to permit it to respond to altering needs within a reasonable period of time.**

Reducing Waiting Times for Cardiac Surgery

5.23 At the end of June 2001, a total of 561 people were on the waiting list for cardiac surgery. A breakdown by Health and Social Services Board area and length of time waiting is provided in Figure 15.

Figure 15 Waiting time for cardiac surgery by Health & Social Services Board

	Number of patients and months waiting at the end of June 2001									
Board Area	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23	24+	TOTAL
Eastern	72	57	53	25	9	16	12	7	12	263
Northern	46	31	22	13	8	4	6	3	5	138
Southern	18	25	17	10	10	11	6	2	6	105
Western	14	11	10	4	7	2	1	1	5	55
TOTAL	150	124	102	52	34	33	25	13	28	561

Source: Regional Information Branch, DHSSPS

5.24 Approximately 1100 people are either put on the waiting list or require urgent/emergency treatment each year. At current activity levels the Royal expects to perform NHS cardiac surgery for approximately 800 patients over the year 2001/02. The waiting list can therefore be expected to increase by about 300 over the next 12 months i.e. there are 300 more patients going on the waiting list than can expected to be treated in the Royal in year.

5.25 In the long term, the goal remains that Northern Ireland be self-sufficient in terms of the majority of cardiac surgery. Even if the recommendations to increase throughput at the Royal are put in place, it will take time for improvements to be evident in the numbers of patients being treated. As an interim measure it will be necessary to purchase operations from other units until the Royal is able to reach its target number of operations. The alternative would be to increase capacity in Northern Ireland in excess of long-term demand. It would however be inefficient and wasteful to build long term capacity within Northern Ireland just to meet short term needs.

5.26 **No patient should have to wait longer than 12 months for cardiac surgery by 2004.** As of June 2001, there were 133 people waiting over 12 months for their cardiac surgery.

5.27 For the purposes of illustration, figure 16 indicates what may be required to improve waiting times. To reduce by 50% the numbers waiting over 12 months within year 1, 70 procedures would need to be purchased elsewhere in addition to the 300 required to prevent the waiting list from growing. To ensure that no one is waiting more than 12 months for surgery by year 2, a further 70 procedures will be needed from elsewhere. To establish equilibrium within these targets, approximately 50 procedures may need to be purchased elsewhere in year 3, but this should be kept under review.

Figure 16 Number of cardiac surgery procedures required to reduce waiting times.

Year	Year One	Year Two	Year Three
Total cardiac surgery procedures needed	1100	1100	1100
Target for no. procedures at RVH	800	950	1100
No. of procedures to be purchased elsewhere to prevent numbers on waiting list from growing	300	150	0
No. of procedures to be purchased elsewhere to a)reduce number waiting more than 12months by 50% by 2002, and b)treat all patients within 12 months	70	70	50
Total procedures to be purchased elsewhere	370	220	50
Cost of procedures to be purchased elsewhere, based on unit cost of £8000	£2.96m	£1.76m	£0.44m

5.28 **It is recommended that the number of procedures at the Royal are increased to 1100 as soon as possible. Until the target number of procedures is achieved at the Royal additional operations should be purchased from other units to prevent waiting lists growing, approximately 300 operations in year 1 and 150 in year 2**. Additional procedures will need to be purchased to achieve waiting list targets.

5.29 Currently the main providers with the ability to facilitate these additional procedures are on the UK mainland. However, it is envisaged that capacity will also become available in the Republic of Ireland over the next 18 months.

5.30 Purchasing operations elsewhere in such numbers will enable a more planned approach to be taken and may result in some degree of economy of scale**. It is important that arrangements are in place to ensure a co-ordinated approach between the Boards, the referring Cardiologists and the cardiac surgery unit at the Royal, particularly regarding continuity of care post-operatively when patients return to Northern Ireland for follow up and rehabilitation.** Purchasing such significant numbers of procedures will be challenging and will be conditional on spare capacity being available at other units.

5.31 Over the past year a number of people have travelled outside Northern Ireland for their cardiac surgery. Some patients, however, have already declined the offer to travel, preferring to wait until they are able to have their surgery performed at the Royal. In order to reduce waiting times it will be necessary for the Royal to take specific steps to ensure that those patients waiting longest but not wishing to travel, are offered surgery at the Royal at the earliest opportunity.

6 THE ORGANISATION OF CARDIAC SURGICAL SERVICES

6.1 During the course of the review and discussions with stakeholders, a number of problems have been identified. Resolving these problems could help to improve both the efficiency and the effectiveness of services.

Access to surgery

6.2 Patients and their families are confused about the point at which patients are put onto a waiting list. **The referring clinician should ensure that the patient understands that they are not on the list for cardiac surgery until a decision is made to that end by the cardiac surgeon following the outpatient appointment.**

6.3 The current referral mechanism to cardiac surgery, which involves weekly face-to-face meetings between cardiologists and cardiac surgeons is cumbersome, time-intensive and does not result in final decisions being made regarding surgery. **These meetings should be discontinued. Following angiography, cardiologists should refer directly to the appropriate cardiac surgeon and their outpatient clinic.** This will permit a more streamlined referral process, particularly for referring cardiologists not based in Belfast. **Referring clinicians must have access to information on the waiting times for each cardiac surgeon.**

6.4 At present, patients are prioritised for surgery by their surgeon but there is not a uniform methodology for clinical prioritisation. **All patients should be assigned a priority status by the cardiac surgeon according to clinical criteria based on an agreed, standard assessment tool.** Waiting list management must be responsive to and consistent with assigned priority. Prioritisation criteria developed for Scotland could provide a useful template.

6.5 Recognising that it will take time for the capacity at the Royal for cardiac surgery operations to build up to the necessary level, the cardiac surgeons should take this opportunity to reduce outpatient waiting times. This will

allow speedier assessment and prioritisation of patients for surgery which will help to reduce the patient's uncertainty and anxiety and also reduce the risk of a high priority patient waiting inappropriate lengths of time to see a cardiac surgeon. **There should be a maximum waiting time for cardiac surgery outpatients of 8 weeks.**

6.6 **There should be a maximum waiting time from outpatients to surgery of 12 months by 2003, working towards a target of 6 months by 2005.**

Information whilst waiting

6.7 A major issue raised by patients awaiting surgery, their families and referring professionals is the difficulty obtaining information both with regard to the patient's condition and the anticipated admission date. **All patients awaiting surgery should receive clear and accurate information at regular intervals regarding their treatment. This information should also be copied to the referring clinician and the patient's GP.**

Cardiac Liaison Nurse

6.8 Currently there is one cardiac surgery liaison nurse funded by Northern Ireland Chest, Heart and Stroke Association. Patients and their families and staff within the unit have all emphasised the value of this role in providing information and support, however it is currently limited by there only being one person and by them being employed outside of the Trust. It may also be the case that much of the information being provided by the liaison nurse should be provided routinely by the unit and doing this would allow further development of the role. **The existing post should be funded as part of the cardiac surgery service. The liaison nurse should work collaboratively with cardiology and rehabilitation nurses to provide a network of care.**

Waiting list and admission management

6.9 There is no mechanism for collective management of the waiting lists for surgery. The recent establishment of a theatre scheduling meeting is directed at managing one aspect of the process. **The patient's waiting time for surgery, admission and subsequent inpatient stay must be managed with maximum efficiency. This responsibility should be clearly assigned within the unit and the process audited at regular intervals. All patients awaiting surgery should be given a provisional date for admission.**

6.10 A proportion of patients awaiting urgent surgery wait as inpatients either in the Royal or in other cardiology units having been judged too ill for discharge home before surgery. Currently there is no systematic approach to the management of these patients with regard to the timing of their surgery. **Patients awaiting urgent surgery should be clearly identified, prioritised on clinical criteria and tracked to ensure they undergo surgery without undue delay. This will ensure equity of access regardless of geographical location.**

Pre-operative assessment

6.11 Preoperative assessment a few weeks prior to cardiac surgery has advantages and is a practice employed in other centres. Both patients and staff find it useful. It provides the opportunity to identify any medical factors likely to complicate surgery. It also permits patients to see the surgical ward, meet staff and ask questions regarding their surgery. A pre-operative assessment clinic has been piloted in the Royal and staff and patient satisfaction appears high. **All patients awaiting elective cardiac surgery should be invited to attend a preoperative assessment clinic.**

Post-operative Management

6.12 In the immediate post-operative period patients are cared for in the CSICU, usually staying 1-2 days. Patients who develop complications may stay longer.

6.13 Patients are formally discharged from CSICU by the cardiac surgical registrar. This normally happens between 10.30am and 6.00pm with few patients discharged from CSICU outside of these hours. **Protocols for clinical management in CSICU should be agreed and applied.** These would permit and encourage transfer of patients when clinically indicated regardless of the time of day and would improve the efficiency of the Unit.

6.14 Decisions regarding the care of patients in CSICU tend to be made jointly by the cardiac surgeon and anaesthetist although long-stay patients are managed primarily by the anaesthetists. While a team approach to care is necessary and desirable this may result in a lack of clarity regarding decision making and the ultimate responsibility for patients in CSICU.

6.15 Currently a consultant anaesthetist remains in CSICU during normal working hours. This has possible recently when the number of patients undergoing surgery is lower than expected. When the Royal reach the target of 1,100 procedures annually consultant anaesthetists will be needed in the theatre and may be less able to provide a presence in CSICU. **A consultant anaesthetist should be present in CSICU during weekday working hours as the lead clinician. Clinical responsibility in CSICU for uncomplicated post-operative patients should be shared between the cardiac surgeons and the anaesthetists. For patients remaining in CSICU beyond 24 hours clinical management should be co-ordinated by the consultant anaesthetist as the lead clinician.**

6.16 CSICU accommodates both elective and urgent/emergency patients following their operation. There is a disproportionate impact from those patients who are non-elective because of the difficulties that arise for scheduling. On some occasions, elective surgery may need to be postponed

because an urgent patient has a greater clinical priority for surgery. Particular difficulties arise accommodating the needs of patients who require urgent surgery because of complications following a heart attack. Some of these patients would not survive unless they undergo surgery, but even with surgery their outcome may be poor and they are likely to have a greatly protracted stay in CSICU. **The decision on whether to operate on high risk patients must be taken by the multi-disciplinary clinical team responsible for their care in full consultation with the patient and their family.**

6.17 The lack of resident medical backup to CSICU is recognised as a major issue and one that may precipitate significant shortcomings in patient management. **Resident medical back up should be available at all times to CSICU, provided by individuals skilled in the management of resuscitation and intensive care, including paediatric resuscitation.**

Fast-tracking

6.18 Few patients in the Royal are currently fast-tracked. Fast tracking is a distinct surgical pathway where the patient is identified prior to surgery as suitable for surgical methods that facilitate shorter surgery, faster recovery and early discharge from CSICU. **The practice of fast tracking should be expanded through the use of agreed and applied protocols including the designation of CSICU beds for these patients.**

6.19 The HDU is contained within Ward 12 and physically removed from the CSICU. The lack of physical proximity of the CSICU and HDU discourages early discharge from CSICU. If a patient in HDU were to deteriorate, transferring her/him back to CSICU entails moving a considerable distance. **The HDU and CSICU should be next to each other to facilitate more effective and efficient use of facilities and staff.**

6.20 When patients who have had their operation elsewhere return to Northern Ireland for follow-up and rehabilitation, arrangements must be in place to ensure a co-ordinated approach to postoperative care.

Cardiac Rehabilitation

6.21 **All patients who undergo cardiac surgery should be offered a programme of cardiac rehabilitation. Discharge plans to include follow up and rehabilitation arrangements should be systemised and communicated clearly to patients and their families, their cardiologist and general practitioner.** It should be clear to all involved what the next steps are for patients following discharge from cardiac surgery wards and who has clinical responsibility for the patients. Follow-up cardiac rehabilitation has demonstrated advantages in assisting long-term recovery and reducing the risk factors associated with heart disease. Cardiac surgery patients are not always offered cardiac rehabilitation, and this should be remedied.

Relationship between cardiac and thoracic surgery

6.22 Current training for cardiac surgeons involves joint training in both cardiac and thoracic surgery. Most centres throughout the United Kingdom have a cardiothoracic unit. Currently, cardiac and thoracic surgery services at the Royal exist as separate specialties and are within separate hospital directorates. Both their clinical and organisational structure and management are distinct. There are potential advantages to be had from aligning the two specialties more closely.

6.23 Future recruitment of cardiac surgeons at the Royal should focus on providing career opportunities that are both challenging and rewarding to prospective applicants. Positions that offer the opportunity of combining cardiac and thoracic surgery may be more attractive and appeal to a greater number of candidates than those limited to developing only one aspect of the speciality. For future appointments, job descriptions could be tailored to include both cardiac and thoracic surgery and cardiac and thoracic surgery could move towards functioning as a more integrated service. Existing surgeons in cardiac and thoracic surgery should not be expected to expand

their casemix unless they were interested in doing so and have retained their clinical skills in both cardiac and thoracic surgery.

6.24 Nursing and technical staff could also benefit from a more integrated approach that would offer opportunities for more flexible and varied working. For example, experience could be gained in both thoracic and cardiac theatres, providing both a broader skill base for staff and greater variety in their workload.

6.25 Integrating cardiac and thoracic surgery would permit a degree of flexibility with regard to developing particular aspects of the speciality in response to changing needs. For example if over the next 10 years there is an increased need for oesophageal surgery and a decreased need for cardiac valve surgery, a combined cardio-thoracic service could more easily adapt to the changing workload.

6.26 Several practicalities would need to be addressed if the cardiac and thoracic surgery services are to develop closer working relationships. Sharing a theatre block and recovery area would be necessary to permit post-operative observation and management of all cardiothoracic patients. Current capacity in CSICU would not permit the throughput of thoracic patients in addition to cardiac surgery patients. However if it was possible to provide long stay (>7 days) CSICU patients with care in an intensive care unit (RICU), then capacity would be freed up in CSICU which could then be used to provide HDU/ICU facilities for both cardiac and thoracic surgery patients. This arrangement may also help to address the difficulties experienced by the thoracic surgeons in accessing ICU beds for their post-operative patients.

6.27 Within the remit of this review, it has not been possible to explore these issues in detail. **It is recommended that a small working group is established to consider the integration of cardiac and thoracic surgery services including:**

- **The future appointment of cardiothoracic surgeons**
- **The development of a recovery unit for postoperative cardiac and thoracic surgery patients**
- **The impact on RICU capacity if long stay postoperative cardiothoracic patients are transferred to RICU**
- **The organisational structure within the Trust of an integrated service.**
- **The further potential for the amalgamation of vascular surgery with cardiothoracic surgery.**

This group should report within three months of its establishment, no later than the end of January 2002.

Equipment

6.28 Modern and dependable equipment is an essential component of a quality cardiac surgery service. Equipment needs should be regularly assessed and replacement or repair of items of equipment should occur as needed.

6.29 The various pieces of electro-medical equipment in use in the Cardiac Surgical Unit are vital to the safe operation on a wide range of very ill patients undergoing cardiac surgery. They cover a wide variety of functions i.e. therapy, life support, monitoring, anaesthetics and laboratory functions.

6.30 There are potential difficulties for the Cardiac Surgical Unit if it is unable to provide adequate support to patients, in terms of electro-medical equipment that it has at its disposal. **There should be a programme for the replacement and maintenance of all electro-medical equipment within the unit. Needs should be prioritised immediately.**

Quality and information

6.31 There are a number of factors that must be emphasised as crucial to the success of a quality service and that must be incorporated into any model of service development. They represent the standards by which the service may be measured and audited.

6.32 As discussed earlier, the service must be patient focused, taking account of individual patient needs and desires and responding to them appropriately. An important aspect of this is that patients should be partners in both their care and decision making.

6.33 A clear and transparent referral mechanism for patients for whom cardiac surgery is being considered would improve the organisational aspects of the service. In particular patients should be informed about the referral process and what they may expect in terms of, for example the waiting period, and the nature of the surgery.

6.34 All prospective patients and their referring physician/cardiologist should have access to waiting time information and should be permitted to choose their cardiac surgeon on the basis of this information in conjunction with other important facts, for example, the surgeon's particular areas of sub-specialisation if appropriate.

6.35 The development of agreed criteria for both referral and prioritisation for cardiac surgery would greatly enhance the service. This would not only ensure equity of access based on clinical need but would also address the needs of the Equality Legislation, that people must not be discriminated against on the basis of specific personal factors.

6.36 Many aspects of the services depend on having accurate and reliable information available. Measuring what is happening and how it is

happening permits an objective assessment of quality. Medical audit conducted in a rigorous manner will facilitate this. Additionally participation in national audit is advantageous in providing a comparative analysis and in highlighting possible discrepancies from other units.

6.37 The surgeons contribute to the National Audit Cardiac Surgical Database. This is an essential element of external quality control and must continue. An electronic database has recently been purchased to allow audit data to be entered in real-time. Since clinical audit is an essential component of good practice and contributes to clinical governance, **The electronic database purchased to support contributions to the national audit must be adequately supported.**

6.38 In addition to the above, **investment must be made for the collection of audit data for use internally and for sharing with the commissioners. There should be a minimum data set agreed with commissioners.** This would allow rapid audit of any identified variations in, for example, referral rates. Data on patient management must be collected, rigorously analysed and shared with commissioners. It should also be made available to patients.

7 THE CARDIAC SURGERY TEAM

7.1 The most vital resource for cardiac surgery is the staff required to deliver the service. There are a number of key principles that apply to all groups of staff in all areas in the unit. The service cannot function without the appropriate numbers of appropriately skilled people. Recruitment and retention of these people is vital and in order achieve this there is a need to ensure that the work environment and conditions are attractive, there are career development opportunities and people feel valued for the job they are doing.

7.2 There are 5 full time consultant cardiac surgery posts in the unit. There are 5 Specialist Registrars and 6 Senior House Officers covering cardiac and thoracic surgery. 9 consultant anaesthetists, not all of who work full-time, staff the Theatre and CSICU. The staffing level is almost equivalent to 8 full-time individuals. There are 3 junior anaesthetists.

7.3 There is theatre capacity for 27 operating sessions per week. Each surgeon has 5 theatre sessions and 1 outpatient clinic a week. The remainder of their time is occupied with ward work, patient assessment, administration, on-call cover, audit and teaching.

7.4 For emergency surgery, there is an on call team including surgeon, nurses, anaesthetist, anaesthetic technician and perfusionist. Team members, including the consultant anaesthetist, surgeon and the junior surgeon will also be simultaneously responsible for on call care within CSICU. During an emergency procedure, particularly one occurring out of hours, medical cover to the CSICU may be compromised. For out of hours cover of the cardiac surgery ward and CSICU, a surgical SHO is on site at all times, with a surgical specialist registrar, a consultant anaesthetist and a consultant cardiac surgeon on call from home.

7.5 Nurse staffing is organised separately for the ward, theatres and CSICU/HDU. There is a pool of nurses who staff CSICU and HDU and they are used flexibly depending on need. CREST guidelines state that each CSICU bed requires a complement of 6.5 nurses. Each HDU bed requires a complement of 3.5 nurses. When staff numbers fall below the optimum level, it may not be possible to utilise all CSICU and HDU beds.

7.6 Recently, additional nurses have been recruited to the cardiac surgery unit, some on a supernumerary basis. This has been acknowledged as beneficial to the unit but needs to be followed by a sustained increase of permanent nurse staffing levels. **As a priority, action must be taken to ensure that nursing levels are at the agreed complement and that current CSICU and HDU beds are adequately staffed.**

7.7 Anaesthetic technicians and perfusionists working in cardiac theatres are an important element in the cardiac surgery team. Currently all staff, with the exception of the anaesthetists, working in cardiac surgery are part of the Cardiology Directorate and are in an organisational sense separated from others in the Trust working in Theatres and Intensive Care.

Recruitment and retention

7.8 Recruiting and retaining quality staff is of paramount importance and must not be underestimated. Staffing levels across all disciplines have an enormous impact on the amount of cardiac surgery that it is possible to deliver. Shortages or recruitment problems in any single discipline will affect the ability of the cardiac surgery team to provide optimum levels of service to patients. A number of factors may help to improve recruitment and retention of staff, particularly skilled nurses who are essential to the service.

7.9 Over recent years, there have been difficulties recruiting and retaining experienced nurses on the wards, in CSICU/HDU and in cardiac theatre.

Several factors have contributed to this, including the pressures caused by low staffing levels. Staffing levels are lower than expected given previous investment from commissioners.

7.10 The highly specialised skills needed to work in these areas, the intensely demanding nature of the work and the relatively poor reimbursement and limits on career development for staff nurses also make recruitment and retention a challenge. The structure of pay and grading and limited career advancement does not provide an incentive to work in cardiac surgery. Difficulties in recruiting and retaining specialised nurses are being experienced nationally by similar units.

7.11 Remuneration must be appropriate for the respective skills and experience of staff. For nurses, a D grading is reasonable during a period of training. When trained, particularly in specialised skills required in theatre or CSICU, it is desirable that nurses are graded at an E grade. The current practice of nurses working in CSICU for many years while remaining on D grade salaries may act as a deterrent to others contemplating a nursing career in CSICU.

7.12 Cardiac theatre depends on anaesthetic technicians and perfusionists. Staffing is below previous levels and it is predicted that if activity increased, major pressures from staff shortages would be experienced. The current grading structure is lower than elsewhere in the UK. The specialist skills required means that there is no natural pool of people from which such staff may be recruited. Most new staff are trained on the job. For both groups of staff, it takes 2-3 years (depending on previous background) from recruitment of a trainee before that individual is able to participate on an on-call rota. Training is mostly completed on-site, requiring time on the part of senior staff.

7.13 **Numbers of nursing staff should be increased on a planned basis, with a training programme and systems in place to support new staff members.**

7.14 **There should be temporary and overlapping appointments of staff where feasible so that the running of the unit is not interrupted by foreseeable staff vacancies.**

7.15 **The grading and remuneration of nurses should be reappraised in the light of changes in practices in specialist areas such as intensive care and specialist theatre nursing.**

7.16 A proactive approach to the recruitment of anaesthetic technicians and perfusionists should be adopted. **Accredited training programmes for these staff, supported by supernumerary posts, will need to be made available if staff are to be recruited, trained and retained within the service.** Apart from formal training, the importance of ongoing personal development should be recognised and supported. **The disparity in grading between Northern Ireland and the rest of the UK should be addressed.**

Professional development

7.17 Career development is another important incentive to staff. The opportunity to access training and development programmes and the time off to attend should be guaranteed for all staff on a regular basis.

7.18 **Staff training and professional development needs to be pro-actively planned and adequately resourced. The position of the clinical education facilitator in CSICU should be permanent and mainstreamed. Regular training opportunities should be identified**

and appropriate courses or programmes attended as part of a development programme.

7.19 **There should be consideration given to the creation of a nurse practitioner role in the unit.** This would be a longer-term objective for when the current staffing issues are resolved.

7.20 Efforts being made within the unit to create stronger links with similar specialty areas should be encouraged for the purposes of professional development for staff in cardiac surgery. **It is recommended that cardiac surgery staff have access to the full range of educational opportunities applicable to their specialty area. Professional links with the surgical directorate should be strengthened to facilitate this.**

7.21 The issue of leadership within nursing in the unit and responsibilities outside the unit needs to be addressed.

7.22 Consideration should be given to creating a role of trained theatre support worker.

Work Environment

7.23 Working hours play a role in determining the availability of staff for any particular position. Staff may be attracted to a position because the hours are predictable or flexible. Working days that regularly run longer than expected may act as a powerful disincentive to that job and as such should be avoided where possible. Staff that are required to work in the evenings or weekends because of an emergency will require to have time off the following day.

7.24 All staffing must be at a level that permits and encourages a highly effective service. European time directives need to be observed and rota arrangements will need to recognise and respond to this. On call medical

arrangements must be sufficiently robust to provide adequate levels of cover.

7.25 Currently, more than 50% of operating sessions run over the time allotted. The normal working day begins at 7.30 am, and it is not unusual for staff to finish at 7 or 8 p.m. even when there are no complicated cases during surgery. This has major implications on theatre scheduling and results in staff working hours in excess of their normal duties. Whilst staff expect some unpredictability in their working hours, the regularity with which they are required to work later than expected is interfering with their ability to plan their lives outside of work, and is causing an understandable amount of dissatisfaction. More active management of theatre scheduling would contribute to limiting this pressure on staff. **A theatre management system should be installed in cardiac theatres to allow staff to monitor efficiency and causes of delayed sessions.**

7.26 **Out of hours cover in the CSICU and HDU must be improved by the availability of anaesthetic cover at all times to CSICU**. This needs to be provided by individuals skilled in the management of resuscitation and intensive care, including paediatric resuscitation.

Teamwork

7.27 Teamwork is critical within the speciality of cardiac surgery. Given the complexity of surgery and the intensive management required during the early postoperative stage, the skills of everyone providing the service must be recognised, maximised and valued. The skills of surgeons, anaesthetists, nurses, perfusionists and technical staff all play a crucial role and contribute directly to the performance of the unit. The eventual development of a nurse practitioner role should be planned to maximise the overall effectiveness of the team.

7.28 Effective teamwork will depend on good formal and informal communication channels and a recognition of the contribution of all team numbers. **We recommend that a multi-disciplinary team (MDT) is established within cardiac surgery and meets regularly.** Open discussion of issues should be encouraged and airing of any particular problems or challenges should be facilitated. **The sub-director of the Cardiology Directorate would be the most appropriate individual to act as the lead clinician of the MDT.** While this is essentially a leadership and co-ordinating role their effective management will help to facilitate a more cohesive team of individuals.

8 PAEDIATRIC CARDIAC SURGERY

8.1 Of all babies born, about 1 in 100 will have a heart defect, for example a hole in the heart. Some defects resolve spontaneously but about 1 in 3 of those babies will require heart surgery on at least one occasion. For some infants only one surgical procedure may be needed but for others, particularly those with complex abnormalities of their heart, repeated surgical procedures may be required throughout their lives. Approximately 100 children (age 0-15 years) undergo paediatric cardiac surgery each year in the Royal. The care they receive is excellent and the surgical outcomes compare favourably with units throughout the UK.

8.2 The numbers of children who require cardiac surgery has stayed at a constant level over many years and we would anticipate that the incidence of congenital heart disease will continue to remain similar. The successes of early treatment have resulted in patients with congenital heart disease living longer. Consequently, the prevalence of paediatric heart disease (i.e. the number of people in the population suffering from it) is increasing and there are now more adults with congenital heart disease, some of who will need repeated surgery.

8.3 Paediatric cardiac surgery has received a lot of media attention since the findings at Bristol Royal Infirmary, where a higher than expected death rate following surgery prompted a rigorous inquiry. The report of the inquiry, the Kennedy Report, contains many recommendations including some specifying the minimum requirements for a unit conducting paediatric cardiac surgery. A review of Paediatric and Congenital Cardiac Services in England, Wales and Northern Ireland is currently being conducted. This will take into account the recommendations of the Kennedy report. It will also permit an objective external appraisal of all Trusts providing paediatric cardiac surgery and paediatric cardiology and will help to inform policy in Northern Ireland. This review is expected to report later in the year.

8.4 Issues that must be considered in relation to paediatric cardiac surgery here include

- The sustainability of paediatric cardiac surgery for a relatively small population

- The challenges posed in maintaining adequate and appropriate paediatric intensive care provision for children undergoing surgery

- The potential of North/ South collaboration in the delivery of the service.

8.5 **The provision of paediatric cardiac surgery in Northern Ireland should be considered in detail when the national review has been completed and the implications of the recommendations can be fully explored.**

9 RECOMMENDATIONS AND IMPLEMENTATION

9.1 It is vital that the implementation of the recommendations of this report is undertaken as a managed process involving staff providing the cardiac surgery service, Trust management, the commissioners and the DHSSPS. We need to outline a systematic way of moving forward to ensure that immediate actions are taken to alleviate the situation for those on the waiting list and also that the longer-term actions needed are planned for and taken, and associated resources are identified. Built into any implementation plan will be the need to monitor actions and outcomes and to review the targets and needs assessment of this report as information becomes available.

9.2 This will enable us to move towards a service where no cardiac surgery patient waits longer than 8 weeks for an outpatient appointment or longer than 12 months for their operation, a service that is sustainable, high quality, modern, appropriately resourced and equipped and able to provide for the needs of the population of Northern Ireland.

RECOMMENDATIONS

FUTURE NEED FOR CARDIAC SURGERY
1. The total number of cardiac surgery procedures should be increased and maintained at the agreed target level of 1100, of which 800 should be CABGs.
2. Until the target number of procedures is achieved at the Royal additional operations should be purchased from other units to prevent waiting lists growing.
3. The future need for cardiac surgery should be regularly reassessed 3 years in light of national and international intervention rates, advances in clinical practice and outcome based data.
4. Existing angiography facilities and those anticipated to become operational in the next year should be utilised for investigative procedures so that additional capacity for PCIs and particularly for angiography/stenting is freed up at the RVH and BCH sites.
ACCESS TO SURGERY
1. A simpler and more efficient referral mechanism should be designed and implemented. Following angiography, cardiologists should refer directly to the appropriate cardiac surgeon and their outpatient clinic. Referring cardiologists must have access to information on the waiting times for each cardiac surgeon.
2. All patients awaiting surgery should be given an assigned status by the cardiac surgeon, according to clinical criteria based on an agreed, standard assessment tool.
3. No patient should wait longer than 8 weeks for a cardiac surgery outpatient appointment.
4. There should be a maximum waiting time of 12 months from the first outpatient's appointment to the date of surgery by 2003, working towards a target of 6 months by 2005.

INFORMATION WHILST WAITING
1. All patients awaiting surgery should receive clear and accurate information at regular intervals regarding their treatment. This information should also be copied to the referring clinician and the patient's GP.
CARDIAC LIAISON NURSE
1. The existing post of cardiac liaison nurse should be funded as part of the cardiac surgery unit. The liaison nurse should work collaboratively with cardiology and rehabilitation nurses to provide a network of care.
WAITING LIST AND ADMISSION MANAGEMENT
1. It is recommended that waiting lists for PCI are held at the hospital where procedures are to be conducted.
2. The patient's waiting time for surgery, admission and subsequent inpatient stay must be managed with maximum efficiency. This responsibility should be clearly assigned within the unit and the process audited at regular intervals.
3. All patients awaiting elective cardiac surgery should be invited to attend a preoperative assessment clinic.
4. All patients awaiting surgery should be given a provisional date for admission.
5. Patients awaiting urgent surgery must be clearly identified, prioritised on clinical criteria, and tracked to ensure they undergo surgery without undue delay. This will ensure equity of access, regardless of geographical location.

CLINICAL PRACTICE
1 Protocols for clinical management in CSICU should be agreed and applied.
2. A consultant anaesthetist should be present in CSICU during weekday working hours as the lead clinician.
3. Clinical responsibility in CSICU for uncomplicated postoperative patients should be shared between the cardiac surgeons and the anaesthetists. For patients remaining in CSICU beyond 24 hours, clinical management should be co-ordinated by the consultant anaesthetist as the lead clinician.
6. The decision on whether to operate on high risk patients must be taken by the multi-disciplinary clinical team responsible for their care in full consultation with the patient and their family.
5 Residential medical cover must be available at all times to CSICU. This must be provided by individuals skilled in the management of resuscitation and intensive care, including paediatric resuscitation.
6.. The practice of fast tracking should be expanded through the use of agreed and applied protocols including the protection of a number of CSICU beds solely for these patients.
7 The HDU and CSICU should be next to each other to facilitate more effective and efficient use of facilities and staff.

DISCHARGE, FOLLOW UP AND REHABILITATION
1. All patients who undergo cardiac surgery should be offered a programme of cardiac rehabilitation.
2. Discharge plans to include follow up and rehabilitation arrangements must be in place and communicated clearly to patients and their families, their cardiologist and general practitioner.
3. When patients who have had their operation elsewhere return to Northern Ireland for follow up and rehabilitation, arrangements must be in place to ensure a co-ordinated approach to postoperative care.
INFORMATION
1. A theatre management system should be installed in cardiac theatres to allow staff to monitor efficiency and theatre utilisation.
2. Data on patient management must be collected, rigorously analysed, and shared with commissioners. It should also be made available to patients. Contributing data to the National Adult Cardiac Surgical Database is an essential element of external quality assurance and must continue. The electronic database purchased to support contributions to the national audit must be adequately supported
EQUIPMENT
1. There should be a programme for the planned replacement and maintenance of equipment within the unit. Needs should be prioritised immediately.

THE CARDIAC SURGERY TEAM
Cardiac Surgery 1 A multi-disciplinary team should be established and meet regularly. The sub-director of the Cardiology Directorate would be the most appropriate individual to act as lead clinician of the MDT
2. Action must be taken to ensure that nursing levels are at the agreed complement and that current CSICU and HDU beds are adequately staffed. Staffing should be increased on a planned basis, with a training programme and systems in place to support new staff members..
3. There should be temporary or overlapping appointments of staff where feasible so that the running of the unit is not interrupted by foreseeable staff vacancies.
4. The grading and remuneration of nurses should be reappraised in the light of changes in practices in specialist areas such as intensive care and specialist theatre nursing.
5. Accredited training programmes for anaesthetic technicians and perfusionists, supported by supernumerary posts should be made available if staff are to be recruited, trained and retained within the service. The disparity in grading between Northern Ireland and the rest of the UK should be addressed.

PROFESSIONAL DEVELOPMENT
1. Staff training and professional development must be planned and adequately resourced. The position of the clinical education facilitator in CSICU should be permanent and mainstreamed.
2. Training opportunities should be identified and attendance at appropriate courses encouraged as part of professional development.
3. Cardiac surgery staff should have access to the full range of educational opportunities applicable to their speciality area. Professional links with the surgical directorate should be strengthened to facilitate this.
4. Consideration should be given to the creation of a nurse practitioner position within the cardiac surgery unit.
5. Consideration should be given to creating a role of trained theatre support worker.
PAEDIATRIC CARDIAC SURGERY
1. Paediatric cardiac surgery must be examined in detail after the publication of the Bristol Inquiry and the report of the Review of Paediatric and Congenital Cardiac Services currently being undertaken in England, Wales and Northern Ireland.
LINKS WITH THORACIC SURGERY
1. A small working group should be established to consider the integration of cardiac and thoracic surgery services.

Appendix 1

Cardiac Surgery Review

Terms of Reference

The Review will carry out an urgent assessment of the need for cardiac surgery, including paediatric cardiac surgery, in the light of developments in interventional cardiology, emerging clinical practices and changing incidence of heart disease. It will take particular account of the need to develop high quality services that: operate efficiently; are delivered in a timely manner when they are needed; achieve good outcomes; and ensure equality of access

The Review will assess the efficiency and effectiveness of current arrangements in delivering cardiac surgical procedures, including the organisation and management of existing services. In reviewing current practice, the Review team will take appropriate account of developing best practice. It will also consider the possibilities for developing closer working relationships with cardiac services in the South.

The Review will make recommendations for a programme of action. These will include proposals for immediate actions, to be taken to support current cardiac surgery services; and for a phased development of cardiac surgical arrangements, to ensure improved access to services and the timeliness of treatment.

The Review, which is to be led by Dr Henrietta Campbell, the Chief Medical Officer, will report to the Minister early in the New Year.

Appendix 2

Cardiac Surgery Steering Group

Chair

1.	**Dr. H Campbell**	Chief Medical Officer	DHSSPS

Members

2.	**Dr. I Carson**	Medical Director	RGH
3.	**Mr. B Cunningham**	Chief Executive	SHSSB
4.	**Dr. P Darragh**	Deputy Chief Medical Officer	DHSSPS
5.	**Mr. A Dougal**	Chief Executive	NI Chest Heart & Stroke Association
6.	**Mr. B Grzymek**	Director of Secondary Care	DHSSPS
7.	**Mr A Hailes**	Patient Representative	
8.	**Dr. C Hamilton**	RMSC Cardiac Sub-Group	RMSC/WHSSB
9.	**Prof. A R Lorimer**	External Advisor	Glasgow Royal Infirmary
10.	**Dr M McCarthy**	Senior Medical Officer	DHSSPS
11.	**Mr. J McGrath**	Director of Planning & Performance Management	DHSSPS
12.	**Ms. M Waddell**	Director of Nursing	EHSSB

SECRETARIAT

13.	**Ms. E Jameson**	DHSSPS
14.	**Mr. T Reid**	DHSSPS

Appendix 3

Results of Consultation

The central process of this review involved getting the views of interested parties on cardiac surgery services in Northern Ireland. There were numerous meetings with staff providing the service at the Royal and two clinical workshops involving a wide range of professionals. The Health and Social Services Councils facilitated seven public meetings, publicised widely. The Northern Ireland Chest, Heart and Stroke Association facilitated a patient focus group. Written submissions were invited from and meetings offered to a broad range of interested parties including General Practitioners, HPSS organisations, District Councils, professional associations and voluntary organisations and there were meetings with 4 District Councils and 1 voluntary organisation on request in order to facilitate their submissions.

A wide range of issues were raised in meetings and in written submissions. It is important to note that there was almost unanimous praise from the public of the services received once they were in the Royal and full support and appreciation for the work of the staff there.

There were a number of key themes common to most responses, which are outlined below. The quotes included are taken from the summary provided by the Southern Health and Social Services Council on feedback from public meetings in Newry, Craigavon and Dungannon.

Waiting Times

Lengthy waiting lists for cardiac surgery was an issue across the board, with patients and their families anxious about deterioration whilst waiting for surgery. Many people gave examples of unacceptable and inappropriate waiting times and the distress caused by this. Professionals referring to the service and providing the service were acutely aware of the importance of this issue and there was

acknowledgement that management and clinical action as well as additional resources would be needed to improve the situation for patients.

There was some confusion evident amongst patients and their families about the point when a person actually joins the waiting list due to the number of referrals involved in the patient pathway. Patients and professionals emphasised the need to look at the whole process including timely access to cardiology outpatients, then diagnostic testing (angiography) then rapid assessment by a cardiac surgeon. There was a feeling that those in peripheral hospitals do not have equal access to angiographies.

Referring physicians from peripheral hospitals felt that there needed to be a clear system of management for patients waiting in hospital for surgery in Belfast that could include the protection of an 'urgent' slot on a weekly basis. There was some concern expressed that patients waiting in the Royal may currently be advantaged by their visibility.

> **"One man outlined that he used to walk to keep his weight down but while waiting for surgery his condition has deteriorated so much that he was no longer able to do this. A woman recounted that her mother suffered a major coronary while waiting for surgery. Participants felt that the anxiety of waiting for surgery or to receive an appointment for surgery was detrimental to the individual's health."**

Information and Communication

Lack of information was a recurring theme in meetings with patients and the public. Some felt that there was a lack of information about the medical and surgical procedures and about activities that could be done whilst waiting for surgery and health promotion advice. Many patients and their families felt frustrated by not knowing when their surgery would take place or where they were on the waiting list and not understanding the patient pathway they were on and the

principles behind how they were being managed. There was also criticism about a lack of communication with the onus seemingly being on the patient to contact the Royal to get the information about when surgery may occur.

GPs and staff in peripheral hospitals highlighted the difficulties they had in getting information about their patients, the proposed management and expected date of surgery. They felt that they had to seek out any information from the Royal rather than it being communicated to them as part of the process. Nursing staff from peripheral hospitals voiced concerns that they do not as a matter of routine receive adequate information to ensure the patient is appropriately supported prior to and following surgery, in some cases not being informed when a patient has had surgery. Patients raised the issue about using their GP as the primary contact point for information only to find out that the GP did not have the information to deal with their queries.

> **"One man told how he was ready to have his operation when he was informed that an emergency had occurred and he was asked to return home for the weekend and to come back the following Tuesday for his operation. He explained that he did not receive his operation for a further three years during which time he found it difficult to get any information. Another man explained how his surgery had been postponed but he had not been told about this until he contacted the Royal himself. He felt that had he not taken the initiative and contacted the hospital when he did he would not have found out about the postponement. He felt that the responsibility should be on the hospital to keep patients informed rather than patients having to constantly check themselves."**

Cardiac Liaison Nurse

At all meetings, patients and professionals highlighted the benefits of the work of the Cardiac Liaison Nurse, Joyce Spence. Patients and their families considered her to be a very valuable source of information and support whilst waiting for surgery and appreciated having a named contact person. Staff from the Royal appreciated the role she plays and see it as a valuable part of the service. The concerns raised about this role were over if one post was sufficient to provide a service for all of Northern Ireland and why the post was reliant on funding from a charitable organisation.

Equity

The issue of equality of access to services was raised at all meetings. Outside of Belfast people had the perception that the Royal was less accessible to them than those living in its catchment area for local hospital services. There was concern expressed that some areas with high mortality rates from CHD were not getting appropriate access to services because of their geographical location. Because of the lack of transparency in waiting lists for surgery, some participants felt that people who 'knew the system' or who 'knew the right people' were more likely to get surgery quickly. There is also the perception of being disadvantaged throughout the patient pathway by the removal or lack of some services at local hospitals, and some participants in the public meetings felt that more services, particularly angiography, angioplasty and stenting should be provided locally to impact on the overall waiting time for cardiac surgery.

> **"Some participants were concerned about patients who needed cardiac surgery and did not have any family or anyone to speak up for them. One young man explained that after a lengthy wait and much persistence he eventually acquired a direct line number to the cardiac surgeon. He told the surgeon he felt he was at breaking point – his mental health was suffering because of his heart condition. This resulted in him receiving an appointment for surgery"**

Staffing

It was widely recognised that staffing issues were central to resolving the current difficulties, specifically the need to recruit and retain an adequate number of appropriately trained nurses. Participants in public meetings tended to view this as a purely resource issue that should be resolved immediately. Meetings with and responses from those within the HPSS or professional bodies raised more specific points. It was widely agreed that the grading and pay structure of nurses, perfusionists and technicians should be reviewed. Most also emphasised the need to support life-long learning and commit to training and development of staff alongside practice development. The need to consider a requirement for specialist nurses to provide effective leadership and management was also highlighted.

It was felt by staff within the unit that morale was generally low and teamworking could be improved. There was an issue about how staff felt valued that went beyond remuneration.

Management of cardiac surgery

There was wide agreement that the cardiac surgery services in Northern Ireland needed to be adequately resourced and supported to develop at a pace in line with elsewhere. Some people expressed the opinion that it is a 'false economy' to try and run the service with no slack as this makes it extremely vulnerable to pressures with high-cost consequences both in terms of putting the service back on track and in terms of the effect on patients waiting for surgery.

Participants at public meetings raised the issue of varying waiting lists for surgeons. Some felt that there should be a composite waiting list but others echoed the views expressed by staff within the service that it was beneficial to know to which surgeon you 'belong'. At meetings with professionals it was suggested that there was a need to look at the operation of the current referral mechanism from cardiology and it was widely agreed that there was a need for agreed detailed criteria for the prioritisation of patients to support a transparent and

equitable system of waiting list management. Suggestions were made about a unit manager being needed to manage and monitor the patient pathway.

It was felt by those within the service that there were many areas where supported audit and data collection would be useful for monitoring the service and detecting any problems early. In addition, it was emphasised that there was a need to ensure arrangements for risk management were in place. It was felt that strengthening accountability and performance management arrangements in a more transparent manner would be beneficial.

There was general consensus from respondents within the service that there was a need to look at combination of clinical and managerial action to resolve problems, such as the use of fast-tracking, management of CSICU and waiting list management. Many also felt that there were benefits to be gained from more partnership and collaboration within the Royal, professionally at local and national levels and with the users of the service.

> **"One man explained that he had a heart condition for 20 years and was prioritised as urgent for surgery. His brother on the other hand also needed surgery but had only experienced the problem for one year and was not categorised as urgent. The surgeon whose list the man's brother was on retired and his workload was distributed among other surgeons. The end result was that the brother who required the operation urgently was still waiting at the time of the meeting while the other brother had already undergone his operation"**

Rehabilitation services

Many at the public meetings emphasised the need for the provision of rehabilitation services to be improved to ensure continuity and co-ordination. It was felt there was a general lack of information following surgery and some participants described it as being in a vacuum, unsure of who they should go to for advice. It was suggested that this is particularly relevant for those going elsewhere

for surgery or undergoing treatment privately. Some professionals from local hospitals felt that greater use could be made of their existing rehabilitation services for cardiac patients.

> **"One man said he had not received any follow-up since his surgery in July 2000. Another man felt he was forgotten about by the hospital after he was discharged and no attempt was made to either check his progress or offer any rehabilitation."**

Referrals elsewhere

There were conflicting opinions about the use of cardiac surgery services outside of Northern Ireland. Whilst there was agreement that no one should have to travel outside of Northern Ireland for their surgery if they didn't want to, there was also a feeling expressed by some of the public and by professionals that people should have the option of going elsewhere if it means they would get their surgery more quickly. There was some concern that those most likely to avail of opportunities to travel for their surgery would be those more generally advantaged and so used to travelling, which could create inequalities in the service. It was emphasised strongly that referring elsewhere should not affect investment in the service in Northern Ireland.

A few people raised the issue of a second unit for cardiac surgery in Northern Ireland located in Belfast City Hospital. Others felt strongly that there should be one centre for Northern Ireland to concentrate expertise and that the unit at the Royal will be able to meet the needs of Northern Ireland if its current problems are resolved.

Private Patients

The issue of private patients was raised at the public meetings and meetings with District Councils. There was concern about the impact of people paying privately on the HPSS waiting list. They were not convinced that one did not affect the other.

Some participants perceived that there was a chance that surgeons from the Royal may have performed their surgery in Glasgow, at the private HCI. They questioned the reason behind this and considered it inappropriate, despite understanding that the main limitation on the number of operations happening at the Royal was the lack of CSICU beds rather than the lack of surgeons' time.

10 National Service Framework

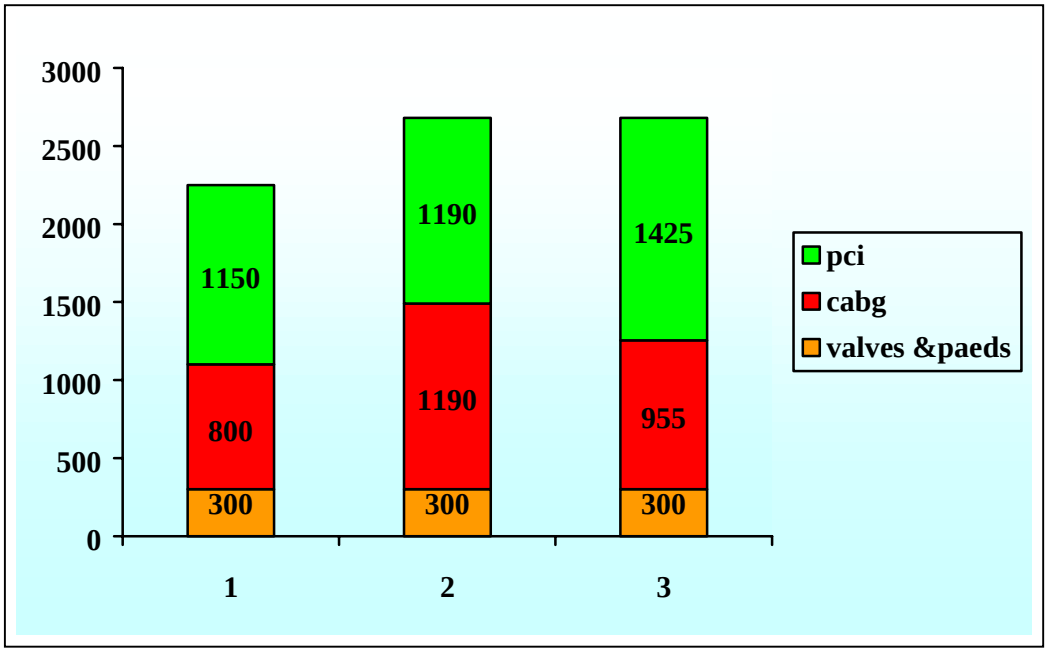
Many participants both public and professional were very aware of the introduction of the National Service Framework for Coronary Heart Disease in England and Wales. There was concern that Northern Ireland did not have a similar framework that acknowledges interdependencies between primary, acute medical and surgical care as in the NSF. People were also disappointed that the standards and resources of the NSF do not apply to Northern Ireland. It was emphasised that funding for our service and standards set should not fall below those in England and Wales.

SUMMARY

The numerous meetings with the public and with those within the service have been extremely important to the process of this review. Participants have raised crucial and valid points that have been of great assistance in formulating a way forward for cardiac surgery services in Northern Ireland. The Review Steering Group consider that all of the meetings held were very informative and worthwhile and are grateful to all those who helped to organise them. The time and thought taken by all participants, whether by attending a meeting or providing a written submission has been much appreciated, as has people's willingness to be very open about their personal experiences or to take a critical look at their own area of work to make suggestions about improving the service provided. Underlying all discussions was the feeling that it will be possible to provide excellent cardiac surgery services in Northern Ireland and an expressed desire to work to help ensure this is the case. This review has been welcomed as an essential

The proportion of people treated by CABG or PCI will influence the future provision for these two procedures. Figure 17 illustrates possible patterns of future provision based on a population of 1.7 million.

Figure 17 Possible patterns of future need



Bar 1 in Figure 17 above illustrates current activity if target levels for cardiac surgery were achieved. Based on the 1100 total procedures target, there is the assumption that this will consist of 100 congenital heart disease procedures, 200 valvular and non-CABG operations and 800 CABG. Current PCI activity in Northern Ireland stands at about 1150 procedures. The total of all procedures is therefore 2250. Of these, 1950 (1140per million population) are interventions for coronary artery disease (PCI and CABG).

Bars 2 illustrates our anticipated level of provision if we adopt the Scottish target of 1400 revascularisation procedures per million population and consider , the ratio

of CABG:PCI as 1:1. We would then expect 1190 CABG's and 1190 PCI's, a total of 2680 procedures including 300 congenital heart disease and vascular procedures. If we adopted this approach, then we are already conducting approximately the target number of PCIs but would need to increase the number of CABGs by almost 400 a year.

Determining the correct ratio between CABGs and PCI is difficult. The ratios adopted in both Scotland and the NSF represent a culmination of current knowledge and trends combined with an acknowledgement of what can be realistically achieved.

Given the current and continuing increase in PCIs in Northern Ireland we might anticipate a ratio of CABG:PCI lower than 1:1. This is in keeping with the findings from the CHD/Stroke Task Force in Scotland where it was recognised in the future PCI might represent a larger proportion of interventions than CABG. If, as illustrated in bar 3, we consider a ratio of CABG:PCI of 1:1.5 it would approximate to 955 CABG procedures (560 per million population), and 1425 PCI procedures (840 per million population). When congenital and valvular surgery is included the total number of procedures would be 2680. This represents an increase over our current number of PCIs and a modest increase in the number of CABGs.

Achieving additional capacity for CABG procedures may require the appointment of additional surgeons. For example, at a ratio of 1:1 and a total of 1490 cardiac surgery procedures per year as a target, 7 surgical teams would be needed. Maintaining a CABG:PCI ratio of 1:1.5 may in time necessitate a sixth cardiac surgery team.

Appendix 5

Equality Obligations

The Northern Ireland Act, 1998, has placed new statutory equality obligations on each of the bodies within the HSSPS family. From 1 January 2000, the Department and all of its associated bodies must, in carrying out their functions, have due regard to the need to promote **equality of opportunity:**

- between persons of different religious belief, political opinion,
- racial group, age, marital status or sexual orientation;
- between men and women generally;
- between persons with a disability and persons without; and
- between persons with dependants and persons without.

Without prejudice to these obligations, a public authority is also required, in carrying out its functions, to have regard to the desirability of **promoting good relations** between persons of different religious belief, political opinion or racial group.

While the Department will undertake a full equality impact assessment on the recommendations contained within this report, with regard to equity of access to cardiac surgery services there are a number of issues which it may be useful to highlight at this stage.

Age

The risk of heart disease increases with advancing age. Older people are more likely to suffer from more severe cardiac disease which has the potential for substantial improvement using modern day cardiac surgery interventions.

While chronological age is not a barrier to treatment, there is a perception, often highlighted in the media and medical literature, that ageism exists in relation to

access to cardiac interventions. The age range of those who undergo cardiac surgery here demonstrates that the majority are aged over 50 years, with a small number aged over 80 years.

Gender

Nationally and internationally, cardiac heart disease is much more common in men than in women. At any age the absolute risk of a coronary event in women is about a fifth of that for men.

Relatively few studies in this area have concentrated specifically on women. However, national and international patterns suggest that women are proportionately under represented among patients undergoing cardiac surgery.

Deprivation

Although deprivation does not fall within the range of issues which the Department must consider under its equality impact assessment, there is a clear relationship between coronary heart disease and social deprivation which must be taken into account by those who plan and deliver the service.

Internationally, there is a substantial body of research evidence which clearly demonstrates the relationship between socio-economic deprivation and high levels of coronary heart disease. While the overall death rates from coronary heart disease have been falling for the last two decades, the death rate for men aged under 65 in the most deprived communities continues to rise. Much of this variation in mortality rates by deprivation can be explained by differences in risk factor prevalence rather than access to cardiac surgery.

As highlighted in '*Investing for Health*', the Department and the Executive is committed to addressing inequalities in health. In this regard and with reference to its statutory equality obligations, the Department would welcome views on the potential equality implications of the recommendations outlined in this report.

Appendix 6

Physical Structure of Service

The unit currently has three designated operating theatres situated on the first floor of main theatre block. There are 26 in-patient beds (Wards 11 and 12), and there are 6 HDU beds in Ward 12, although for staffing purposes the beds are only opened if there are at least 2 patients requiring high dependency care.

There is a Cardiac Surgery Intensive Care Unit (CSICU) adjacent to cardiac theatres to which all patients are transferred post-operatively. While there are 13 physical bed spaces including 1 isolation room not all of this space is available for use with some bed spaces needed for storage and to be reserved for paediatric patients. The unit is funded and staffed as an 8 bedded unit although the Trust has tried opening an additional two beds to use for fast-tracking patients.

The planned pattern of care is for patients to spend 24 hours in CSICU and 24 hours in HDU post-operatively. The current average length of stay in CSICU is 2.1 days: the physical separation of CSICU and HDU causes difficulties for the flexible use of staff and can be a disincentive to the early discharge of patients to HDU. Patients are sometimes kept in CSICU until sufficiently stable to move directly to a ward bed. Fast-tracking patients involves identifying those patients prior to surgery who are suitable to be managed throughout the peri-operative period in such a way that allows early extubation and discharge from CSICU. The current physical structure does not easily lend itself to facilitating fast-tracking and as highlighted in Section 4, the distance between CSICU and HDU creates a major difficulty for the flexible use of facilities and staff.

Considerable changes will take place as a result of the new building programme and both Phase 1 and Phase 2 will have an impact on cardiac surgery and we need to recognise the changing physical environment. The significant capital

development currently underway offers huge opportunities to improve many aspects of the service.

Influence of Phase 1: this will entail thoracic surgery moving from its current location, thus freeing the space adjacent to CSICU currently used as a recovery area. This could be used as an HDU following refurbishment. Post-operative ward accommodation (Wards 11 and 12) will be transferred to the new building.

Influence of Phase 2: Phase 2 building is due to begin in 2002. It is anticipated that cardiac surgery will have theatres and CSICU/HDU adjacent to one another, and close to the ward beds. The facility is planned to accommodate up to 4 cardiac surgery theatres and a 20 bedded CSICU/HDU unit - this could accommodate CSICU/ HDU and provide the potential for fast tracked beds in comparison to the current capacity of CSICU.

It is worth stressing that the terminology ICU/HDU apply not to the physical structure of a unit but to the way a bed is utilised and most importantly the level of nurse staffing designated to that bed. Therefore a unit providing care for patients who require intensive management should have beds with the flexibility to incorporate both HDU and ICU at levels appropriate to the casemix at particular time.

In providing ICU/HDU care there many be an advantage in having two small adjacent units rather than one large one for infection control purposes.

Glossary

Acute myocardial infarction

Heart attack. Refers to the death of heart muscle (myocardium) which follows sudden reduction in or cessation of the flow of blood down the coronary arteries, e.g. narrowing due to atheroma of the vessels, leading to thrombosis in the coronary arteries.

Advanced life support

Attempt to restore spontaneous circulation following cardiac arrest using basic life support, defibrillation, advanced airway management and drugs.

Angina, angina pectoris

Literally pain in the chest. Usually gripping or crushing in nature in the chest and/or left arm and jaw felt when there is insufficient blood supply to the heart muscle.

- Stable angina is the term used for angina (pectoris) which is relatively predictable and the intensity and frequency of which remains similar over long periods.

- Unstable angina is angina (pectoris) which is severe and unpredictable and which threatens to progress to an acute myocardial infarction.

Angiogram

A procedure in which a fine catheter is inserted via a blood vessel to inject x-ray opaque dye into the coronary arteries to obtain an x-ray image of the anatomy of the coronary arteries.

Angioplasty

A procedure in which a small balloon on the end of a catheter is inserted into an artery (in CHD the coronary arteries) and inflated to widen a narrowed artery**.**

Arrhythmia

An abnormal rhythm of the heart.

Artery

A blood vessel that carries blood away from the heart.

Atheroma

Deposits of fatty material and cholesterol inside the walls of arteries.

Atherosclerosis

Narrowing and thickening of arteries due to the development of fibrous tissue in the wall and sometimes calcium deposits. Usually associated with atheroma.

CABG

Coronary artery bypass grafting. An open-heart operation in which blockages to the coronary arteries are bypassed by grafting on a length of artery or vein to bring a fresh blood supply to the heart muscle.

Cardiac arrest

Complete cessation of the heart beat.

Cardio-pulmonary resuscitation (CPR)

The techniques of treating arrest of the heart by artificial respiration and cardiac compression.

Cardiothoracic

Of the heart and chest contents e.g. oesophagus and lungs.

Catheter, cardiac

A long, narrow tube which, when passed through the veins or arteries into the heart cavities is used for measuring pressures or injecting x-ray opaque dye for outlining the heart and blood vessels.

Catheterisation laboratory

The x-ray laboratory in which an angiogram is performed.

Coronary angiogram

An angiogram of the coronary arteries.

Coronary arteries

The arteries that supply the heart muscle with blood.

Coronary heart disease

Narrowing or blockage of the coronary arteries by atheroma, leading to angina, coronary thrombosis or heart attack, heart failure, and/or sudden death.

Defibrillator

An instrument for delivering an electric shock in an attempt to terminate ventricular fibrillation.

Electrocardiogram (ECG)

A recording of the heart's electrical activity obtained from electrodes positioned on the chest wall and limbs. An exercise (stress) ECG is taken before and during exercise (usually using a treadmill or stationary bicycle) to obtain objective and quantitative recording of myocardial ischaemia on exertion.

Echocardiogram

An image and measurement of the heart obtained using ultrasound.

Embolism

The migration through the bloodstream of a blood clot from one part of the body to another where it causes an occlusion.

Infarction

Death of tissue following interruption of the blood supply.

Ischaemia

Blood supply inadequate for tissue needs especially during exercise.

Perfusionist

Specially trained staff who manage the heart-lung bypass equipment used during open heart surgery.

Primary care

The conventional first point of contact between a patient and the National Health Service.

Primary prevention

The prevention of the development of a condition e.g. CHD, by avoidance of factors known to contribute to its development e.g. smoking, lack of exercise. See also secondary prevention.

Protocols

A plan detailing the steps that will be taken in the treatment of a patient or in a research study.

Percutaneous intervention

A composite term that includes PTCA and stenting

Percutaneous transluminal coronary angioplasty (PTCA)

Angioplasty of the coronary arteries i.e. the introduction of a balloon on a catheter through the skin (percutaneous), into a blood vessel (transluminal) and into the coronary arteries to widen them.

Revascularisation

A procedure to improve the blood supply. In the case of CHD these include CABG and PTCA.

Secondary prevention

In the case of CHD, interventions such as lifestyle changes or drugs aimed at slowing or reversing the progression of disease.

Stent

An artificial structure inserted into a coronary artery following PTCA to support the vessel wall and reduce the risk of re-occlusion.

Tertiary centre

A major medical centre providing open-heart surgery and PTCA, which receives referrals from both primary and secondary care.

Thrombolysis

The lysis (dissolving) of blood clots by the use of thrombolytic drugs.

Thrombolytic therapy

A class of drugs used to achieve thrombolysis.

Thrombosis

The process of clot formation (thrombus – clot).

Unstable angina pectoris

Angina which threatens progression to heart attack.

Ventricles

The two main pumping chambers of the heart.