

Revascularisation Surgery in the North East of England

Background

Coronary Heart Disease (CHD) is the most common cause of premature death in the United Kingdom¹. The condition is a narrowing of the coronary arteries that supply blood and oxygen to the heart due to a build up of atheroma. Symptoms of CHD include angina, myocardial infarction (heart attack), and death. The economic burden of CHD in the UK - including healthcare costs, lost earnings and 'informal care'- is estimated to be £7 billion per year².

The major factors associated with CHD in the population are smoking, obesity, lack of exercise and high blood cholesterol levels. The risk of developing the disease is also increased by a family history of coronary heart disease under the age of 50, diabetes, high blood pressure, being male, being female after the menopause or being over the age of 65.

Death rates for CHD correlate strongly with social class and levels of deprivation. Nationally, males in the lowest

social class group are 50% more likely to die from CHD than the rest of the male population and the death rate for under 65s is approximately three times higher in Manchester than those in Richmond on Thames.

In many cases, CHD can be treated with medical therapy³. If this is insufficient, surgical interventions such as *percutaneous transluminal coronary angioplasty (PTCA)* and *coronary artery bypass grafting (CABG)* are often necessary. Both of these

procedures primarily aim to improve quality of life and relieve symptoms by increasing blood flow to the heart muscle.

Government strategy outlined in the 1999 White Paper *Our Healthier Nation* seeks to reduce the number of deaths from CHD and stroke in the under 75 years age groups by at least 40% (of the 1999 level) by 2010⁴. This is underpinned by the 2000 publication of the *National Service Framework (NSF) for Coronary Heart Disease*⁵.

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Summary

- There has been variable progress in the North East of England towards achieving the National Service Framework targets for revascularisation surgery rates and there is considerable variation between primary care trusts (PCTs).
- All North East PCTs fall short of the NSF target of performing all revascularisations within 3 months of the decision to operate.
- Only 3 PCTs in the region meet the NSF target for the minimum rate of 1,500 revascularisations per million population, when adjusted for need using CHD crude death rate.
- Revascularisation rates for males exceed those for females across all age groups.
- Revascularisation provision does not reflect need in the most socially deprived groups.

Guidance

The 2000 *National Service Framework (NSF) for Coronary Heart Disease*⁵, reflected the aim of Government⁴ to reduce the number of deaths from CHD and stroke in the under 75 years age group by at least 40% of the 1999 level by 2010. The NSF builds upon much of the 1996 guidance from the Joint Working Group for Angioplasty, that advocated an average annual revascularisation rate of 400 PTCA's per million population⁶, and the Scottish Intercollegiate Guideline Network that advocated average annual rates of 550 per million population for CABG and for PTCA⁷. With reference to revascularisation, the NSF criteria are described in detail below.

Choice of intervention

CABG is recommended for those patients where angiography reveals significant narrowing of:

- the left main coronary artery; or
- three coronary arteries; or
- two coronary arteries including the proximal left anterior coronary artery.

OR:

- Where severe angina persists despite optimal medical therapy.

PTCA is recommended for those patients with operable narrowing of one vessel or two coronary arteries without significant narrowing of the left main stem⁸.

The NSF goals

The goals set out in the *National Service Framework for Coronary Heart Disease*⁵ are as follows:

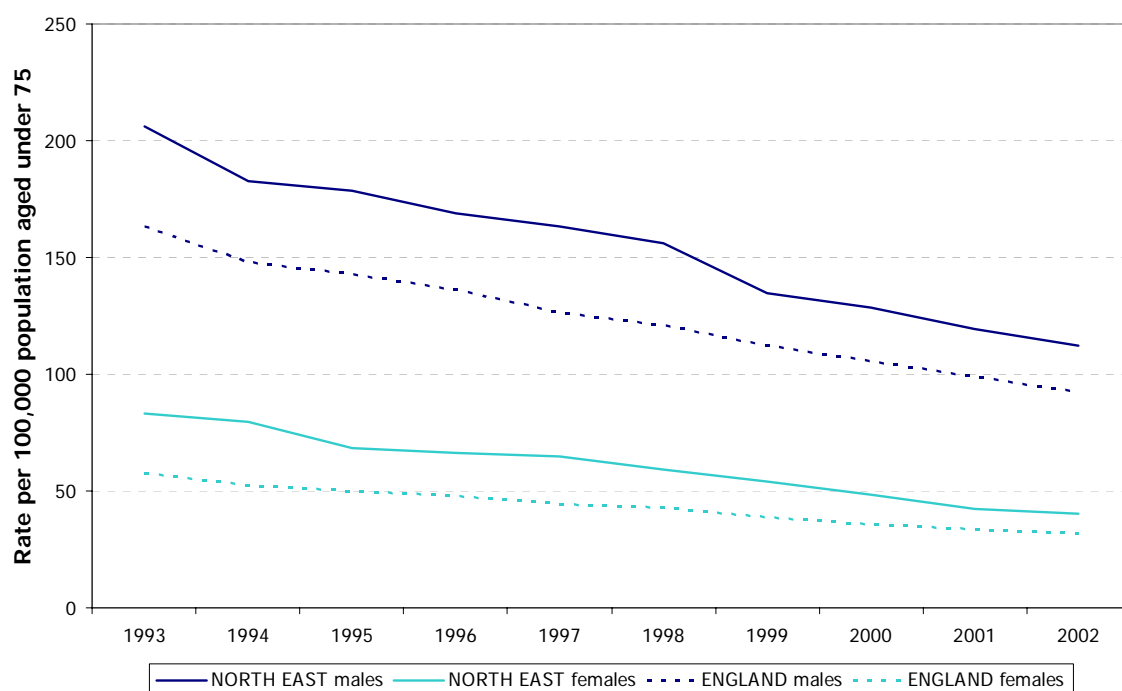
- A national average revascularisation rate of 750 per million population for CABG and 750 per million population for PTCA. These targets must reflect local needs and therefore should be highest in communities in greatest need and with local burden of disease.
- A maximum wait of 2 weeks from GP referral to specialist assessment or consultant appointment. For those patients where it is indicated, revascularisation should be performed within 3 months of the decision to operate.

Analysis of mortality data

Trends in CHD mortality

Using data from the *Compendium of Clinical and Health Indicators*⁹, it can be seen that in the ten year period 1993-2002 mortality rates for CHD have fallen sharply for males and females in the under 75 age group in North East England and England.

Figure 1: Trend in CHD Mortality Rates, under 75 age group for North East England and England, 1993-2002. Directly Standardised Rate per 100,000 population



Source: Compendium of Clinical and Health Indicators

Analysis of HES data

Patient flow for revascularisation surgery

Table 1: Main Trust of provision for residents of North East PCTs for revascularisation FCEs at all ages, 2003/04

PCT Name	Main Provider(s)
Newcastle PCT	Newcastle upon Tyne Hospitals NHS Trust (99%)
North Tyneside PCT	Newcastle upon Tyne Hospitals NHS Trust (99%)
Northumberland CT	Newcastle upon Tyne Hospitals NHS Trust (99%)
Gateshead PCT	Newcastle upon Tyne Hospitals NHS Trust (98%)
South Tyneside PCT	Newcastle upon Tyne Hospitals NHS Trust (99%)
Sunderland Teaching PCT	Newcastle upon Tyne Hospitals NHS Trust (97%) South Tees Hospitals NHS Trust (2%)
Easington PCT	Newcastle upon Tyne Hospitals NHS Trust (57%) South Tees Hospitals NHS Trust (42%)
Derwentside PCT	South Tees Hospitals NHS Trust (85%) Newcastle upon Tyne Hospitals NHS Trust (13%)
Durham & Chester-le-Street PCT	South Tees Hospitals NHS Trust (85%) Newcastle upon Tyne Hospitals NHS Trust (13%)
Durham Dales PCT	South Tees Hospitals NHS Trust (96%) Newcastle upon Tyne Hospitals NHS Trust (3%)
Sedgefield PCT	South Tees Hospitals NHS Trust (96%) Newcastle upon Tyne Hospitals NHS Trust (2%)
Middlesbrough PCT	South Tees Hospitals NHS Trust (98%)
Langbaurgh PCT	South Tees Hospitals NHS Trust (98%)
Hartlepool PCT	South Tees Hospitals NHS Trust (99%) Newcastle upon Tyne Hospitals NHS Trust (1%)
Darlington PCT	South Tees Hospitals NHS Trust (99%)
North Tees PCT	South Tees Hospitals NHS Trust (99%)

Table 1 shows the main provider trusts and hospital sites for revascularisation surgery that are the destination for residents of the region's 16 primary care organisations.

Well over 99% of NHS revascularisation procedures performed on residents of the North East region in 2003/04 were carried out by either The Newcastle upon Tyne Hospitals NHS Trust at the Freeman Hospital, or by South Tees Hospitals NHS Trust at the James Cook University Hospital. During 2002/03, only 38 revascularisation FCEs for North East residents were carried out by NHS providers elsewhere in England.

As may be expected, the relative proximity to a provider unit appears to determine where the patients of each PCT are treated. Potentially, a small number of episodes may be lost to the HES system as HES only records episodes in English NHS hospitals. It is possible that a number of North East residents may be treated in private hospitals, or residents of north Northumberland could seek treatment in Scottish Hospitals.

Improving patient access

The National Service Framework target for revascularisation procedures is a national average of 750 per million population each for CABG and PTCA. Figure 2 shows the increasing rates of revascularisation surgery undertaken in the North East of England in recent years.

Figure 2: Finished Consultant Episodes (FCEs) of revascularisation operations per million population (all ages), 1998/1999 – 2003/2004 for the North East of England

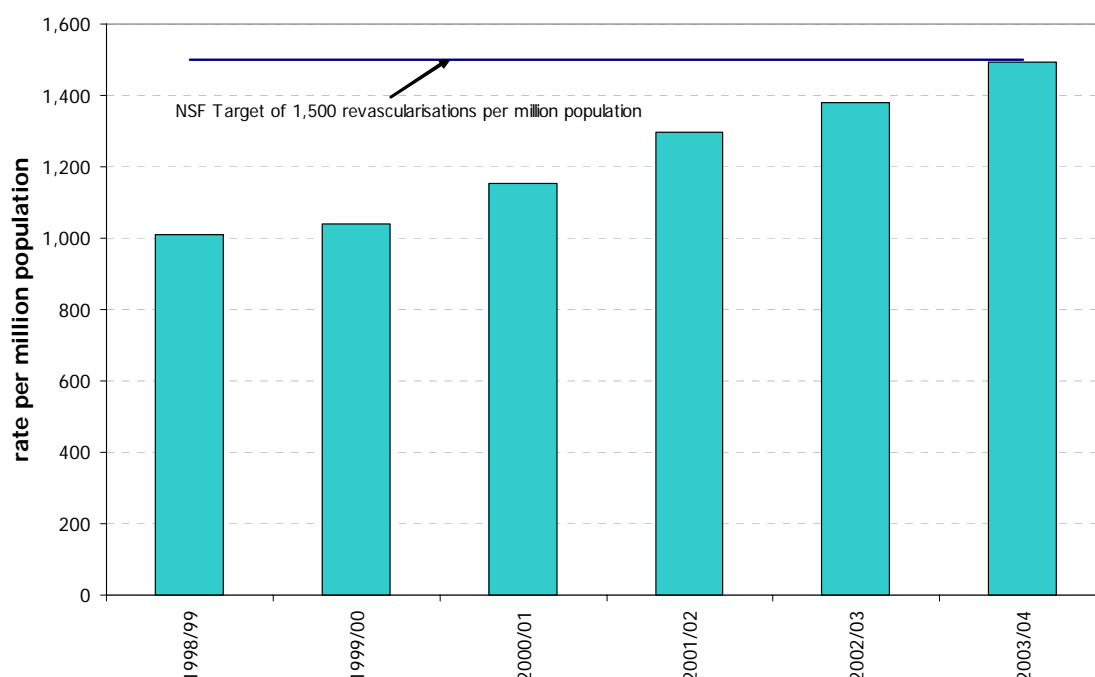
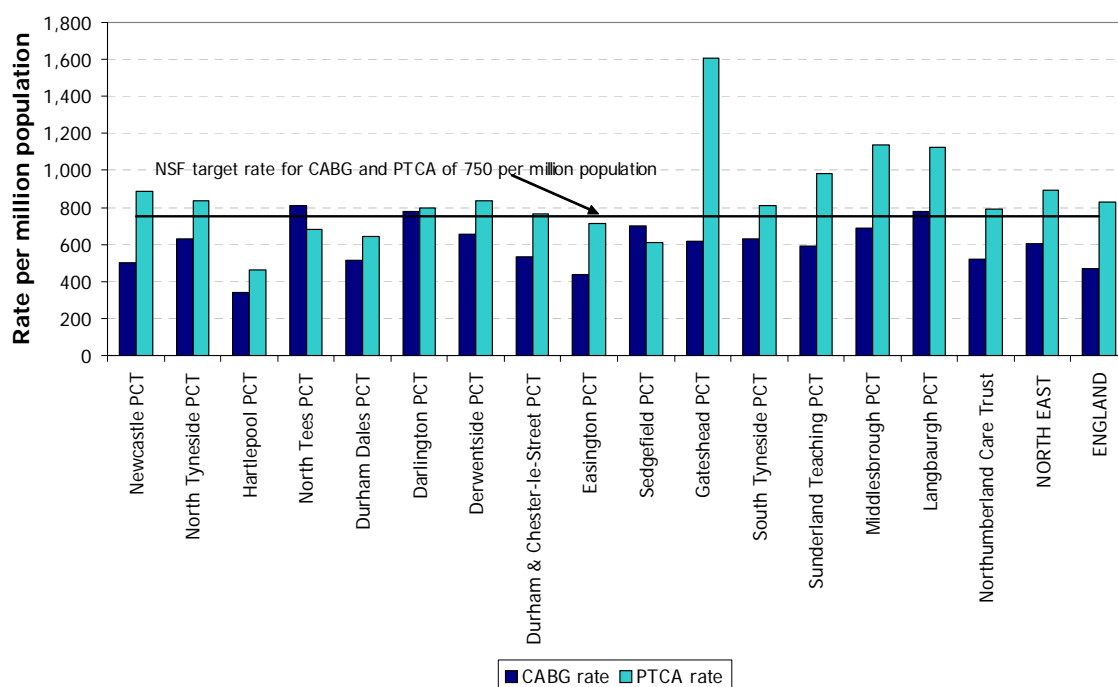


Figure 3 shows the ratio of CABG to PTCA rates for each PCT in the North East. This shows that, with the exception of North Tees and Sedgefield PCTs, the rate of PTCA procedures is greater than for CABG both nationally and locally. This appears consistent with findings in 2004 by the Healthcare Commission¹⁰.

Figure 3: Finished Consultant Episodes (FCEs) of CABG and PTCA episodes per million population (all ages), 2003/04 PCTs in the North East of England, compared to the average NSF target rate of 750 per million population



Target rate of procedures and calculation of 'local need'

The National Service Framework further stipulates that the target rate for CABG and PTCA must reflect local needs. Rates therefore should be highest in communities in greatest need and with local burden of CHD. The North East of England's requirement for a higher than national average revascularisation rate was highlighted in the *Regional Revascularisation Strategy* of 2001¹¹.

We have estimated, using the method described by the Joint Working Group on Angioplasty¹² and described more fully by NHS Scotland¹³, the required rate for all revascularisation procedures for each North East PCT by weighting the combined PTCA and CABG national average target with the 2003 crude death rate for Coronary Heart Disease for each PCT.

$$\text{Expected revascularisation rate (per million)} = \frac{\text{CHD death rate for PCT}}{\text{CHD death rate for England}} \times 1500$$

Figure 4 shows the revascularisation rate for each PCT plotted against the NSF target weighted by CHD crude death rate. Table 2 shows the discrepancy between the actual number of FCEs for each PCT and the expected number required to meet the NSF target in 2003/04 when adjusted for need in this way.

Both Figure 4 and Table 2 show that with the exception of 3 PCTs (Gateshead PCT, Middlesbrough PCT and Langbaugh PCT), there was a shortfall between the observed numbers of revascularisation FCEs and those required to meet the NSF targets when adjusted for need using CHD crude death rate. Only five of the PCTs (Hartlepool PCT, Durham Dales PCT, Durham & Chester-le-Street PCT, Easington PCT and Northumberland Care Trust) were statistically significantly (using 3 standard deviations) below their needs adjusted target.

Across the region, there was a shortfall of 799 revascularisation FCEs.

Figure 4: All revascularisation FCEs per million population (all ages), 2003/04 for the North East of England, compared to the NSF target rate of 1500 per million adjusted for need using CHD crude death rate

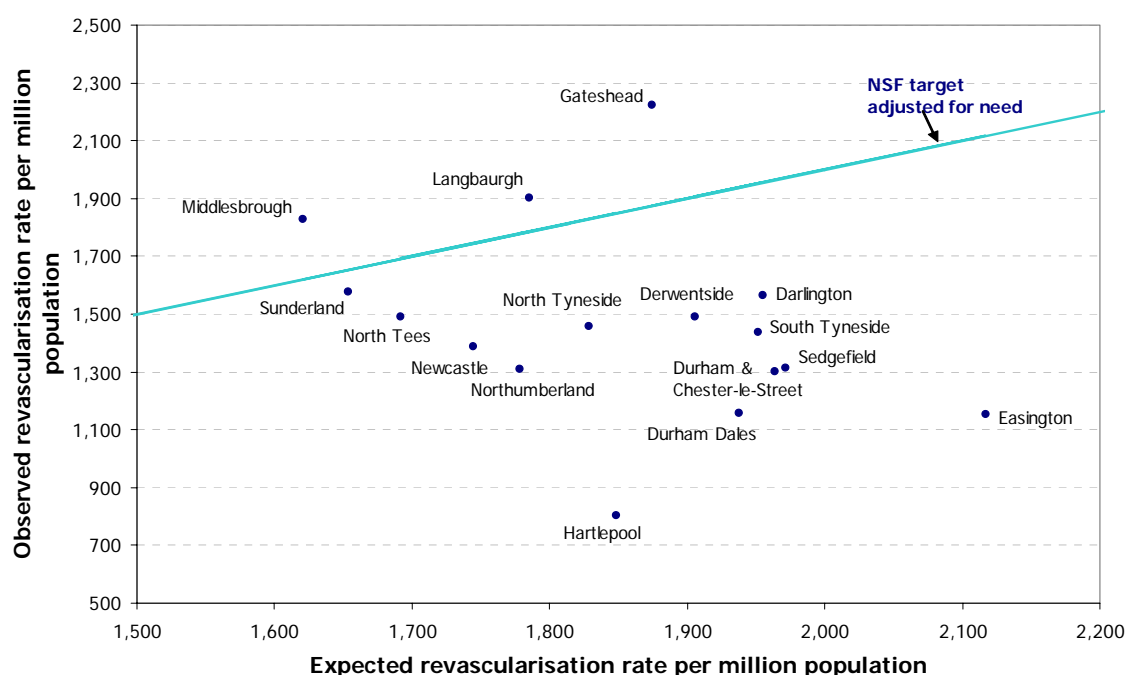


Table 2: All revascularisation FCEs in 2003/04 for North East of England PCTs, compared to the expected number required to meet the NSF target rate of 750 per million adjusted for need using CHD crude death rate

PCT	Observed Revascularisation FCEs: 2003/04	Expected (Target) Revascularisation FCEs: 2003/04	Distance from target (target - observed) 2003/04
Newcastle	361	454	93
North Tyneside	279	349	70
Hartlepool	71	163	92
North Tees	267	303	36
Durham Dales	99	165	66
Darlington	153	191	38
Derwentside	127	162	35
Durham & Chester le Street	182	275	93
Easington	108	198	90
Sedgfield	114	171	57
Gateshead	424	357	-67
South Tyneside	219	297	78
Sunderland	440	461	21
Middlesbrough	321	284	-37
Langbaugh	186	174	-12
Northumberland	402	545	143
NORTH EAST	3753	4552	799

NOTE: PCTs shown in red are below the needs adjusted target; PCTs shown in green are above the needs adjusted target.

Age and sex specific rates for CABG & PTCA

It can be seen from Figures 5 and 6 that for the North East region, CABG and PTCA rates for males in all age groups are much greater than those for females. This may be in part due to the higher incidence of CHD in the male population, which is estimated to be 1.5 times greater than in the female population, in the North East¹⁴.

Figure 5: Age/Sex specific rates for males based upon Finished Consultant Episodes (FCEs) for all revascularisations, 2003/04 for the North East of England

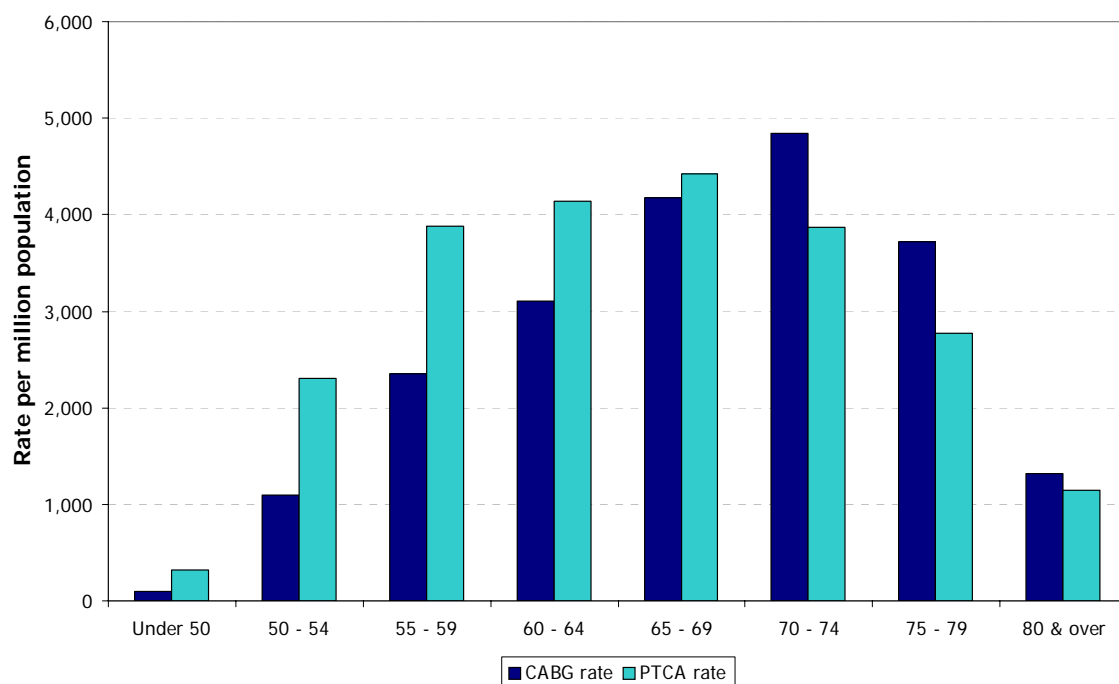
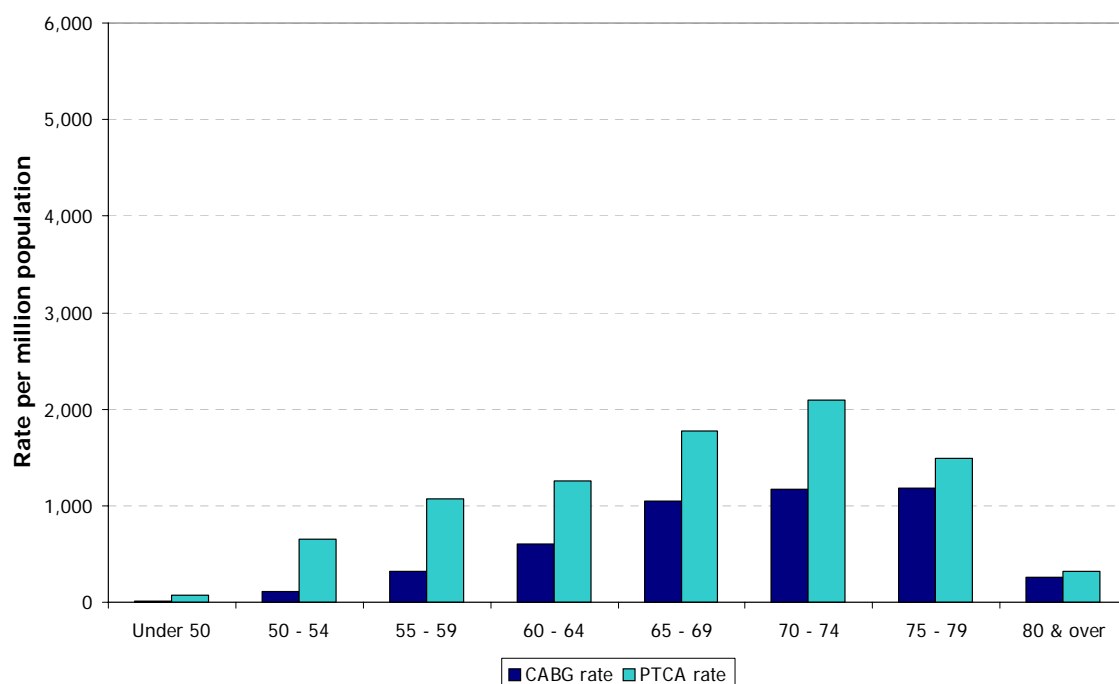


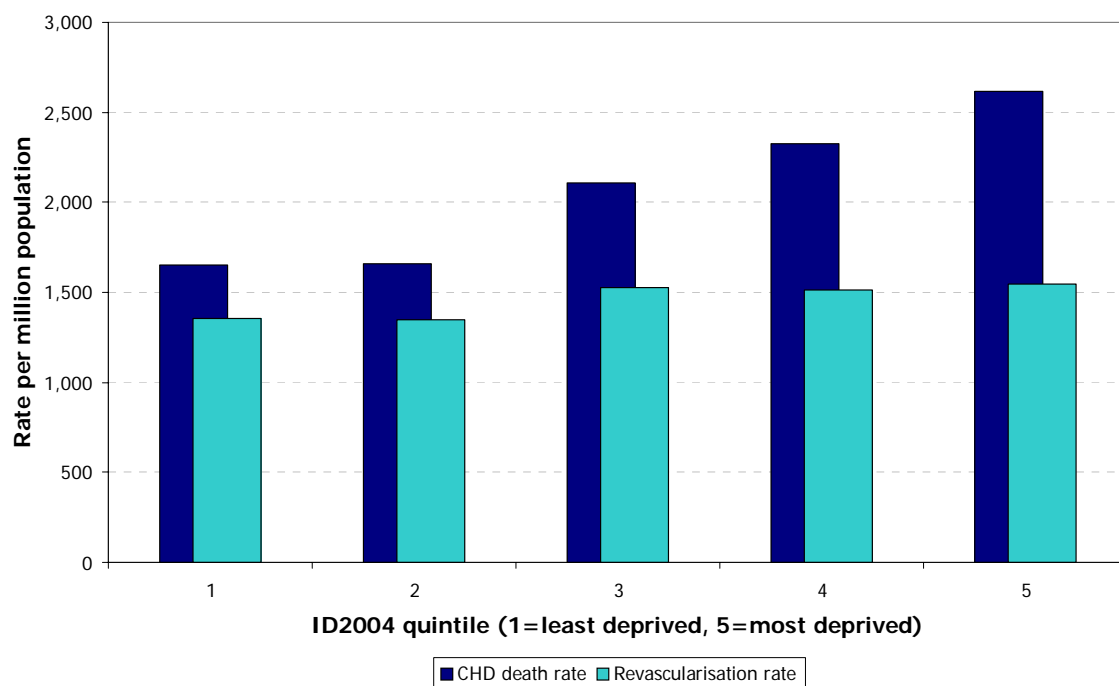
Figure 6: Age/Sex specific rates for females based upon Finished Consultant Episodes (FCEs) for all revascularisations, 2003/04 for the North East of England



Revascularisation rates and deprivation

The link between death rates from CHD and social deprivation has long been documented¹⁵. Figure 7 illustrates this relationship showing death rates for CHD in the North East Region for 2003, linked to the Indices of Deprivation 2004 (ID2004). Figure 7 also shows that the differential between CHD mortality (as a proxy for need) and provision of revascularisation surgery increases with social deprivation. The need for revascularisation in the more socially deprived groups is apparent.

Figure 7: CHD mortality rates and revascularisation rates per million population (all ages), by quintiles of Deprivation, 2003/04 for the North East of England



Patient pathway

The Freeman Hospital (Newcastle upon Tyne Hospitals NHS Trust) and James Cook University Hospital (South Tyneside Hospitals NHS Trust) performed 2,428 and 1,948 revascularisation FCEs respectively in 2003/04. Patients not resident in the North East accounted for 9% and 22% respectively of each unit's total. An additional 8 PTCA FCEs were performed in the region and were attributed to City Hospitals Sunderland NHS Foundation Trust, Gateshead Health NHS Foundation Trust and County Durham & Darlington Acute Hospitals NHS Trust.

Waiting times

The *NSF for Coronary Heart Disease*⁵ states that the waiting time from referral to outpatient assessment should be no more than 2 weeks. At present, HES does not include outpatient data and so this target cannot be measured using this data source. It is expected, however, that outpatient data will begin to be available through the regional HES service from Spring 2005; it should then be possible to assess progress towards this target. The *National Service Framework* also states that the waiting time from outpatient assessment to surgery should be no more than 3 months. PCTs receive information on official waiting time statistics (QF01 and KH07) every quarter. The analysis included below which relates to 2003/04 and should be viewed as historic.

HES data do not take into account any suspension times from the elective waiting list; it simply records the difference between the date the patient is placed on the waiting list for admission and the admission date. In this respect, waiting time data from HES differ from official waiting time statistics (QF01 and KH07), which are adjusted to discount the time that patients were suspended from the waiting list due

to medical reasons (e.g., being unfit for surgery) or social reasons (e.g., inability to attend because of holidays or family commitments).

Figure 8: Percentage of patients with an elective admission for revascularisation surgery within 3 months and 6 months of outpatient assessment , 2003/04 for PCTs in the North East of England

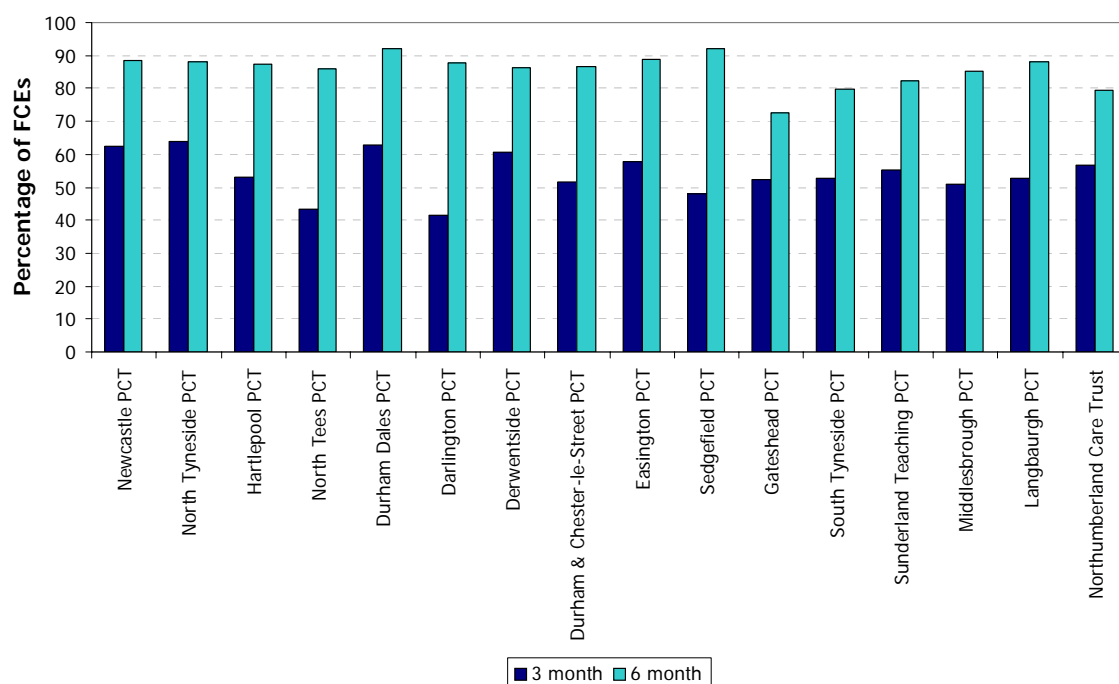


Figure 8 shows that from HES data, the percentage of revascularisation patients from each PCT admitted within the NSF target time of 3 months from outpatient consultation varied between 42% and 64%; the percentage seen within 6 months varied between 73% and 92%. These differ from official Department of Health statistics for all cardiothoracic surgery (speciality code 171), compiled from QF01 and KH07 returns from PCTs which identified ranges of 60% - 95% and 93% – 100% for 3 month and 6 month waits respectively¹⁶.

The Healthcare Commission confirms that James Cook University Hospital is meeting all the current waiting time targets and that waiting times for CABG are decreasing. There are longer than national average waits for transfers for urgent treatment and waiting times have increased for routine angioplasties due to a rise in emergency angioplasties and a consultant vacancy¹⁷.

The Healthcare Commission also confirms that at Freeman Hospital, as of mid 2004 only a small number of patients waited more than 6 months for revascularisation, with all patients to be seen within 3 months by March 2005¹⁸.

Method of admission

At Freeman Hospital, approximately 4% of both CABG and PTCA FCEs were emergency admissions; at James Cook University Hospital the figures were 13% and 40% respectively. Although both units performed just over 70% of their CABG FCEs as elective admissions, James Cook University Hospital performed only 36% of PTCA FCEs as elective admissions compared to 59% of PTCA FCEs at Freeman Hospital.

Figure 9 shows that James Cook University Hospital performed a greater proportion of the total revascularisation FCEs as emergency admissions. A greater proportion of non-emergency transfers from other hospitals were admitted to Freeman Hospital for revascularisation procedures than at James Cook University Hospital. A χ^2 test shows a statistically significant association between admission method and hospital for all revascularisations, CABGs and PTCAs (all $p < 0.001$).

Figure 9: Proportion of revascularisation admissions to Freeman Hospital and James Cook University Hospital by admission type, 2003/04

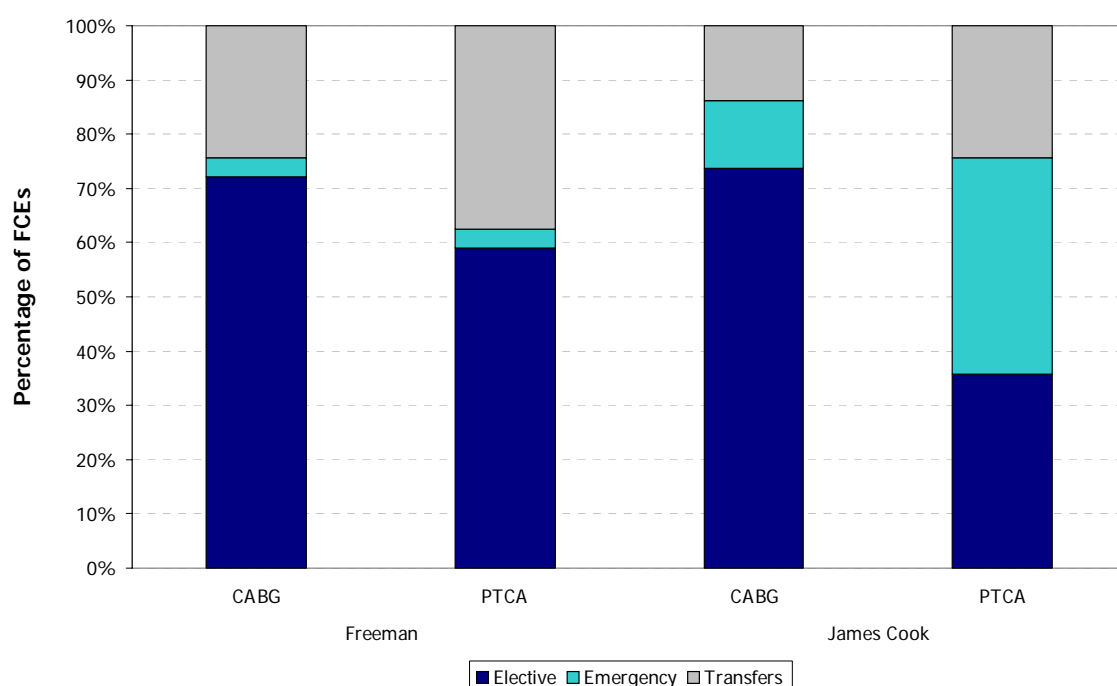
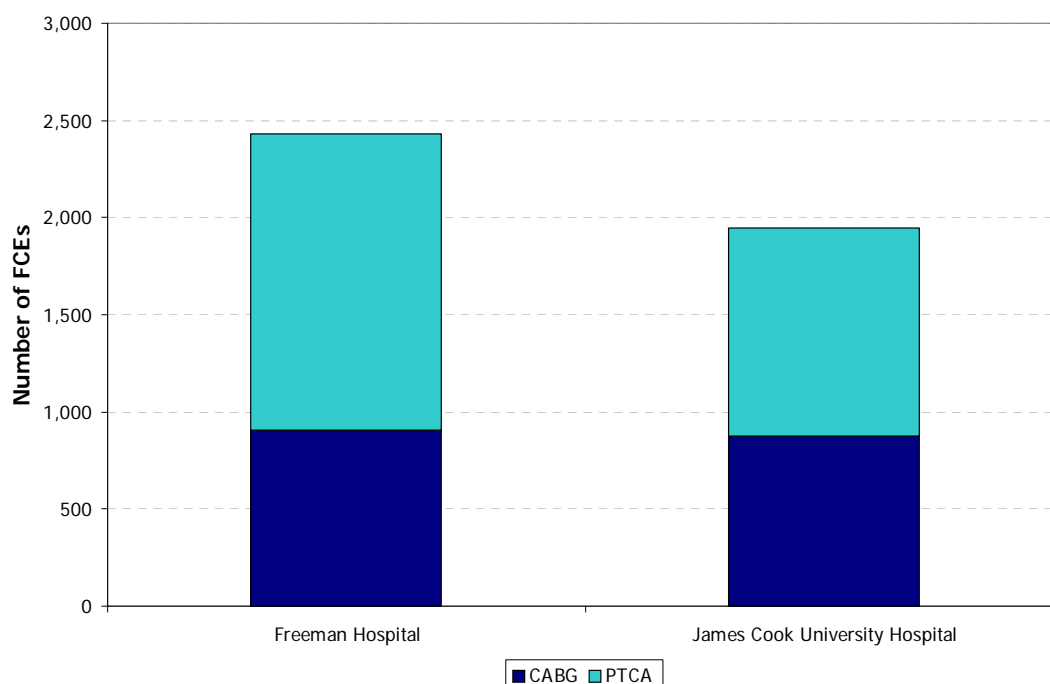


Figure 10 shows that while the Freeman Hospital and James Cook University Hospital performed similar numbers of CABGs in 2003/04, the Freeman Hospital undertakes a greater number of PTCAs than does James Cook University Hospital.

Figure 10: Number of FCEs for CABG and PTCA for the main provider Trusts in the North East England, 2003/04



Summary of Findings

Revascularisation surgery is a relatively common procedure, usually performed on people over 50. The benefits of revascularisation operations on older people are immense. In this paper, we use HES data, deprivation data and mortality data to assess to what extent hospital trusts and primary care organisations in the North East of England are meeting the targets set out in *National Service Frameworks: Coronary Heart Disease*⁵. The key messages are as follows:

- Although the death rates for CHD are falling, there has been variable progress in the region towards achieving the national targets on revascularisation surgery when weighted for need using CHD crude death rates. There is considerable variation between the number of operations commissioned in each primary care organisation (PCO).
- Only Gateshead, Middlesbrough and Langbaurch PCTs met the NSF target of 1,500 revascularisations per million population, when weighted for need using CHD crude death rate. Sunderland TPCT and North Tees PCTs fell only marginally short of this target. Across the entire region, there was a shortfall of 799 revascularisation FCEs in 2003/04. Five of the PCTs (Hartlepool PCT, Durham Dales PCT, Durham & Chester-le-Street PCT, Easington PCT and Northumberland Care Trust) were statistically significantly (using 3 standard deviations) below their needs adjusted target.
- CABG and PTCA rates for males in all age groups are much greater than those for females. This may be in part due to the higher incidence of CHD in the male population.
- There is a disparity between revascularisation provision and need in the most socially deprived groups in the population.
- Admission patterns differ between the two provider Trusts, with a higher proportion of patients admitted as emergencies at James Cook University Hospital.
- From available data, it was not possible to determine the performance of provider trusts against the NSF target for a maximum 2 week wait from GP referral to outpatient appointment. Outpatient data will begin to be available through the regional HES service from mid 2005; it should then be possible to assess progress towards this target.
- Using HES data, no PCT or Trust in the North East met the waiting list target that no-one should wait more than 3 months from outpatient assessment to admission. This however does not take into account any periods of suspension from the waiting list. Official publicly available statistics assessed using QF01 and KH07 returns do not distinguish between revascularisation and other cardiovascular procedures, therefore these are of limited use in determining revascularisation waiting list targets.

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Further Information

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