

# Myocardial Infarction National Audit Project (MINAP)

## How the NHS manages heart attacks

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Fifth Public Report 2006

Prepared on behalf of the  
MINAP Steering Group

June 2006



Royal College  
of Physicians  
Setting higher medical standards





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## **Myocardial Infarction National Audit Project (MINAP)**

■ **This report is written for the public to show the performance of hospitals and ambulance services in England and Wales against national standards and targets for the care of heart attack patients.**

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### **Acknowledgements**

The MINAP team would like to thank all the hospitals and ambulance services that have collected data.

This report was completed in close collaboration with the Central Cardiac Audit Database (CCAD), [www.ccad.org.uk](http://www.ccad.org.uk), which performed data management and analysis. Sue Manuel has been especially involved.

The Healthcare Commission exists to promote improvements in the quality of healthcare and public health in England and Wales. In England, it is responsible for assessing and reporting on the performance of both NHS and independent healthcare organisations, to ensure that they are providing a high standard of care. It also encourages providers to continually improve their services and the way they work. The Commission is now responsible for directing the clinical audit programme for England and Wales and funds MINAP. By publicly identifying where improvement is required and sharing good practice within the service, the Healthcare Commission helps the NHS to raise standards of patient care.

MINAP has been based in the Clinical Effectiveness and Evaluation Unit of the Royal College of Physicians (RCP) since 2000 but has recently moved to the National Institute for Clinical Outcomes Research at the Heart Hospital, University College London. Most of the work relating to this report was performed at the RCP. MINAP continues to maintain a close collaboration with the RCP

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# Foreword

**By the National Director for Heart Disease**

The Myocardial Infarction National Audit Project (MINAP) is probably the largest and most comprehensive database anywhere in the world.

The data summarised in this report show that patients with heart attack are being treated at a level of excellence that is unsurpassed anywhere in Europe or beyond.

The rate of improvement has slowed this year largely because it is difficult to improve on services that are already near to the optimum, but the last twelve months has seen two important developments. Firstly, more patients than ever are being given clot-busting treatment very early by paramedics before they reach hospital; secondly, we are seeing more patients being treated by immediate angioplasty through the seven pilot sites that have been set up across England.

The remarkable improvements seen each year since the inception of MINAP are a tribute to the many staff across the country who look after heart attack patients, including the ambulance services, accident & emergency departments, cardiac care units as well as the MINAP team itself. I am pleased to acknowledge the work of Dr Phillip Thomas, Director of Cardiac Services for Wales, in supporting similar improvements in Wales.

Importantly, this report contains useful information about heart attack for patients emphasising the importance of calling for help early by ringing '999' and explaining what treatments should be given once an attack has occurred.

I am extremely grateful to everyone concerned and for the skill and dedication shown by clinical teams across the country.

June 2006

**Professor Roger Boyle CBE**  
National Director for Heart Disease

# Executive Summary

This is the Fifth Public Report from the Myocardial Infarction National Audit Project (MINAP) on the treatment of heart attack patients. It presents data from all hospitals and ambulance services in England and Wales that provided care for patients with suspected heart attack from April 2005 to March 2006 (2005/6) in comparison with data from the previous year (2004/5). The report shows continuing improvement in the care of heart attack patients.

High quality care of these patients includes the early diagnosis and rapid treatment to re-open the blocked coronary artery responsible for the heart attack. This is usually by treatment with clot dissolving drugs (thrombolytic treatment) and the prescription of drugs that reduce the risk of further heart attack (secondary prevention therapy). Although the majority of patients receive a thrombolytic drug, an increasing number are now receiving primary angioplasty instead of thrombolytic treatment.

## **Patients receive thrombolytic treatment faster**

- 58% of patients received thrombolytic treatment within 60 minutes of calling for professional help in England compared with only 22% in early 2001, while in Wales the figure was 30%, compared to 22% in 2003/4.
- 83% of eligible patients in England received thrombolytic treatment within 30 minutes of arrival at hospital compared with 44% during early 2001.
- 74% of eligible patients in Wales received thrombolytic treatment within 30 minutes of arrival at hospital, compared to 65% in 2003/4 when the Welsh hospitals were first included in the Public Report.
- The percentage of hospitals in England providing thrombolytic treatment to 75% of their eligible patients within 30 minutes of the patient's arrival at hospital is similar, 88% against 89% in the last report in June 2005. In Wales the percentage fell from 56% to 47%.

## **Thrombolytic treatment is increasingly being given by paramedics before the patient reaches hospital, saving valuable time**

- 28 of the 31 ambulance services in England and the Welsh ambulance service can now give thrombolytic treatment to patients before they reach hospital (pre-hospital thrombolysis).
- In 2005/6, 2,231 patients received pre-hospital thrombolytic treatment compared with 1,374 patients in 2004/5.

## **More patients are being treated by primary angioplasty**

More hospitals are now providing angioplasty as an emergency treatment for heart attack. This is known as primary angioplasty.

- In 2005/6, 1,647 patients were treated with primary angioplasty instead of thrombolytic treatment, compared with 1,087 in 2004/5.

## **Prescription of secondary prevention medication continues to increase**

- The proportion of heart attack patients prescribed secondary prevention medication on discharge from hospital continues to exceed the targets remaining at 97% for aspirin, 92% for beta-blockers and 96% for statins in England, with a corresponding increase to 98%, 91% and 94% in Wales.

part 1

# Introduction

The Myocardial Infarction National Audit Project (MINAP) allows hospitals and ambulance services to measure their performance against national standards and targets for the care of heart attack patients. Treatment of heart attack patients is compared nationally using the same definitions.

The continuous collection and publication of data enables comparison of performance across the NHS and monitors the improvement in care for people who have suffered a heart attack. Measuring performance identifies areas where care for people with heart attacks can be improved. MINAP provides quarterly reports to Strategic Health Authorities who are responsible for monitoring performance within their area. In addition, MINAP is providing data to cardiac networks to support local service improvement. MINAP also provides data to ambulance services to help them monitor patient outcomes and support improvements in training and care delivery.

This report concentrates on the time taken to give thrombolytic treatment (clot dissolving drugs) to suitable patients and the use of drugs to reduce the risk of another heart attack (secondary prevention). However 29 hospitals in England and two hospitals in Wales now use primary angioplasty to treat heart attack patients. There is good evidence that both these treatments are highly effective in saving lives and that mortality following heart attack is falling nationally.

For more information on what happens when you have a heart attack, see Appendix 1.

## 1. Thrombolytic treatment

Not all patients will be suitable for thrombolytic treatment. For example, patients will be eligible for thrombolytic treatment if:

- they have definite signs of a heart attack including typical evidence on the electrocardiogram (ECG)
- there is no reason why thrombolytic treatment might be harmful to them, and
- there is no good reason to delay giving thrombolytic treatment.

The Government's National Service Framework (NSF) for Coronary Heart Disease (see Appendix 2) set standards for treatment of heart attack. Wales has its own equivalent of the Coronary Heart Disease NSF, *Tackling CHD in Wales: implementing through evidence*, see Appendix 2.

### *Thrombolytic treatment within 30 minutes of arriving at hospital*

One of the early priorities in the NSF was that 75% of eligible patients should receive thrombolytic drugs within 30 minutes of arriving at hospital. This reflects performance in hospital treatment. This was an early success, and good performance has been maintained.

*Thrombolytic treatment within 60 minutes of calling for professional help*

This standard reflects the combined performance of the ambulance service, GPs and hospitals and is the most relevant overall indicator of care. It encourages collaborative working across all relevant NHS organisations – particularly between ambulance services and hospitals – to reduce delays to thrombolytic treatment. The call for professional help will usually be direct to the ambulance service but may be to a GP or NHS Direct.

The Department of Health set NHS organisations in England the target of delivering a ten percentage point improvement each year in the proportion of patients suffering from heart attack who receive thrombolytic treatment within 60 minutes of calling for professional help, starting from a baseline of 38% which was set in December 2002. The national target for 2004/5 was 58% and for 2005/6 is 68%.

There are various reasons why meeting this target is challenging for some NHS organisations. For example, where an ambulance service covers a large rural area and journey times are long and paramedics have yet to be trained to provide thrombolytic treatment. Delays in transporting a patient to hospital may also occur in built up areas, high rise buildings, in heavy traffic or when a patient first calls their GP who visits them before calling an ambulance.

All emergency ambulances are equipped with ECG machines to help paramedics and other staff identify heart attack patients. In many areas the ECG can be transmitted to hospital or to ambulance control for advice and to alert the receiving hospital to expect a heart attack patient. Increasing numbers of paramedics have been trained to treat heart attack patients with thrombolytic drugs, especially when journey times are long. This is known as 'pre-hospital thrombolysis' and holds the key to further reductions in delay by taking the treatment to the patient.

## **2. Primary angioplasty**

Some hospitals are now using angioplasty for immediate treatment of heart attack patients. This is known as primary angioplasty. For more details see Appendix 1. Little difference in benefit has been shown between thrombolytic treatment when it is given early and primary angioplasty. The most important factor in survival from heart attack is to treat patients as quickly as possible to restore blood flow, whether by thrombolytic treatment or primary angioplasty. There is evidence that from about three hours after the onset of symptoms, primary angioplasty is more effective than thrombolytic treatment in patients with heart attack. However six out of ten patients with heart attack received one or other form of treatment within three hours of onset of symptoms.

A full 24-hour primary angioplasty service is available in a relatively small number of hospitals with the necessary staff and equipment. Offering this service as an emergency treatment requires 24-hour staffing of the facilities with a cardiologist, nurses and cardiac technicians. London hospitals, together with the London Ambulance Service, have been at the forefront of developing this service in England, largely due to the availability and close proximity of many specialised cardiac units across the capital. Outside London, a small number of hospitals, mainly in urban areas, are also offering primary angioplasty services as an alternative to thrombolytic treatment. Around 8% of heart attack patients are currently treated with primary angioplasty. The Department of Health is assessing the feasibility of expanding primary angioplasty services as the main treatment in England and a decision on future strategy will be based on the outcome of this study. Networks exist in which one hospital is designated the primary angioplasty centre and receives patients from the area of neighbouring hospitals for treatment.

An effective primary angioplasty service requires a good working partnership between hospitals and ambulance services, with paramedics trained in early identification of heart attack patients who are suitable for primary angioplasty.

Where a hospital provides a primary angioplasty service, or is part of a network of hospitals using a local primary angioplasty centre, the number of patients receiving thrombolytic treatment may be too small to enable meaningful analysis of the thrombolytic treatment target. These hospitals are identified in the results table.

### **3. Use of secondary prevention medication on discharge**

The NSF also required hospitals to ensure that at least 80–90% of patients discharged from hospital following a heart attack should be prescribed aspirin, beta-blockers and statins. These drugs reduce the risk of another heart attack. For more information see Appendix 3.

### **4. Data quality**

The information published in this report is an analysis of data provided by hospitals and ambulance services who are responsible for the quality of submitted data. At national level, MINAP monitors the completeness of 11 key data fields; these were 98% complete for the year 2005/6. All hospitals are requested to check the accuracy of their data in an annual data validation study and this year 203/208 hospitals in England and all 18 hospitals in Wales participated.

part 2

## Results

All hospitals in England and Wales which treat heart attack patients submit data to MINAP. The 208 hospitals in England and 18 hospitals in Wales are listed alphabetically in Tables 1 and 2, with the location of the hospital alongside its name. To help improve pre-hospital care, ambulance services are now able to access MINAP data on the treatment of heart attack patients under their care.

The standard for thrombolytic treatment to commence within 60 minutes of calling for professional help ('call to needle time') is a joint responsibility of hospitals and ambulance services. This year we are showing the performance against the national target to have 68% of people treated within 60 minutes.

We are again showing results as the percentage achieving the target. The Tables show hospital thrombolytic treatment data for April 2004 to March 2005 and April 2005 to March 2006. Complete data for ambulance services were not available for April 2004 to March 2005 and only data for April 2005 to March 2006 are shown. Data for secondary prevention medication are also shown only for April 2005 to March 2006.

### 1. Hospitals with a low number of patients

We have identified hospitals with the '!' symbol if there were less than 20 patients included in the thrombolytic treatment analyses for the year. Increasing numbers of patients now make their own way to hospital without involving either the ambulance service or their GP. These patients are excluded from analyses of 'call to needle time' and may account for small numbers in some hospitals. Smaller hospitals may also have reported low numbers of heart attack patients.

### 2. Hospitals that perform primary angioplasty

In hospitals providing a primary angioplasty service, identified with an '\*' (asterisk) in the table, most patients receive primary angioplasty rather than thrombolytic treatment to re-open the blocked artery. These hospitals will have low numbers of patients who receive thrombolytic treatment

- In 2005/6, 1,647 patients were treated with primary angioplasty, compared with 1,087 in 2004/5.

### 3. Hospitals that have access to primary angioplasty at an interventional centre

Depending on local circumstances and available facilities, paramedics may identify a patient as having a heart attack and take the patient directly to the nearest interventional centre, bypassing the patient's local hospital. This will result in much smaller numbers having thrombolytic treatment in their local hospital.

#### 4. Hospital performance in relation to the 2005/6 national target for thrombolytic treatment given within 60 minutes of calling for help

This target is a shared target between hospitals and ambulance services and so the hospital performance includes the performance of their associated ambulance service.

In Tables 1 and 2, the percentages in **bold** type indicate that the hospital met or exceeded 75% of patients receiving thrombolytic treatment within 30 minutes of hospital arrival. For the 60-minute target, the percentages in **bold** indicate that a hospital reached or was above the national target of 68% for 2005/6. It is not expected that each individual hospital will achieve 68% but that they will deliver a 10% point improvement each year to contribute towards the national target level. Some hospitals in 2004/5 had already exceeded the national target level set for 2005/6 of 68%. In these cases they are expected to continue to achieve improvement each year but this need not be as much as 10 percentage points.

- 154/176 (88%) hospitals in England met the early priority of delivering thrombolytic treatment to 75% of patients within 30 minutes of hospital arrival.<sup>†</sup>
- 7/15 (47%) hospitals in Wales met the early priority of delivering thrombolytic treatment within 30 minutes of hospital arrival.<sup>†</sup>
- This year 83% of patients in England and 74% of patients in Wales, received thrombolytic treatment within 30 minutes of hospital arrival.
- The percentage of hospitals in England providing thrombolytic treatment to 75% of their eligible patients within 30 minutes of the patient's arrival at hospital is similar, 88% compared with 89% in the last report in June 2005. In Wales, the percentage has decreased from 56% to 47%.
- 46/165 (28%) hospitals, with their associated ambulance services, in England reached or exceeded the national target for 2005/6 on delivering thrombolytic treatment within 60 minutes of patients calling for professional help.<sup>†</sup>

#### 5. Ambulance service performance in relation to the 2005/6 national target for thrombolytic treatment given within 60 minutes of calling for help

This target is a shared target between hospitals and ambulance services and so the ambulance service performance includes the performance of their associated hospitals.

In Table 3, the percentages in **bold** type indicate that that an ambulance service reached or was above the national target of 68% for the 60-minute target for 2005/6. The percentage of eligible patients that received pre-hospital thrombolysis is also shown for each ambulance trust.

- 28 of the 31 ambulance services in England and the Welsh ambulance service can now give thrombolytic treatment to patients before they reach hospital (pre-hospital thrombolysis).
- In 2005/6, 2,231 patients received pre-hospital thrombolytic treatment compared with 1,374 patients in 2004/5.
- 4/31 (13%) of ambulance services in England reached or exceeded the national target of 68% for 2005/6 on delivering thrombolytic treatment within 60 minutes of patients calling for professional help. In a further 10 ambulance services, between 60% and 67% of patients received thrombolytic treatment within 60 minutes of calling for professional help.

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<sup>†</sup> The denominator does not include hospitals having less than 20 cases.

## **Myocardial Infarction National Audit Project (MINAP)**

- The percentage of eligible patients that received pre-hospital thrombolytic treatment for each ambulance service varied between 0 and 67%. Pre-hospital thrombolytic treatment is not given by three ambulance services because either there is local agreement that primary angioplasty is the preferred treatment, or because, in urban areas, the ambulance journey time is already very short.

### **6. Use of secondary prevention medication on discharge**

- Aspirin, beta-blockers and statins were prescribed to 97%, 92% and 96% of patients in England and to 98%, 91% and 94% of patients in Wales. The proportion of heart attack patients prescribed secondary prevention medication on discharge continues to exceed the targets.

## 7. Results by hospitals and ambulance services

TABLE 1. *Hospitals in England* (see pages 4–5 for key to bold type and symbols used in this table)

Year	Percentage of patients having thrombolytic treatment within 30 mins of arrival at hospital		Percentage of patients having thrombolytic treatment within 60 mins of calling for help		Percentage of patients discharged on secondary prevention medication	
	2004/5	2005/6	2004/5	2005/6	2005/6	2005/6
<b>Target</b>	<b>75%</b>	<b>75%</b>	<b>58%</b>	<b>68%</b>	<b>80%</b>	<b>80%</b>
<b>England National Average</b>	<b>84</b>	<b>83</b>	<b>54</b>	<b>58</b>	<b>97</b>	<b>92</b>
Addenbrooke's Hospital, Cambridge	89	100	43	48	98	88
Airedale General Hospital, Steeton	72	82	23	58	82	70
Arrowe Park Hospital, Wirral	87	87	72	78	95	86
Ashford Hospital, Middlesex	60	58	41	!	94	88
Barnet General Hospital, Barnet	78	76	34	50	100	95
Barnsley District General Hospital, Barnsley	81	88	51	79	99	92
Basilston Hospital, Basildon	84	84	59	58	100	97
Bassetlaw District General Hospital, Nottingham	97	98	50	47	95	100
Bedford Hospital, Bedford	88	88	56	42	99	98
Birmingham Heartlands Hospital, Birmingham*	81	!	!	!	100	96
Bishop Auckland General Hospital, Bishop Auckland	96	97	60	54	100	100
Blackburn Royal Infirmary, Blackburn	84	88	53	58	97	98
Bradford Royal Infirmary, Bradford	85	79	55	69	97	87
Bridlington & District Hospital, Bridlington	85	75	31	!	98	94
Bristol Royal Infirmary, Bristol*	74	!	69	!	98	90
Broomfield Hospital, Chelmsford	73	85	45	58	99	98
Burnley General Hospital, Burnley	98	83	60	49	99	95

Continued over

TABLE 1. *Hospitals in England* – continued (see pages 4–5 for key to bold type and symbols used in this table)

Year	Percentage of patients having thrombolytic treatment within 30 mins of arrival at hospital		Percentage of patients having thrombolytic treatment within 60 mins of calling for help		Aspirin		Beta-blockers		Statins	
	2004/5	2005/6	2004/5	2005/6	2005/6	2005/6	2005/6	2005/6	2005/6	2005/6
<b>Target</b>	<b>75%</b>	<b>75%</b>	<b>58%</b>	<b>68%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>
<b>England National Average</b>	<b>84</b>	<b>83</b>	<b>54</b>	<b>58</b>	<b>97</b>	<b>92</b>	<b>96</b>			
Calderdale Royal Hospital, Halifax	86	96	50	81	100	100	99			
Central Middlesex Hospital, London	82	!	!	!	100	99	100			
Charing Cross Hospital, London	!	!	!	!	100	98	98			
Chase Farm Hospital, Enfield	85	83	55	!	100	99	100			
Chelsea & Westminster Hospital, London	78	!	!	!	99	87	91			
Cheltenham General Hospital, Cheltenham	88	90	32	34	100	100	96			
Chesterfield Royal, Chesterfield	92	85	45	46	99	87	98			
Chorley Hospital, Chorley	77	78	37	53	97	85	98			
City Hospital, Birmingham*	92	85	83	72	100	100	100			
Colchester General Hospital, Colchester	87	88	39	39	99	94	94			
Conquest Hospital, St Leonards on Sea	95	98	83	75	100	95	97			
Countess of Chester Hospital, Chester	85	74	56	59	97	92	94			
County Hospital Hereford, Hereford	89	85	46	46	100	92	98			
County Hospital Louth, Louth	93	!	!	!	93	90	95			
Cumberland Infirmary, Carlisle	66	76	26	40	96	86	91			
Darent Valley Hospital, Dartford	86	85	62	53	96	91	93			
Darlington Memorial Hospital, Darlington	92	96	69	55	99	90	89			
Derby Royal Infirmary, Derby	67	68	43	45	100	100	100			
Derriford Hospital, Plymouth	60	80	34	43	94	71	90			
Dewsbury District Hospital, Dewsbury	93	81	64	58	94	84	94			

Diana, Princess of Wales Hospital, Grimsby	69	77	61	64	93	85	95
Doncaster Royal Infirmary, Doncaster	96	91	74	72	90	85	91
Dorset County Hospital, Dorchester	84	91	42	60	98	95	96
Ealing Hospital, Southall	57	!	36	!	100	87	96
East Surrey Hospital, Redhill	80	79	34	44	98	95	95
Eastbourne District General Hospital, Eastbourne	95	94	44	53	100	99	100
Epsom Hospital, Epsom	93	95	60	65	100	96	100
Fairfield General Hospital, Bury	84	85	84	74	99	94	96
Frenchay Hospital, Bristol	94	92	63	73	100	98	96
Friarage Hospital, Northallerton	!	79	!	14	95	99	95
Frimley Park Hospital, Frimley	96	93	65	78	98	90	92
Furness General, Barrow-in-Furness	57	81	41	71	99	92	97
George Elliot Hospital, Nuneaton	90	83	55	61	99	95	97
Glenfield Hospital, Leicester*	91	91	30	44	91	87	91
Gloucestershire Royal Hospital, Gloucester	91	98	23	35	100	100	98
Good Hope General Hospital, Sutton Coldfield	90	86	75	62	98	95	99
Grantham & District General, Grantham	80	63	!	35	93	93	92
Halton General Hospital, Runcorn	88	!	50	!	100	100	100
Hammersmith Hospital, London*	!	!	!	!	100	98	100
Harefield Hospital, Middlesex*	!	!	!	!	100	91	100
Harrogate District Hospital, Harrogate	86	92	55	!	98	94	100
Heatherwood Hospital, Ascot	!	!	!	67	94	80	88
Hemel Hempstead General, Hemel Hempstead	87	76	57	55	99	97	96
Hexham General Hospital, Hexham	!	!	!	!	90	78	88
Hillingdon Hospital, Uxbridge	!	!	!	!	98	95	88
Hinchingbrooke Hospital, Huntingdon	74	92	32	74	100	97	100
Homerton Hospital, London	!	!	!	!	98	100	97
Hope Hospital, Manchester	89	!	82	!	100	89	96
Horton General Hospital, Banbury	67	93	42	64	98	89	97
Hospital of St Cross, Rugby	87	85	70	!	100	100	100
Huddersfield Royal Infirmary, Huddersfield	84	85	50	71	100	100	100

Continued over

TABLE 1. *Hospitals in England* – continued (see pages 4–5 for key to bold type and symbols used in this table)

Year	Percentage of patients having thrombolytic treatment within 30 mins of arrival at hospital		Percentage of patients having thrombolytic treatment within 60 mins of calling for help		Aspirin		Beta-blockers		Statins	
	2004/5	2005/6	2004/5	2005/6	2005/6	2005/6	2005/6	2005/6	2005/6	2005/6
<b>Target</b>	<b>75%</b>	<b>75%</b>	<b>58%</b>	<b>68%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>
<b>England National Average</b>	<b>84</b>	<b>83</b>	<b>54</b>	<b>58</b>	<b>97</b>	<b>92</b>	<b>96</b>	<b>97</b>	<b>96</b>	<b>96</b>
Hull Infirmary, Hull	72	80	27	33	98	97	98	98	98	98
James Cook University Hospital, Middlesbrough*	!	!	!	!	97	96	95	95	95	95
James Paget Hospital, Great Yarmouth	77	51	42	63	98	100	100	100	100	100
John Radcliffe Hospital, Oxford*	85	88	33	39	99	98	96	96	96	96
Kent & Canterbury Hospital, Canterbury	88	93	47	55	95	78	90	90	90	90
Kent & Sussex Hospital, Tunbridge Wells	89	92	31	!	99	93	98	98	98	98
Kettering General Hospital, Kettering	96	96	63	66	100	100	100	100	100	100
King George Hospital, Goodmayes	86	82	60	61	99	95	95	95	95	95
King's College Hospital, London*	!	!	!	!	98	94	99	99	99	99
Kings Mill Hospital, Nottingham	73	74	59	51	94	90	96	96	96	96
Kingston Hospital, Kingston-upon-Thames	94	91	73	81	96	91	96	96	96	96
Leeds General Infirmary, Leeds*	77	!	38	!	100	100	100	100	100	100
Leicester Royal Infirmary, Leicester*	84	87	37	44	96	96	98	98	98	98
Leighton Hospital, Crewe	71	89	53	67	99	99	100	100	100	100
Lincoln County Hospital, Lincoln	86	82	49	53	97	88	98	98	98	98
Lister Hospital, Stevenage	85	91	42	59	98	95	97	97	97	97
Luton & Dunstable Hospital, Luton	75	68	54	47	99	89	97	97	97	97
Macclesfield District General, Macclesfield	91	66	69	48	98	86	94	94	94	94
Maidstone General Hospital, Maidstone	85	69	38	63	96	80	96	96	96	96
Manchester Royal Infirmary, Manchester*	67	66	!	66	97	87	95	95	95	95

Manor Hospital, Walsall	98	91	83	83	97	95	97
Mayday University Hospital, Croydon	74	70	48	33	98	92	96
Medway Maritime Hospital, Gillingham	83	84	40	61	92	83	90
Milton Keynes General Hospital, Milton Keynes	86	91	68	70	100	100	100
Montagu Hospital, Mexborough	!	!	!	!	98	94	97
New Cross Hospital, Wolverhampton*	89	90	75	70	100	97	98
Newark Hospital, Newark	!	86	!	!	90	68	89
Newham General Hospital, London	89	86	64	59	97	88	98
Norfolk and Norwich Hospital, Norwich	93	92	35	69	94	85	96
North Devon District Hospital, Barnstable	77	92	38	50	96	83	89
North Hampshire Hospital, Basingstoke*	88	!	!	!	100	74	100
North Manchester General Hospital, Manchester	62	79	62	79	95	91	96
North Middlesex Hospital, London	80	86	59	56	95	85	97
North Staffordshire Hospital, Stoke-on-Trent*	90	!	74	87	95	88	95
North Tyneside General Hospital, North Shields	84	95	76	87	89	79	92
Northampton General Hospital, Northampton	85	85	44	36	100	98	98
Northern General Hospital, Sheffield*	91	83	70	76	98	89	93
Northwick Park Hospital, Harrow	89	81	79	46	100	100	100
Nottingham City Hospital, Nottingham*	82	78	49	63	94	83	96
Oldchurch Hospital, Romford	90	87	53	55	100	99	98
Peterborough District Hospital, Peterborough	80	88	41	57	99	98	99
Pilgrim Hospital, Boston	92	87	45	38	91	81	87
Pinderfields General Hospital, Wakefield	82	84	47	49	99	100	100
Pontefract General Infirmary, Pontefract	81	74	53	35	96	97	98
Poole Hospital, Poole	92	71	77	68	99	95	99
Princess Alexandra Hospital, Harlow	52	63	32	28	97	94	98
Princess Royal Hospital, Haywards Heath	88	94	!	59	99	98	89
Princess Royal Hospital, Telford	85	96	59	76	97	94	97
Princess Royal University Hospital, Orpington	76	78	49	52	100	99	98
Queen Alexandra Hospital, Portsmouth	90	86	61	57	95	91	90
Queen Elizabeth Hospital, King's Lynn	91	92	35	51	98	93	95

Continued over

TABLE 1. *Hospitals in England* – continued (see pages 4–5 for key to bold type and symbols used in this table)

Year	Percentage of patients having thrombolytic treatment within 30 mins of arrival at hospital		Percentage of patients having thrombolytic treatment within 60 mins of calling for help		Aspirin		Beta-blockers		Statins	
	2004/5	2005/6	2004/5	2005/6	2005/6	2005/6	2005/6	2005/6	2005/6	2005/6
<b>Target</b>	<b>75%</b>	<b>75%</b>	<b>58%</b>	<b>68%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>
<b>England National Average</b>	<b>84</b>	<b>83</b>	<b>54</b>	<b>58</b>	<b>97</b>	<b>92</b>	<b>96</b>			
Queen Elizabeth Hospital, Gateshead	87	82	68	69	97	94	96			
Queen Elizabeth Hospital, Woolwich, London	94	80	85	77	99	91	97			
Queen Elizabeth II Hospital, Welwyn Garden City	82	88	65	!	98	92	95			
Queen Elizabeth the Queen Mother, Margate	97	94	77	83	94	82	85			
Queen Mary's Hospital, Sidcup	89	97	72	56	100	97	98			
Queen's Hospital, Burton-upon-Trent	85	95	60	59	100	100	99			
Rochdale Infirmary, Rochdale	94	97	94	94	100	91	100			
Rotherham General Hospital, Rotherham	92	92	66	72	97	96	96			
Royal Albert Edward Infirmary, Wigan	87	85	89	81	98	97	98			
Royal Berkshire Hospital, Reading	85	86	61	63	100	98	100			
Royal Bolton Hospital, Bolton	84	86	83	74	99	96	96			
Royal Bournemouth General Hospital, Bournemouth	83	87	75	77	100	97	100			
Royal Cornwall Hospital, Truro	62	64	40	43	99	93	97			
Royal Devon & Exeter Hospital, Exeter*	69	80	31	22	98	94	91			
Royal Free Hospital, London*	78	!	71	!	100	97	99			
Royal Hallamshire Hospital, Sheffield	89	91	75	68	99	94	94			
Royal Hampshire County Hospital, Winchester	88	91	61	72	100	100	98			
Royal Lancaster Infirmary, Lancaster	75	75	36	38	98	93	98			
Royal Liverpool University Hospital, Liverpool	77	81	71	49	96	94	99			
Royal London Hospital, London	94	!	86	!	100	98	99			

Royal Oldham Hospital, Oldham	75	95	73	93	95	90	96
Royal Preston Hospital, Preston	89	91	72	63	99	89	97
Royal Shrewsbury Hospital, Shrewsbury	84	!	60	61	100	100	100
Royal Surrey County Hospital, Guildford	91	81	51	34	100	100	100
Royal Sussex County Hospital, Brighton*	79	77	57	50	98	91	97
Royal United Hospital Bath, Bath	74	88	28	34	99	100	100
Royal Victoria Infirmary, Newcastle	92	95	52	67	100	100	98
Russells Hall Hospital, Dudley	86	77	67	55	85	79	95
Salisbury District Hospital, Salisbury	81	86	31	40	96	90	94
Sandwell District Hospital, West Bromwich*	89	79	82	76	99	85	98
Scarborough General Hospital, Scarborough	92	67	36	21	99	94	99
Scunthorpe General Hospital, Scunthorpe	90	84	65	58	87	75	86
Selly Oak Hospital, Birmingham	90	94	66	57	100	100	100
Skegness District Hospital, Skegness	!	!	!	!	!	!	!
Solihull General Hospital, Birmingham	82	79	55	!	100	97	99
South Tyneside District Hospital, South Shields	88	84	58	51	100	98	95
Southampton General Hospital, Southampton*	82	81	40	29	100	94	98
Southend Hospital, Westcliffe on Sea	95	85	73	64	97	94	96
Southmead Hospital, Bristol	77	80	55	66	100	98	100
Southport and Formby District General, Southport	82	90	67	52	97	90	94
St George's Hospital, London*	89	!	65	!	99	97	100
St Helier Hospital, Carshalton	89	90	42	!	97	87	97
St James' University Hospital, Leeds	83	!	57	!	100	100	100
St Mary's Hospital, Newport	73	84	33	27	100	100	99
St Mary's Hospital, Paddington, London*	!	!	!	!	100	93	100
St Peter's Hospital, Chertsey	88	89	57	!	94	89	97
St Richard's Hospital, Chichester	89	94	54	62	98	94	95
St Thomas' Hospital, London*	77	83	!	!	100	94	96
Staffordshire General Hospital, Stafford	54	66	75	72	98	96	100
Stepping Hill Hospital, Stockport	74	86	54	72	96	95	97
Stoke Mandeville Hospital, Aylesbury	79	82	34	40	99	99	97

Continued over

TABLE 1. *Hospitals in England* – continued (see pages 4–5 for key to bold type and symbols used in this table)

Year	Percentage of patients having thrombolytic treatment within 30 mins of arrival at hospital		Percentage of patients having thrombolytic treatment within 60 mins of calling for help		Percentage of patients discharged on secondary prevention medication	
	2004/5	2005/6	2004/5	2005/6	2005/6	2005/6
<b>Target</b>	<b>75%</b>	<b>75%</b>	<b>58%</b>	<b>68%</b>	<b>80%</b>	<b>80%</b>
<b>England National Average</b>	<b>84</b>	<b>83</b>	<b>54</b>	<b>58</b>	<b>97</b>	<b>92</b>
Sunderland Royal Hospital, Sunderland	87	90	82	85	94	90
Tameside General Hospital, Ashton under Lyne	72	96	79	89	98	92
Taunton & Somerset Hospital, Taunton	78	63	20	42	99	90
The Alexandra Hospital, Redditch	74	91	49	50	98	91
The Great Western Hospital, Swindon	97	95	40	52	99	95
The Ipswich Hospital, Ipswich	69	84	40	65	95	90
Torbay Hospital, Torquay	78	83	43	55	99	87
Trafford General Hospital, Manchester	85	81	79	63	100	96
University College Hospital, London*	!	!	!	!	99	92
University Hospital Aintree, Liverpool	94	95	72	78	100	99
University Hospital Lewisham, London	74	!	!	!	98	95
University Hospital of Hartlepool, Hartlepool	71	82	52	59	100	100
University Hospital of North Durham, Durham	89	88	48	50	99	88
University Hospital of North Tees, Stockton on Tees	80	82	58	55	99	95
University Hospital Queen's Medical Centre, Nottingham	74	73	39	44	97	86
Victoria Hospital, Blackpool*	83	93	77	86	98	95
Walsgrave Hospital, Coventry*	91	95	60	74	100	97
Wansbeck General Hospital, Ashington	!	89	!	59	95	90
Warrington District General Hospital, Warrington	86	76	55	57	96	97
Warwick Hospital, Warwick	92	75	50	41	99	93
						96
						80%
						80%

Watford General Hospital, Watford	96	80	68	53	98	78	89
West Cornwall Hospital, Penzance	!	!	!	!	100	100	100
West Cumberland Hospital, Whitehaven	67	75	35	42	94	89	95
West Middlesex University Hospital, Isleworth	!	!	!	!	100	100	100
West Suffolk Hospital, Bury St Edmunds	82	81	31	59	99	97	97
Westmoreland General Hospital, Kendall	92	82	32	35	94	84	89
Weston General Hospital, Weston-super-Mare	82	90	73	69	96	87	92
Wexham Park Hospital, Slough	90	92	63	50	90	77	94
Whipps Cross Hospital, London	79	55	44	39	96	89	94
Whiston Hospital, Prescott	89	76	78	71	100	99	99
Whittington Hospital, London	!	!	!	!	94	93	95
William Harvey Hospital, Ashford	84	84	30	53	91	72	89
Worcester Royal Infirmary, Worcester	65	72	43	38	98	92	97
Worthing Hospital, Worthing	65	63	38	56	99	98	99
Wycombe General Hospital, High Wycombe	88	88	50	!	100	97	100
Wythenshawe Hospital, Manchester*	98	95	91	85	96	91	95
Yeovil District Hospital, Yeovil	88	94	46	59	99	97	90
York District Hospital, York	86	95	37	48	99	97	95

TABLE 2. *Hospitals in Wales* (see pages 4–5 for key to bold type and symbols used in this table)

Year	Percentage of patients having thrombolytic treatment within 30 mins of arrival at hospital		Percentage of patients having thrombolytic treatment within 60 mins of calling for help		Percentage of patients discharged on secondary prevention medication	
	2004/5	2005/6	2004/5	2005/6	2005/6	2005/6
<b>Target</b>	<b>75%</b>	<b>75%</b>	<b>58%</b>	<b>68%</b>	<b>80%</b>	<b>80%</b>
<b>Wales National Average</b>	<b>70</b>	<b>74</b>	<b>28</b>	<b>30</b>	<b>98</b>	<b>94</b>
Bronglais General Hospital, Aberystwyth	!	!	!	!	90	87
Glan Clwyd District General Hospital, Bodelwyddan	<b>86</b>	<b>92</b>	36	42	<b>96</b>	<b>92</b>
Llandough Hospital, Llandough	<b>76</b>	68	!	44	<b>98</b>	<b>80</b>
Llandudno General Hospital, Llandudno	!	!	!	!	97	99
Maelor Hospital, Wrexham	<b>83</b>	73	43	40	99	94
Morriston Hospital, Swansea*	63	45	37	39	<b>100</b>	<b>98</b>
Neath Port Talbot Hospital, Neath	<b>76</b>	!	38	!	99	96
Nevill Hall Hospital, Abergavenny	<b>77</b>	<b>83</b>	!	20	92	97
Prince Charles Hospital, Merthyr Tydfil	61	66	25	16	<b>98</b>	<b>100</b>
Prince Philip Hospital, Llanelli	68	60	22	30	<b>100</b>	<b>97</b>
Princess of Wales Hospital, Bridgend	<b>89</b>	<b>82</b>	43	41	<b>98</b>	<b>96</b>
Royal Glamorgan, Llantrisant	<b>82</b>	<b>82</b>	10	23	99	94
Royal Gwent Hospital, Newport	52	<b>77</b>	22	26	<b>95</b>	<b>97</b>
Singleton Hospital, Swansea	41	37	22	17	97	92
University Hospital of Wales, Cardiff*	<b>75</b>	<b>86</b>	!	!	99	91
West Wales General, Camarthen	67	72	29	!	99	96
Withybush General Hospital, Haverfordwest	<b>84</b>	62	13	26	99	95
Ysbyty Gwynedd, Bangor	65	<b>83</b>	16	20	<b>100</b>	<b>97</b>

**TABLE 3. Ambulance services in England and Wales** (see pages 4–5 for key to bold type used in this table)

	Percentage of patients having thrombolytic treatment within 60 mins of calling for help	Percentage of eligible patients that received pre-hospital thrombolysis
<b>Year</b>	<b>2005/6</b>	
<b>Target</b>	<b>68%</b>	
<b>England National Average</b>	<b>58%</b>	<b>18%</b>
Avon	<b>68</b>	18
Bedfordshire & Hertfordshire	46	2
Coventry & Warwickshire	62	15
Cumbria	45	15
Dorset	67	33
East Anglia	63	53
East Midlands	47	22
Essex	53	32
Gloucestershire	33	19
Greater Manchester	<b>81</b>	0
Hampshire	48	7
Hereford & Worcester	47	30
Isle of Wight Healthcare	27	0
Kent	62	13
Lancashire	66	16
Lincolnshire	51	15
London	52	0
Mersey	65	20
North East	59	12
Oxfordshire	42	17
Royal Berkshire	61	20
Sussex	61	23
Staffordshire	<b>76</b>	67
Surrey	63	2
South Yorkshire	<b>76</b>	0
Tees, East & North Yorkshire	41	1
Two Shires	47	4
Westcountry	45	31
Wiltshire	48	21
West Midlands	62	6
West Yorkshire Metropolitan	57	5
Welsh	31	10

### 8. Trends in the management of heart attack patients since 2001

Trends in these measures since the inception of MINAP are shown in the following graphs.

For each graph:

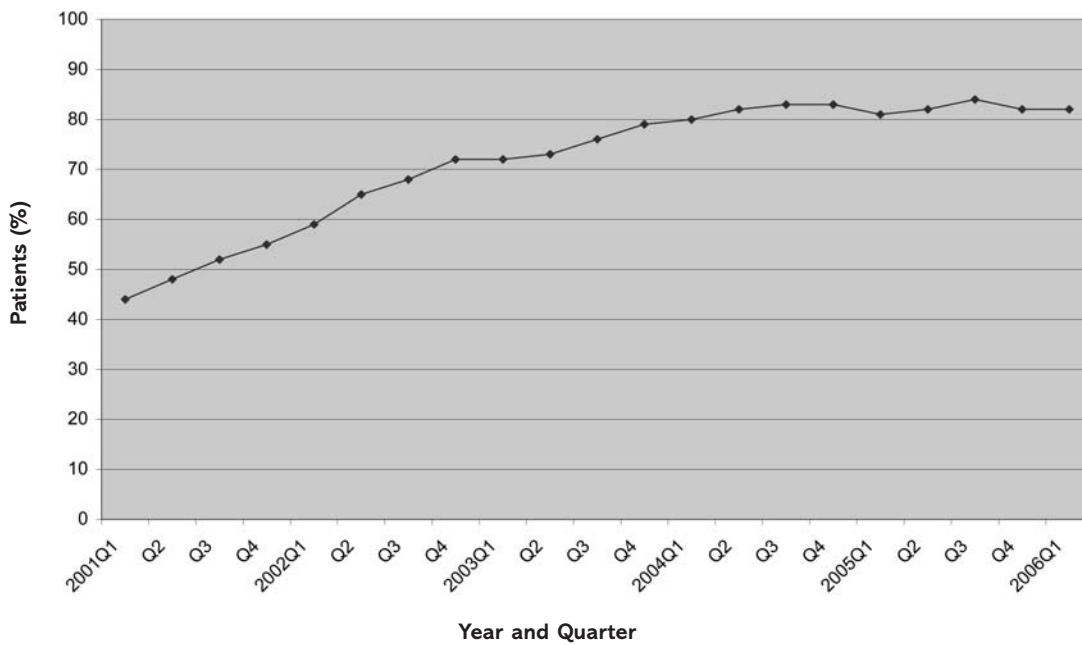
Q1 = January–March

Q3 = July–September

Q2 = April–June

Q4 = October–December

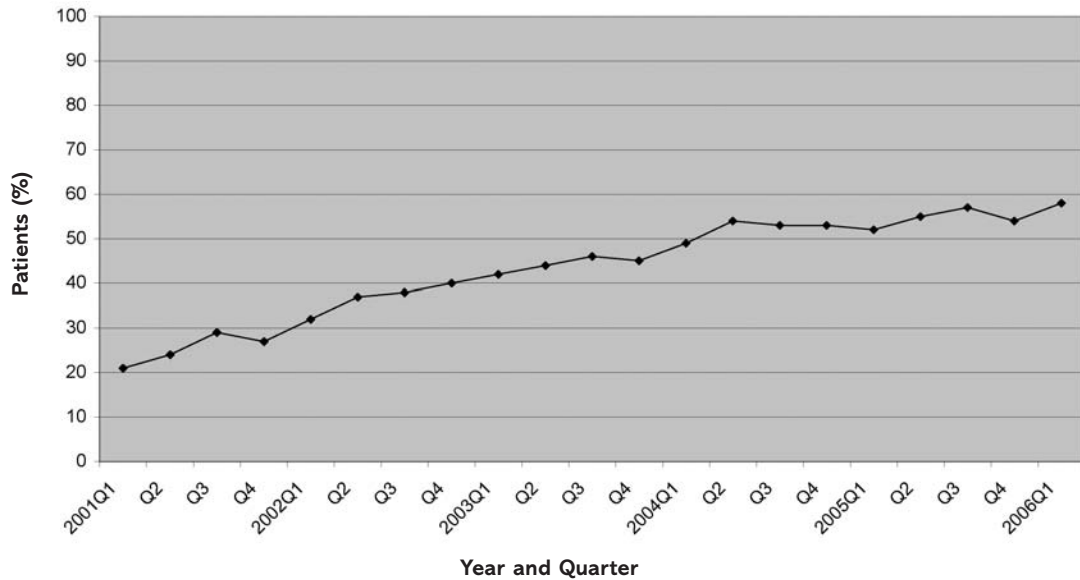
**Fig. 1 Patients receiving thrombolytic treatment within 30 minutes of hospital arrival.**



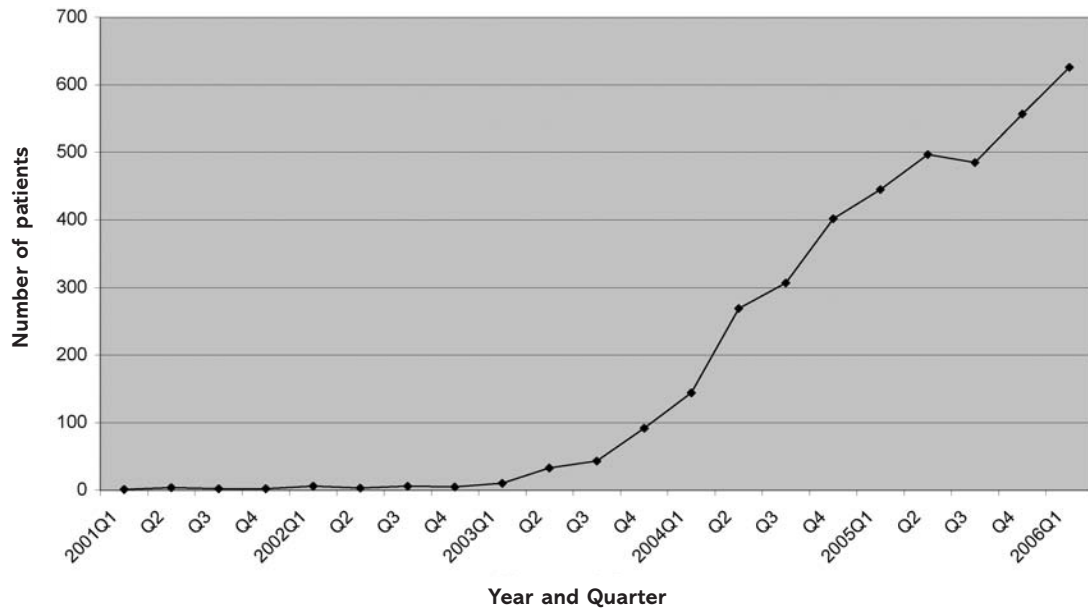
The considerable improvement in the percentage of patients receiving thrombolytic treatment within 30 minutes of arrival at hospital is a reflection on the greatly improved organisation within emergency departments.

This target has been achieved and performance has plateaued above 80%. Further improvement is not expected to carry significant benefit.

**Fig. 2 Patients receiving thrombolytic treatment within 60 minutes of call for help.**



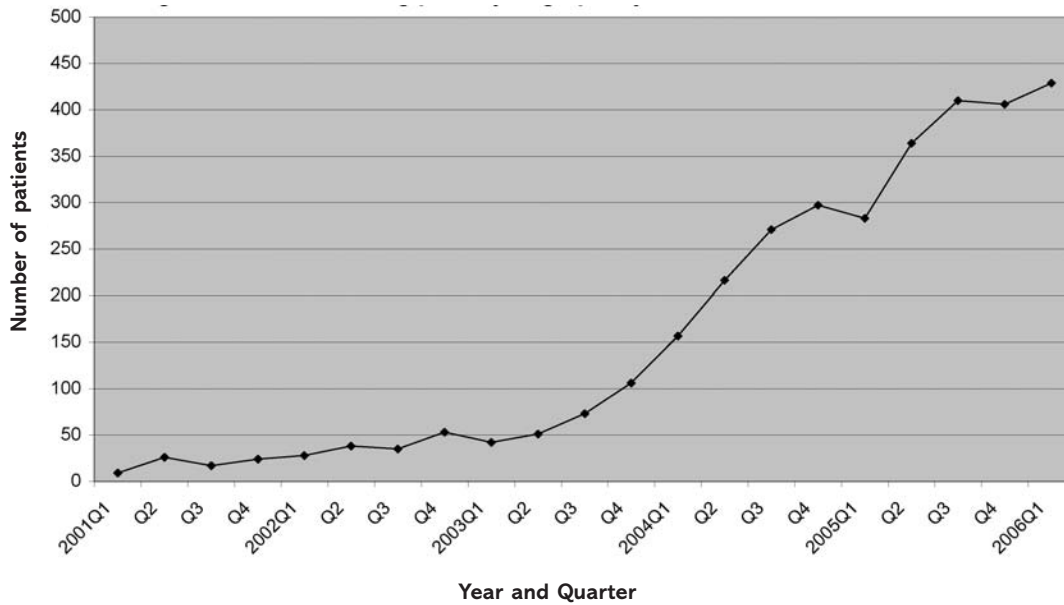
**Fig. 3 Patients receiving pre-hospital thrombolysis.**



91% of the ambulance services in England and Wales now provide thrombolytic treatment for carefully selected patients with heart attack. Pre-hospital thrombolysis was only introduced in 2001.

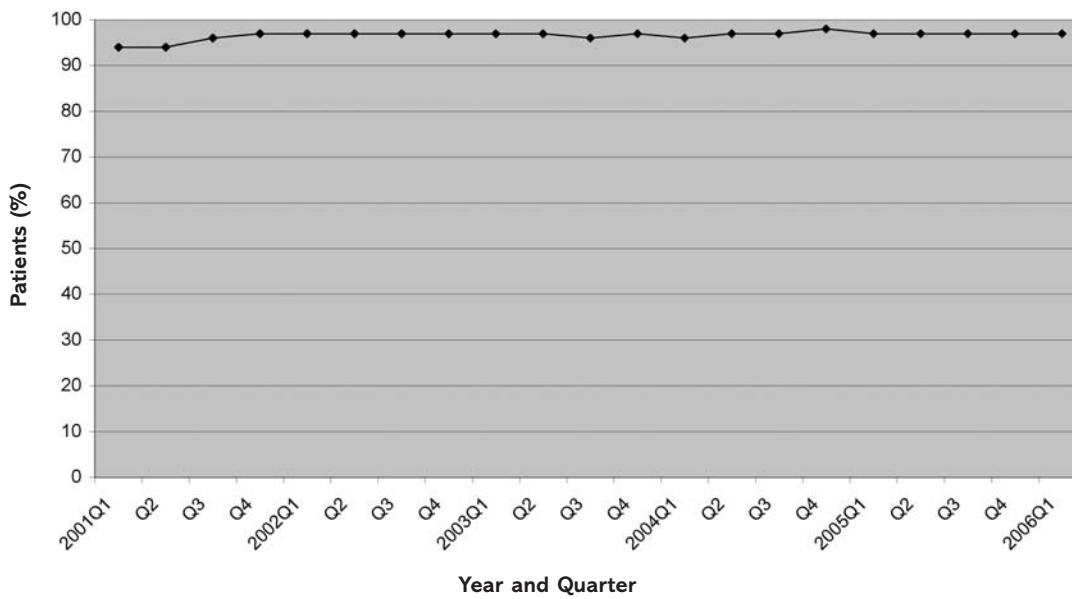
Myocardial Infarction National Audit Project (MINAP)

Fig. 4 Patients receiving primary angioplasty.

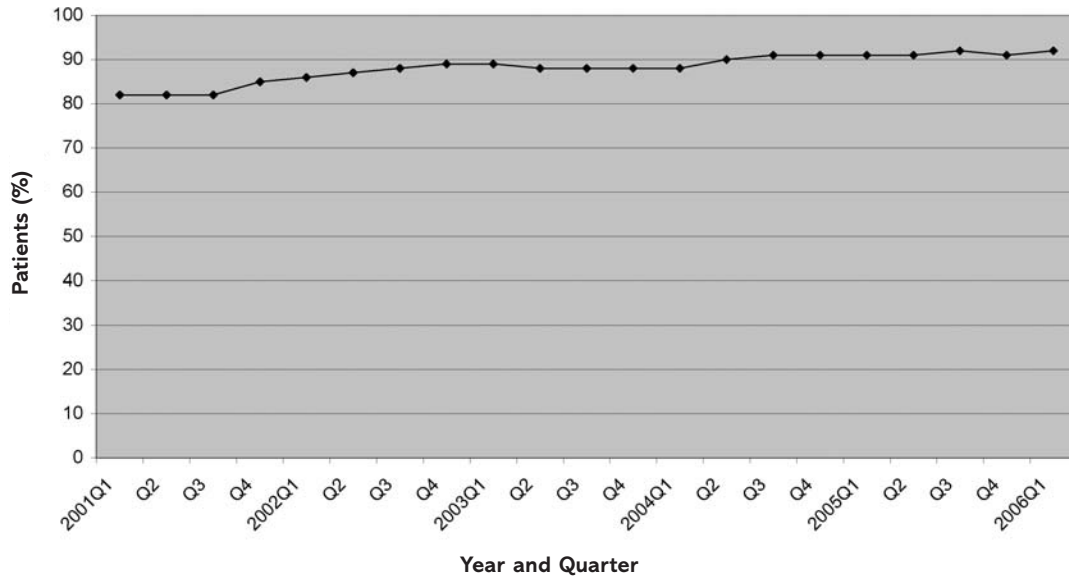


The use of angioplasty as the first treatment for heart attack (primary angioplasty) is increasing rapidly.

Fig. 5 Patients prescribed aspirin on discharge from hospital.

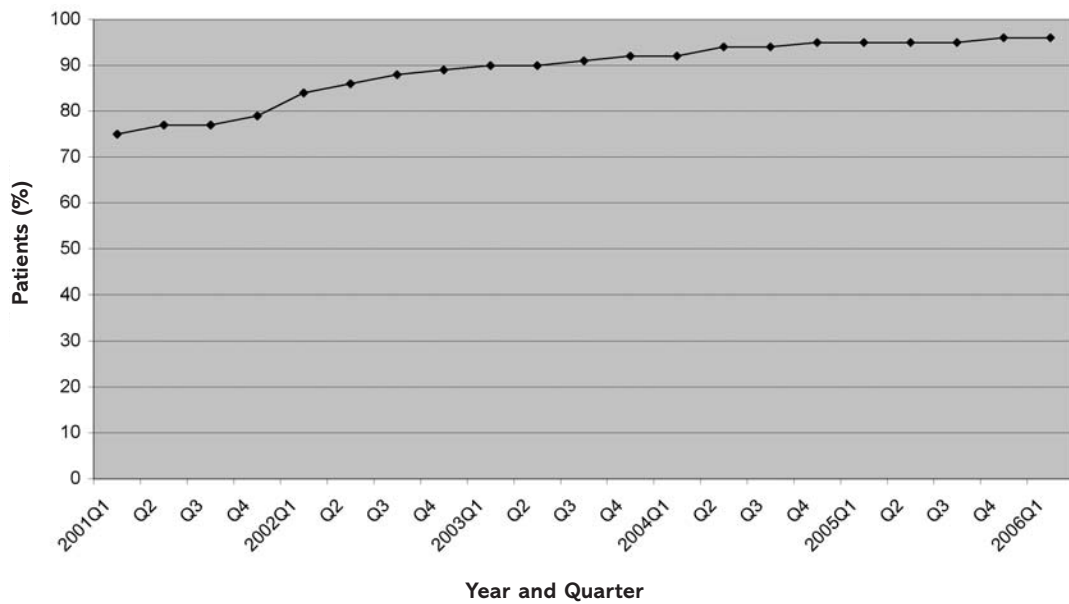


**Fig. 6 Patients prescribed beta-blockers on discharge from hospital.**



The use of beta-blockers following heart attack improves long-term outlook. Increasing use for eligible patients throughout England and Wales is a major contribution to the treatment of coronary heart disease.

**Fig. 7 Patients prescribed statins on discharge from hospital.**



## part 3

# Conclusions

- The Myocardial Infarction National Audit Project (MINAP) has collected data for six years (2000–2006), and since it started has accumulated data on almost 450,000 patients. It now receives data from all hospitals that admit heart attack patients in England and Wales.
- While there is variation between hospitals, most patients with heart attack are treated sooner after arriving at hospital and after calling for professional help than in 2004/5.
- The use of secondary prevention medication has continued to exceed the national targets.
- The early treatment of heart attack patients is changing with the introduction of pre-hospital thrombolysis by ambulance services and the provision of primary angioplasty in an increasing number of hospitals.
- Improvement in thrombolytic treatment within 60 minutes of calling for professional help is the result of the increased use of pre-hospital thrombolysis by paramedics.
- Hospitals and ambulance services have used MINAP data to improve systems for response to and recognition of heart attack patients and to provide treatment rapidly. Examples of how services have been improved are available in reports published by the Department of Health and the Healthcare Commission, see Appendix 2.
- Improved and faster access to thrombolytic treatment and primary angioplasty should result in increased survival from heart attacks.
- As more hospitals introduce primary angioplasty, the number of hospitals that have sufficient numbers of patients receiving thrombolytic treatment will fall, and the MINAP Public report will take this into consideration next year.

### Key messages to patients

The longest delay in the treatment of heart attack patients is not usually the arrival of the ambulance or giving thrombolytic treatment, but the delay in calling for professional help. The earlier the treatment can be given the better the outcomes for patients.

- Patients should ring 999 for help immediately if the symptoms of a heart attack last more than 15 minutes and are not relieved by resting or using nitrate tablets or spray, if prescribed.
- Ambulance crews are trained to recognise the symptoms of a heart attack and thus patients who call 999 can be treated more quickly than those who make their own way to hospital.
- Most hospitals and ambulance services will have a Patient Advice and Liaison Service that should be able to give advice on your hospital's and ambulance service's performance.

part 4

## Appendices

### **APPENDIX 1: What happens when you have a heart attack**

A heart attack occurs when a clot (thrombus) suddenly develops within a heart artery as a result of spontaneous damage to the inner lining of the artery (plaque rupture). The heart muscle supplied by the blocked artery will suffer permanent damage if the blood supply is not restored quickly. Therefore the sooner treatment is given, the less damage is caused to the heart muscle resulting in the likelihood of fewer complications.

#### *Thrombolytic treatment*

Heart attack is usually treated using clot-dissolving (thrombolytic) drugs. Thrombolytic treatment is effective up to about 12 hours after the onset of symptoms but is most effective when given very early after the symptoms started.

Thrombolytic drugs are not given until a heart attack is confirmed by an electrocardiogram (ECG). As these drugs are designed to dissolve clots, they may be unsuitable for some patients who are at risk of internal bleeding. Patients at significant risk of bleeding may not be given this treatment where the risk of bleeding is greater than any potential benefit.

#### *Primary angioplasty*

Another technique to re-open the blocked coronary artery responsible for the heart attack involves the passage of a fine catheter (tube) from an artery in the leg or arm into the blocked heart artery. A small inflatable balloon is then passed through the catheter and across the blockage, allowing the artery to be re-opened by temporary inflation of the balloon. This is called angioplasty and when given as the initial treatment for heart attack it is referred to as 'primary angioplasty'. Increasingly, angioplasty balloons are used to deliver small metal tubes (stents) to the site of the blockage, in order to keep the artery open.

For more information see the British Heart Foundation publication *Coronary angioplasty and coronary bypass surgery*, available on their website ([www.bhf.org.uk/publications/description.asp?secondlevel=423&artID=1032](http://www.bhf.org.uk/publications/description.asp?secondlevel=423&artID=1032)).

### **APPENDIX 2: National Service Framework for Coronary Heart Disease**

The NSF for coronary heart disease is a 10-year programme published by the Department of Health in March 2000. It sets standards of care for patients with coronary heart disease (CHD) in England ([www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/CoronaryHeartDisease/fs/en](http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/CoronaryHeartDisease/fs/en)).

The NSF helps the NHS to plan and deliver the service changes needed to raise standards of care, to improve clinical outcomes and to monitor progress. In addition it promotes equal care for all people with coronary heart disease. In order to make this happen, the NSF has set 12 standards covering areas from prevention to rehabilitation.

Wales has its own equivalent of the CHD NSF, *Tackling CHD in Wales: implementing through evidence* ([www.wales.nhs.uk/publications/coronary-heart-disease-e.pdf](http://www.wales.nhs.uk/publications/coronary-heart-disease-e.pdf)).

## Myocardial Infarction National Audit Project (MINAP)

Welsh hospitals report against 30 minute 'door to needle' times as used in MINAP. The performance target for Wales for 'call to needle' for 2005/6 is that 60% of patients should receive thrombolytic treatment within 60 minutes of calling for help.

For more information on what these targets mean for you, see the British Heart Foundation publication: *Good Service? The National Service Framework for coronary heart disease. A guide for members of heart support groups, consumer groups and individuals interested in how services for coronary heart disease in England are developed* ([www.bhf.org.uk/publications/uploaded/bhf\\_good\\_service.pdf](http://www.bhf.org.uk/publications/uploaded/bhf_good_service.pdf)).

A report on progress towards achievement of the NSF targets, *Leading the way – progress report 2005*, was published by the Department of Health in March 2005 ([www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT\\_ID=4105281&chk=Hmsi0z](http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT_ID=4105281&chk=Hmsi0z)).

The Healthcare Commission has published the National Service Framework report: *Getting to the heart of it. Coronary Heart Disease in England: a review of progress towards the national standards* ([www.healthcarecommission.org.uk/serviceproviderinformation/reviewsandinspections/national-serviceframeworks/nsfdetail.cfm?cit\\_id=450](http://www.healthcarecommission.org.uk/serviceproviderinformation/reviewsandinspections/national-serviceframeworks/nsfdetail.cfm?cit_id=450)).

## APPENDIX 3: Drugs to reduce the risk of another heart attack

Several drugs are available which have been shown in large clinical trials to reduce the risk of another heart attack. These are called secondary prevention drugs and include:

- Aspirin, which helps to prevent the blood from clotting
- Beta-blockers, which slow the heart rate and lower blood pressure
- Statins, which reduce cholesterol levels in the blood

Someone who has had a heart attack is normally given these drugs unless they are unable to take them because of side effects.

## APPENDIX 4: Glossary

**Angina** – Symptoms of chest pain that occur when narrowing of the coronary arteries prevent enough oxygen containing blood reaching the heart muscle when its demands are high, such as during exercise.

**Anti-platelet drugs** – Drugs including aspirin that prevent blood clotting. Anti-platelet drugs act by reducing the 'stickiness' of the small blood cells that can clump together to form a clot.

**Aspirin** – An anti-platelet drug used to help prevent blood clots forming.

**Beta-blockers** – Beta-blockers are drugs that block the actions of the hormone adrenaline that makes the heart beat faster and more vigorously. They are used to help prevent attacks of angina, to lower blood pressure, to help control abnormal heart rhythms and to reduce the risk of further heart attack in people who have already had one. They may also be used in small doses in heart failure.

**Cholesterol** – A fatty substance mainly made by the liver. It plays a vital role in the functioning of every cell wall throughout the body. The body also uses cholesterol to make other vital chemicals. However, too much cholesterol in the blood increases the risk of coronary heart disease and heart attacks.

**Clot dissolving drugs** – Drugs used to dissolve blood clots after a heart attack, see ‘thrombolytic drugs’.

**Electrocardiogram** – Also known as ‘ECG’. A test to record the rhythm and electrical activity of the heart. The ECG will show if a person has had a heart attack, either recently or some time ago.

**Heart attack** – A heart attack occurs when a clot (thrombus) suddenly develops within a heart artery. The heart muscle supplied by the blocked artery suffers permanent damage if the blood supply is not restored quickly. The damage to heart muscle carries a risk of sudden death, and heart failure in people who survive.

**Heart failure** – Heart failure occurs when a damaged heart becomes less efficient at pumping blood round the body. This may result from damage to the heart muscle caused by a heart attack.

**Myocardial infarction** – A heart attack.

**Pre-hospital thrombolysis** – Thrombolytic treatment is given to the patient in the ambulance by paramedics when they have diagnosed a heart attack. This treatment may be used in rural areas where it takes a long time to get to hospital.

**Primary angioplasty** - An emergency treatment to reopen a blocked artery using a fine catheter with a small inflatable balloon at its tip. This is a relatively new treatment for heart attack, which is not yet widely available.

**Secondary prevention** – Drugs that reduce the risk of another heart attack.

**Statins** – Drugs used to reduce cholesterol levels in the blood.

**Thrombolytic drugs/Treatment/Thrombolysis** – Treatment which dissolves a clot blocking an artery and restores blood flow to the heart muscle.

**Thrombus** – A blood clot.

## **APPENDIX 5: Contacts for information on heart conditions**

Ambulance Service Association [www.asa.uk.net](http://www.asa.uk.net)

American Heart Association [www.americanheart.org](http://www.americanheart.org)

Blood Pressure Association [www.bpassoc.org.uk](http://www.bpassoc.org.uk)

British Cardiac Patients Association [www.bcpa.co.uk](http://www.bcpa.co.uk)

British Cardiovascular Society [www.bcs.com](http://www.bcs.com)

British Heart Foundation [www.bhf.org.uk](http://www.bhf.org.uk)

NB: The British Heart Foundation runs a heart information line that provides information about heart conditions and their management. It cannot respond to questions about services in individual hospitals. Tel: 08450 70 80 70

Diabetes UK [www.diabetes.org.uk](http://www.diabetes.org.uk)

Department of Health website [www.dh.gov.uk/Home/fs/en](http://www.dh.gov.uk/Home/fs/en)

HEART UK [www.familyheart.org](http://www.familyheart.org)

National Library for Health [www.library.nhs.uk/cardiovascular](http://www.library.nhs.uk/cardiovascular)

NHS Direct [www.nhsdirect.nhs.uk](http://www.nhsdirect.nhs.uk) Tel: 0845 4647

Resuscitation Council [www.resus.org.uk](http://www.resus.org.uk)

