

# Mending hearts and brains

*Clinical case for change: Report by Professor Roger Boyle,  
National Director for Heart Disease and Stroke*



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# Mending hearts and brains

**Rapid specialist care concentrated in centres of excellence can save lives and reduce disability for heart attack and stroke victims, explains Professor Roger Boyle, National Clinical Director for Heart Disease and Stroke.**

Over my lifetime, treatment for heart disease has improved beyond recognition.

I qualified as a doctor in 1972, when the only treatments available to patients who had had a heart attack were heroin to ease the pain and a defibrillator in case of cardiac arrest. Coronary care units were only just emerging as the best model of care for such patients. Since then amazing changes have been researched and implemented in the NHS that have revolutionised the level of care offered to the 100,000 people who still suffer an attack each year.

For the last six years, I have had the privilege of leading a programme that has accelerated that change, reducing waiting times, bringing in new treatments, training more specialists, and ensuring patients have more and better choices available.

I am now working to repeat those strides forward for stroke, the brain's equivalent of heart attack. There are a similar number of strokes to heart attacks, but this equally devastating condition has been slower to catch the medical and public imagination in this country. With our ageing population, it represents a growing challenge for the future.

Cardiovascular disease – heart disease, stroke and related conditions – accounts for two-thirds of all premature deaths in England as well as major ill health in terms of physical and communication disability. The overwhelming majority of this is preventable through healthier lifestyles and preventative medication such as statins for high cholesterol and drugs to control high blood pressure. Yet as we – like all developed countries – struggle to defuse the obesity 'time bomb', we cannot afford to be complacent about the threat these diseases pose in the future.

Fortunately we have every reason to be optimistic about the prospects for treating heart attack and stroke ever more effectively. Our highly committed NHS and social care professionals – who have driven fantastic improvements already – share an ambition to deliver world class services and cutting-edge care. Our internationally renowned leading centres are developing new expertise and introducing new treatments at an impressive pace. This future is not whimsical or wishful crystal ball gazing, but developments that are just around the corner, treatments that may become the norm before my small daughter reaches adulthood.

### **Better care demands a changing organisation of services**

- Service changes for heart disease and stroke will save lives and reduce disability, and make services safer for patients.
- Angioplasty as a first treatment for heart attacks (balloon surgery) and thrombolysis (clot-busting treatment) for stroke need to be delivered by personnel with an appropriate level of experience and training – in settings with sophisticated diagnostic and monitoring facilities on a 24 hours a day, seven days a week immediate access basis. Both treatments require a wide range of highly skilled professionals. This means concentrating services in centres of excellence rather than spreading staff, skills and equipment over too many sites.
- National coverage of primary angioplasty services would prevent around 500 deaths, around 1,000 further heart attacks and around 250 strokes.
- If stroke were treated as an emergency – including delivery of thrombolysis through specialist centres at rates currently delivered in other countries – then over 1,000 stroke victims a year would regain independence rather than die or be left dependent on others because of significant disability.
- For both heart disease and stroke, paramedics are playing a greater role in assessing where patients should be treated – taking some heart patients direct to a specialist heart attack treatment centre and in some areas pre-alerting stroke units about suspected stroke patients to facilitate direct admission.
- People tell us that they want more services in the community, closer to home. Lengths of stay for stroke are falling and early supported discharge schemes, which have been shown to reduce long-term disability, are allowing stroke survivors to go home sooner. Minimally invasive techniques for heart disease also result in shorter hospital stays.
- Improved support for heart attack and stroke survivors in the community will help meet patients' expectations of a more convenient service suits their needs and preferences.
- Services need to be sustainable – the evidence shows that there are improvements in heart and stroke services that will lead to more efficient use of resources as well as saving lives and reducing disability. There is variation across the country in the efficiency and productivity of services and significant benefits to patients will be delivered as trusts learn from the best.

## The common cause of heart attacks and strokes

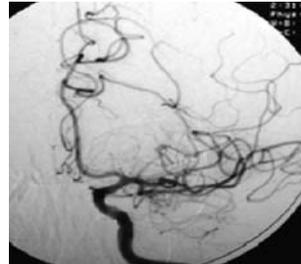
Most heart attacks and strokes are caused by a clot in an artery

**Coronary artery**



100,000 heart attacks each year

**Cerebral artery**



110,000 strokes each year

## Treatment on the doorstep

Pensioner Benny Parsons was enjoying a game of golf when the first chest pains hit him.

He struggled home and then collapsed in front of his wife Betty. Frantically she called 999 and within minutes paramedics from the East Anglian Ambulance NHS Trust arrived.

They immediately hooked Benny up to an ECG monitor and confirmed he was suffering a major heart attack. The information was relayed to a doctor at East Anglian Ambulance headquarters and he immediately gave permission to give Benny thrombolysis treatment.

The injection was given 35 minutes after the heart attack had started and proved a life-saving decision.

Previously Benny would have had to endure a 45-minute journey to West Suffolk Hospital from the village he lives in just to get assessed by an Accident and Emergency doctor.

Benny said: “I was falling in and out of consciousness and I didn’t think I was going to make it. If it hadn’t been for the clot-buster I wouldn’t be here today.”

He spent only a week in hospital and has now made a full recovery. Benny added: “Time is vital when you suffer a heart attack and it is not good waiting to get the patient to hospital to give him this drug. I think what these paramedics are doing is fantastic.”

## The right treatment in the right place

When Kevin Jolly’s colleague called 999 for him because he had persistent chest pain, the London Ambulance crew attending took him to the London Chest Hospital for primary angioplasty, bypassing four Accident and Emergency departments on the way.

Kevin said: “I think with heart attacks it is so critical they get you straight away to the right place. You don’t know what is happening to you.”

London Ambulance Service senior paramedic Mark Whitbread explained: “Using specialist equipment on the ambulance we discovered that Kevin’s heart attack would be best treated at the London Chest Hospital.

“We managed to get from Romford to Bethnal Green in under half an hour, where Kevin was received by the primary angioplasty team. Ten minutes after arriving he was given his treatment and within an hour he was recuperating on the ward.

“If we had taken him to a normal A&E department he would have had to wait for the appropriate treatment, and all the while irreparable damage would be done to his heart.”

Kevin was back at home in three days and after a month was taking part in circuit training. One year on he is fit and well and enjoying life.

### **Life-changing treatment**

56-year-old grandmother Mary Galton was out shopping when her vision suddenly started to go. At first she thought it was a severe migraine and asked shop assistants for help.

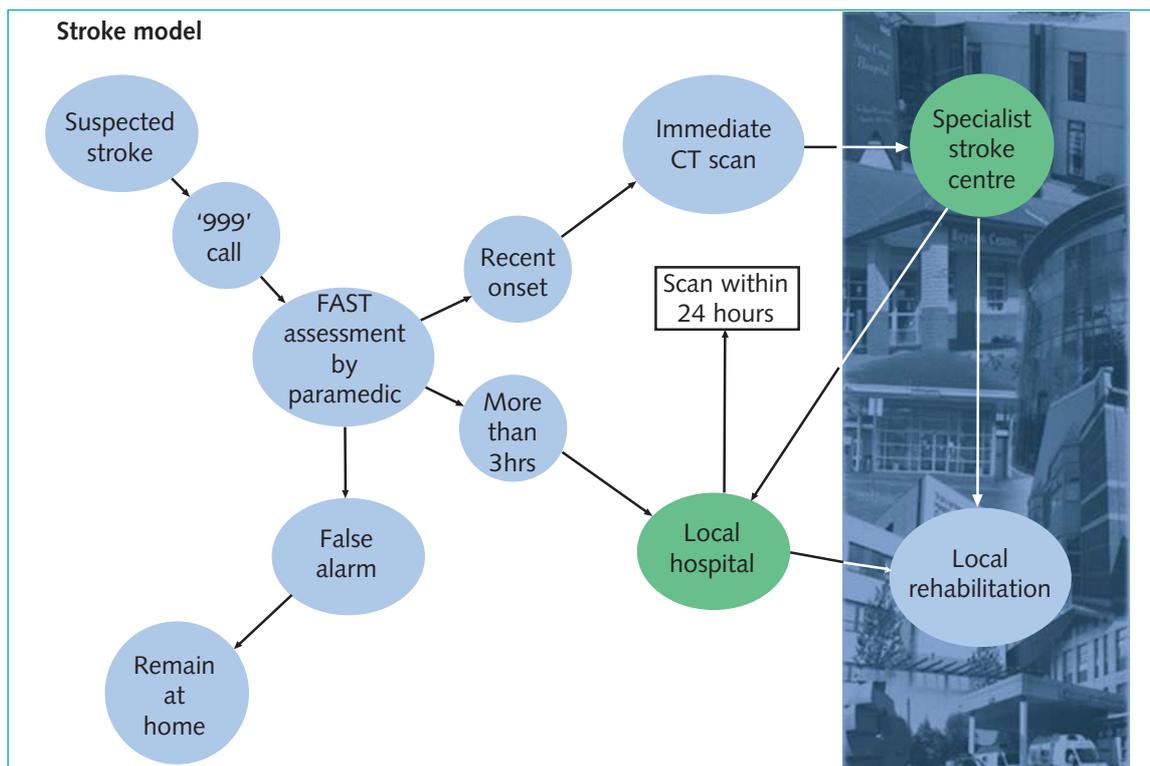
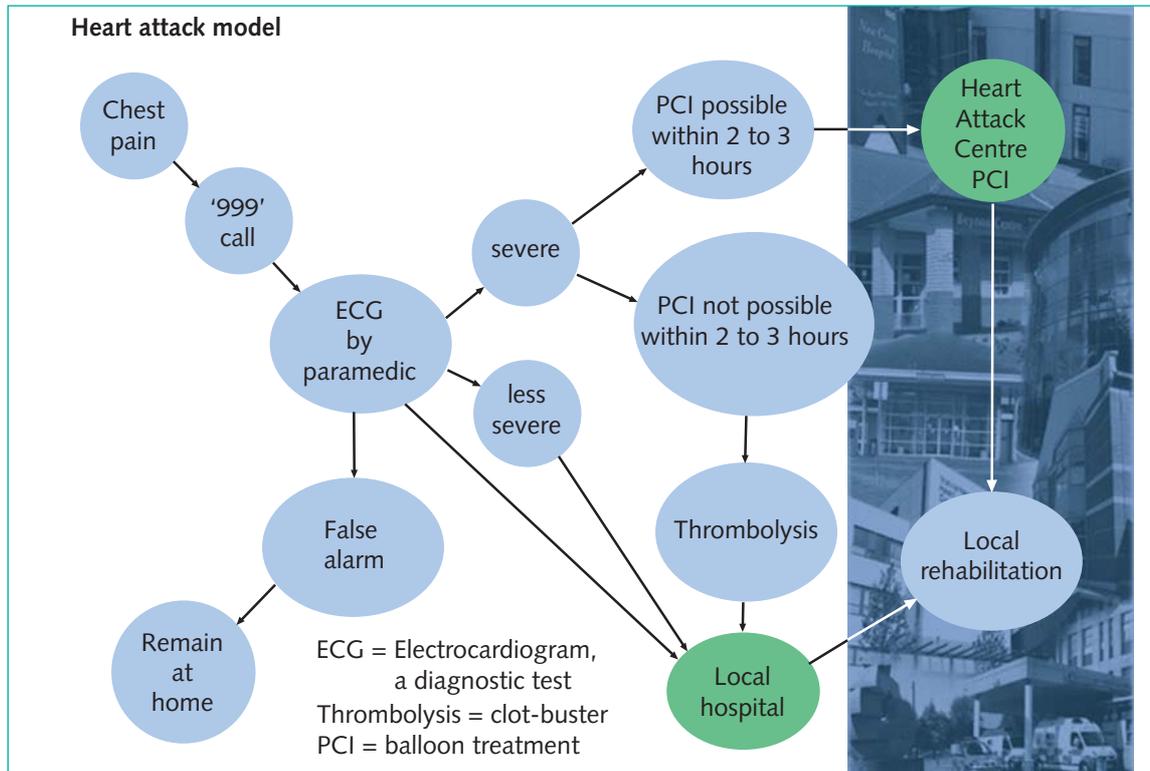
The next thing she knew, she was being rushed to hospital. Paramedics used FAST – the Facial Arm Speech Test – and discovered that it was highly likely Mary had suffered a stroke. So she was taken straight to the Royal Bournemouth Hospital where she had an immediate CT head scan and was treated with a ‘clot-busting’ (or thrombolytic) drug by Dr Toby Black.

Within hours, Mary was making a good recovery from a serious stroke that, without this treatment, was likely to have left her with a significant disability.

‘I feel so lucky,’ Mary said, ‘I have come out of it with no visible defects. I feel perfectly fit.’

## 'Hub and Spoke' care

Local Accident and Emergency units are not the best places to treat heart attack and stroke victims. In future paramedics will play a key role in deciding which hospitals they go to.



## The vision

Paramedics deciding which hospital can give patients the best specialist treatment represents the future for heart and stroke treatment in England.

Clinicians agree that this is what is best for their patients. We're talking about adding minutes to journey times to get immediate specialist care instead of catch-all general care.

And all the medical studies agree, the sooner you start *specialist treatment in the right setting* for heart and stroke victims the better. The reorganisation of services is for the benefit of patients. For both heart attack and stroke, treatment is a race against the clock. Going via a local A&E adds a delay that can mean it is too late for the patient to benefit from the newest drugs and procedures.

What George Alberti, the National Director of Urgent and Emergency Care, and I are saying is that there are more options out there than Accident and Emergency units.

When we talk about giving life-saving drugs on the doorstep or bypassing Accident and Emergency departments in favour of direct access to specialists, it is not about saving money – although better treatment can save money in the long run.

I'm giving this advice because it is going to save lives and reduce disability. Bypassing local hospitals to deliver balloon surgery for heart attack victims could save an estimated 500 lives, and prevent around 1,000 further heart attacks and around 250 strokes. Rapid clot-busting treatment for strokes in specialist centres could result in over 1,000 more stroke victims a year regaining independence – avoiding death and disability.

How services are organised will vary across the country – geography will have a strong influence. What you do in Whitechapel, where there are several hospitals, isn't what you are going to do in Whitehaven. That's where local decision making comes in.

## Heart disease – the new model

New treatments for narrowed and blocked arteries are becoming available so that patients who would previously have required major surgery can now be treated by a keyhole technique known as angioplasty

In some areas this is now offered as a first treatment for heart attack, known as primary angioplasty.

This emerging technique is not an approach that is possible in every hospital in the country, but a strong evidence base is building suggesting that this treatment provides better outcomes. It may take a little longer to obtain than the clot-busting treatment – up to three hours rather than being delivered immediately by the paramedic or local hospital – but the outcomes are still improved.

Research shows that treatment of the severest forms of heart attack in this way will not only reduce the number of deaths but also the risk of stroke and the risk of needing further major treatment in the months to come.

In an isolated area, like Whitehaven, running a 24-hour service would not be practical.

The Department of Health is currently conducting 11 pilots around the country looking at different models of heart attack care and measuring patients' experiences of each.

### Balloon surgery

**Name:** Primary angioplasty

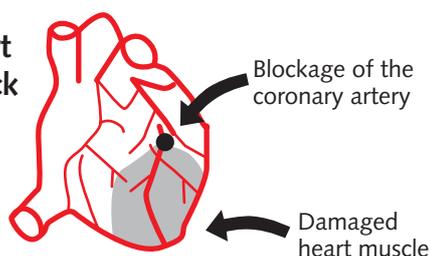
**Description:** A tiny tube is passed through the blood vessels in the arm or groin to reach the blockage or narrowing in the heart. This enables a small balloon to be put in place and inflated to re-open the artery. Then a metal stent is left behind to support the walls of the artery.

**Centres:** 11 pilots around country and many others at the planning stage.

**Benefits:** Around 500 lives saved and 1,000 heart attacks and 250 strokes prevented. 3–4 day recovery compared with 7–10 for heart surgery. Less chance of need for future surgery.

**Professor Roger Boyle:** "There's no doubt it gives better outcomes. People recover quicker and in elderly patients it decreases the likelihood of stroke and complications."

### Heart attack



1) Blockage of artery restricts blood to heart and begins to damage muscle tissue.



2) A balloon is inserted using keyhole surgery. This is then used to open up the blocked artery. A miniature metal stent remains to support the artery wall and stop further blockages.

## Our ambition for stroke

With strokes you have even less time to react. You need to go from paramedic, to specialist, to scan, to clot-busting drug within three hours of the stroke hitting. So the speed with which you get a patient to a specialist is even more important.

Some strokes are caused by bleeding rather than a clot and giving a clot-busting drug to these patients is extremely dangerous. Patients need a scan to show whether the stroke was caused by a clot or a bleed.

Around 10 per cent of stroke patients are receiving clot-busting drugs in the leading centres around the world.

However, getting stroke victims to a specialist will also require the creation of specialist centres and patients sometimes bypassing existing emergency facilities.

We can't equip every Accident and Emergency department in this country with a 24-hour stroke consultant service and open access to a CT scanner. There simply aren't enough people with the right skills to do this safely.

We have to look at a 'hub and spoke' model, similar to that being tested for heart attacks. Paramedics will assess whether the patient is within the three-hour treatment window for clot-busting drugs and then take them to a specialist stroke centre or a local hospital accordingly.

### Clot-busting drugs

Name: Thrombolysis

**Description:** A family of drugs which work by thinning blood. Given early enough they can dissolve the clot that is restricting blood to the brain.

**Centres:** Delivered by about 30 specialist stroke centres around the country.

**Benefits:** Over 1,000 stroke victims a year would regain independence rather than die or be dependent in the long term if 10 per cent of eligible patients were thrombolysed. This treatment has also been shown to be very cost effective.

**Professor Roger Boyle:** "To give clot-busting treatment to the right stroke patient can produce miraculous results. Give it to the wrong patient and the result may well be fatal."

## The changing face of cardiovascular disease

In the 1970s and 1980s the UK was regarded as the ‘heart disease capital of the world’.

Not only were there high death rates from cardiovascular disease (CVD – heart disease, stroke and related conditions), there was also poor access to care and low uptake of effective treatments. The UK had higher smoking rates and higher cholesterol and blood pressure than the rest of Europe and we were placed half way between Europe and America in the obesity league table.

Although by 1996 there were dedicated coronary care units in almost every hospital, they lacked resources and weren’t organised enough to deliver round-the-clock rapid treatment.

There has been a dramatic change following publication of the *NHS Plan* and the *National Service Framework for Coronary Heart Disease* in 2000.

Since then **heart** services in the community and hospitals have seen major improvements in access to treatment, waiting times, capital infrastructure and quality of care.

The management of heart attack patients has been transformed. Sixty-five per cent now receive clot-busting drugs within one hour of calling 999.

The result has been a steady fall in the number of people dying from heart attacks following admission to hospital.

England has a target of reducing CVD deaths by 40 per cent by 2010. Since 1996, deaths from CVD have been dropping steadily at about 4 per cent a year. A large part of that fall is as a result of a decline in smoking in the 1970s and 1980s. The rest of the change is down to better treatment and changes in the way we deliver care in England.

### Heart attack facts

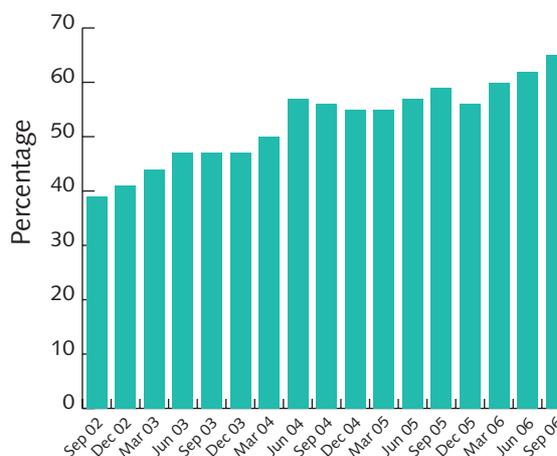
**Rate:** 100,000 victims a year.

**1948 treatment:** Two weeks’ bed rest, no return to normal activity for six months.

**2006 treatment:** Immediate injection of clot-busting drugs by paramedic or immediate transportation to a specialist primary angioplasty centre to insert balloon to open artery; followed by immediate rehabilitation at home or in the community.

**Professor Roger Boyle:** “Time is muscle – every minute you delay treatment more muscle in the heart dies.”

Steady improvement in the percentage of heart attack patients treated within one hour of a call for help



Part of that story is dramatic reductions in waiting times. Five per cent of patients used to die while waiting up to two years for heart operations. Now nobody has to wait more than three months for heart surgery.

I have colleagues in the US who would give their eye teeth to carry out this type of reform programme.

None of this would have been possible without the tremendous hard work and enthusiasm of all the professionals involved in this programme. The cardiac networks, which have grown in strength and experience over the past couple of years, have delivered the management and clinical engagement we need to make a reality of the *National Service Framework's* ambitions.

The fall in mortality rates from heart disease means that England is now approaching the best CVD rates in the world, but we're not quite there.

To keep up with England's ageing population – by 2025 the number of people over 85 will have grown by two-thirds – we have to redouble our efforts.

Cardiovascular disease across the world is killing more people than AIDS, TB and malaria combined and, in England, more than all the cancers put together.

The real challenge of **stroke** is that it is the forgotten disease because it is assumed you will die with it in old age. Fatalism has long blighted stroke services in England.

Where we are now with stroke care is where we were in the 1990s with heart conditions. As a result of the *National Service Framework for Older People*, specialist stroke services are now available in every hospital in England, but most are not organised to deliver round-the-clock rapid treatment. Moreover, the support that people need when they leave hospital is not always there. There are good services out there, but I couldn't pretend everybody has really got it right yet.

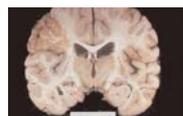
### Stroke facts

**Rate:** Approximately 110,000 strokes and 20,000 transient ischaemic attacks.

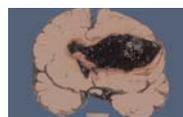
**1948 treatment:** Ignorance meant victims were made comfortable and left to die.

**2006 treatment:** In some areas paramedics can immediately identify victims and take them to a specialist stroke centre for a CT scan to reveal type of stroke. If it is caused by a blood clot, thrombolytic drugs can reduce damage dramatically.

**Professor Roger Boyle:** "Time is brain – every minute you delay treatment more cells in the brain die."



Brain damage due to blocked artery



Brain damage due to haemorrhage

We spend more on stroke care than any other country in Europe but get worse outcomes. Many people are not getting the treatments they need, we have only around 80 dedicated stroke consultants compared with 700 cardiologists and we don't see people quickly enough.

This lack of early treatment is partly due to ignorance. Few people know the signs associated with stroke and because many people don't realise what can be done for the victim it is not treated as an emergency.

The warning signs are there to be seen but we need to develop greater public awareness. The Facial Arm Speech Test – FAST – is an easy way of remembering to call 999 fast if a person has facial weakness, arm weakness and/or speech problems.

Proper immediate treatment can dramatically improve a stroke victim's chances of recovery. But this includes a CT scan, to exclude a bleed, and clot-busting drugs where appropriate.

We've proved what redesigning services and treatment can do for heart disease. Now is the moment to capitalise on the upsurge of interest in stroke care amongst NHS professionals to do the same for stroke. I am currently working with a range of experts to draw up a new national strategy for stroke care. This is likely to recommend exploring models for 'hub and spoke' stroke treatment with round-the-clock, seven days a week access to a scanner and clot-busting drugs as well as making recommendations for improvements to the other parts of the patient journey.

We have already made funding available for stroke research networks around the country and other resources include a new commissioners' guide and interactive toolkits.

## Community rehabilitation and home care

Transforming the urgent care available for heart attack and stroke victims will enable them to go home sooner. But we know that what makes a major difference for both stroke and heart attack patients is specialised rehabilitation in the community and care at home.



Under the new models of care, treatment in specialist acute hospitals may only last a few days. After that patients need more services in the community, closer to home. For example, early supported discharge schemes, which have been shown to reduce long-term disability, are allowing stroke survivors to go home sooner. Improved support for heart attack and stroke survivors in the community will help meet patients' expectations of a more convenient service that meets their needs and preferences.

As we go down this route, primary care trusts and GPs are going to have to redesign services for heart and stroke survivors. The risk of further heart attacks and strokes will have to be monitored and careful attention will have to be paid to supporting people to live healthier lifestyles. Fortunately, this is now bread and butter activity for GPs and primary care teams.

## Conclusion

Medicine and healthcare are always changing. And the NHS has always evolved to try to keep pace. If we don't continue to change the way we deliver stroke and heart disease services, we run the risk of repeating what happened before additional investment went into the NHS.

Slow responses led to long waits. Long waits meant treatment was less effective, which led to more complications, longer hospital stays and poor outcomes for patients. Staff morale enters a downward spiral. We lose the ability to change things for the better.

Instead, we need to embrace change and value its power to transform care for heart attack and stroke, reducing disability and saving lives. We now need to enable and encourage change at a local level. We need national momentum to empower the public, clinicians and managers to change things in their own communities.

Most of what has been achieved has been done purely through the hard work of everyone involved to change the way we deliver services. The drive and enthusiasm of NHS staff has been overwhelming.

We are not seeking to dictate the way services are provided but we have to set the bar a lot higher in defining the level of service the public should be able to expect.





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