



Heart and Stroke Improvement

Commissioning for Stroke Prevention in Primary Care - The Role of Atrial Fibrillation



Contents

The Challenge	3
Our Approach	3
Summary of conclusions and actions recommended to cardiac and stroke networks and their constituent primary care trusts (PCTs)	4
Commissioning for Stroke Prevention in Primary Care - The role of Atrial Fibrillation (AF)	6
The Evidence	6
1 Prevalence of AF	6
2 The importance of AF as a cause of stroke	6
3 The benefits of warfarin in AF	6
4 Which patients with AF should receive warfarin?	7
5 AF in the elderly	8
6 The cost efficacy of anti-coagulation in AF	10
7 Is current treatment adequate?	11
8 What can be done to improve AF detection?	12
9 Assessment of risk in patients already known to have AF	12
10 The decision to commence warfarin in primary care	13
11 Resources to support implementation	13
References	14

www.improvement.nhs.uk/heart
www.improvement.nhs.uk/stroke

The Challenge

Stroke management and stroke prevention are major priority areas for the NHS. Atrial fibrillation (AF) is a major cause of stroke, accounting for some 14% of all strokes. Atrial fibrillation increases the risk and severity of stroke. Recognition and optimal treatment of AF is of particular importance as strokes due to AF are eminently preventable.

- **Prevalence rate in primary care is 1.2%, which equates to just over 600,000 patients in England with AF.**
- **12,500 strokes per year are thought to be directly attributable to AF.**
- **The estimated total cost of maintaining one patient on warfarin for one year, including monitoring, is £383.**
- **The cost per stroke due to AF is estimated to be £11,900 in the first year after stroke occurrence.**

Audit data suggests that:

- **Current anti-coagulant management of AF is sub-optimal. NICE estimate that 46% of patients that should be on warfarin are not receiving it.**
- **Improvement in AF management would lead to a very substantial reduction in stroke numbers nationally.**

Our Approach

This document considers the evidence that a review of AF management in primary care is needed to develop more systematic strategies for the identification, diagnosis and optimal treatment of patients with AF to reduce the risk of stroke.

This has been published following a collaborative meeting in November 2008 between NHS Improvement, the Department of Health and representatives from a spectrum of professional and patient organisations including the Atrial Fibrillation Association (AFA), the British Geriatric Society, the British Heart Foundation, Heart Rhythm UK, and the Primary Care Cardiovascular Society, to address the management of AF in primary care.



Summary of conclusions and actions recommended to cardiac and stroke networks and their constituent primary care trusts (PCTs)

The evidence indicates:

- AF is a major cause of stroke, particularly amongst the elderly.
- Warfarin is very effective in reducing stroke risk in AF.
- Warfarin is still effective amongst the elderly population, with no increased risk of bleeding complications in comparison with aspirin.
- Treatment with warfarin is cost effective in terms of strokes prevented.
- There is considerable under-use of anticoagulants amongst patients with an established diagnosis of AF who are at high risk of stroke.
- More appropriate risk stratification and uptake of warfarin in primary care could prevent up to 6,000 strokes nationally each year.
- Stroke patients with AF have longer hospital stays than other stroke patients.

Suggested actions for cardiac and stroke networks and PCTs:

- Encourage pulse taking through opportunistic screening.
- Include pulse taking as part of your NHS Health Check Programme¹.
- Recognise that the national Quality and Outcomes Framework (QOF) does not reflect new evidence on the advantages of warfarin over aspirin in treating high risk patients. Consider addressing this through your local QOF.
- Encourage individual practices to audit anti-coagulant use amongst patients with an established diagnosis of AF to ensure that high risk patients without contra-indications to warfarin are being optimally treated.
- Consider incorporating the GRASP-AF tool² to facilitate audit and aid identification of high risk patients not on warfarin.
- Provide support for individual GPs both in the confirmation of the ECG diagnosis of AF and to support risk assessment.
- Consider use of 'The Auricle' tool³ to link primary and secondary care without the need for formal secondary care referral. ECGs, letters and echo results can all be attached to this local cardiologist e-consultation.
- Consider the use of the AFA toolkit⁴ to support practices to manage patients with AF.

Key National Drivers

- Chapter 8 of the CHD National Service Framework: Arrhythmias and Sudden Cardiac Death⁵
- National Stroke Strategy⁶
 - Quality Marker 2: Managing risk: 'Markers of a quality service: Risk factors, including hypertension, obesity, high cholesterol, atrial fibrillation (irregular heartbeats) and diabetes, are managed according to clinical guidelines, and appropriate action is taken to reduce overall vascular risk'
 - 'Action needed: Commissioners and providers use ASSET to establish baseline and to ensure that there are systems in place locally for the following key prevention measures: warfarin for individuals with atrial fibrillation'
 - 'Measuring success: Greater proportion of individuals who have a history of stroke or cardiovascular disease or who are at a high risk who have had advice and/or are receiving treatment'
- Putting prevention first. Vascular Checks: risk assessment and management. Next Steps Guidance for Primary Care Trusts¹
 - 'Other elements that PCTs may wish to add to the core test could include: taking the pulse in older groups to identify atrial fibrillation, the most common arrhythmia; identifying and managing this effectively reduces the incidence of stroke'
- Darzi Review 'High Quality Care for All'⁷
 - Recommendations: Guarantee patients access to the most clinically and cost effective drugs and treatments.



Commissioning for Stroke Prevention in Primary Care - The role of Atrial Fibrillation

The Evidence

Atrial fibrillation (AF) is the commonest heart rhythm disturbance. It occurs as a result of uncoordinated electrical activity within the heart's upper chambers and results in an irregular heart rhythm. The lack of proper contraction in the upper chambers results in stagnation of blood and clot formation which predisposes to stroke.

1. Prevalence of AF

AF is common. The overall prevalence in primary care is of the order of 1.2%, which equates to just over 600,000 patients with AF in England. These figures are likely to be an underestimate because in many patients the condition is undetected.

The prevalence data shows that AF increases with each decade of age. As a consequence, detection and appropriate management of AF is of particular importance in the elderly. Prevalence rates may continue to rise in the future due to an ageing population and increased survival rates for conditions associated with AF.

2. The importance of AF as a cause of stroke

Each year in England alone there are some 89,000 strokes. 18% of patients presenting with stroke are in AF at presentation, equating to some 16,000 strokes, of which 12,500 are thought to be directly attributable to AF. Based on these estimates, AF is directly responsible for some 14% of all strokes.

The annual risk of stroke is 5-6 times greater in AF patients than in people with normal heart rhythm and is therefore a major risk factor for stroke. However, AF can be easily detected and with appropriate treatment, the risk of strokes substantially reduced.

3. The benefits of warfarin in AF

Warfarin is highly effective in preventing stroke in AF. A recent pooled analysis of studies showed that warfarin reduced risk of stroke by 64% in comparison with placebo⁸. Aspirin, by contrast, is relatively ineffective, reducing the risk of stroke by 22%.

2006 NICE Guidelines on AF⁹ recognised the superiority of warfarin to aspirin in stroke prevention and recommends the use of warfarin in preference to aspirin amongst high risk patients.

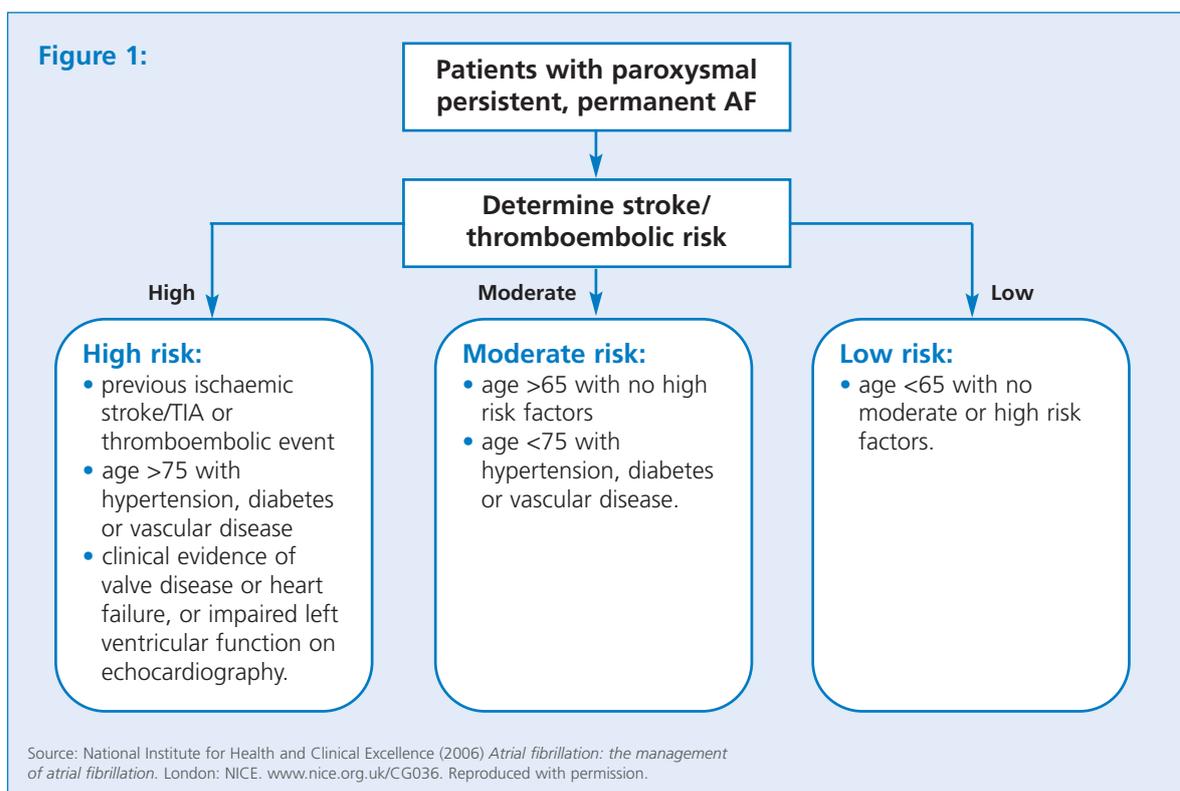
4. Which patients with AF should receive warfarin?

The risk of stroke in patients with AF varies depending on the presence or absence of underlying heart disease. In patients with 'lone AF', without an identifiable underlying cardiac cause, the risks of stroke are modest, and are not great enough to warrant the risks of formal anti-coagulation with warfarin.

A number of factors are associated with an increased risk of stroke. NICE identified independent risk factors as:

- a history of previous stroke or TIA
- being elderly (age over 75)
- structural heart disease
- hypertension
- previous myocardial infarction.

NICE proposed an algorithm incorporating these and other risk factors, to identify stroke risk as low, intermediate or high (Fig 1).



Warfarin is recommended for high risk individuals and aspirin for low risk, with either being appropriate for intermediate risk.

The NICE approach is a composite of clinical history and, where available, investigational findings, such as echocardiography.

An alternative approach, particularly suited to primary care, is to base risk assessment on a simple clinical risk score, the CHADS₂ score¹⁰. A patient score is totalled based on a score of one for each of the following risk factors:

- Congestive heart failure
- Hypertension
- Age > 75
- Diabetes.

Previous Stroke or TIA scores two.

A CHADS₂ score of two or more approximates to the high risk group in the NICE algorithm and can be regarded as an indication for warfarin (Fig 2).

Figure 2: CHADS₂ score	
Congestive heart failure	1
History of hypertension	1
Age >75	1
Diabetes	1
Stroke/TIA	2
Warfarin indicated when CHADS₂ score ≥2	

The NICE algorithm and CHADS₂ score are very similar in their identification of patients at high risk of stroke, when a CHADS₂ score of two or more is taken as an indication for warfarin. The NICE algorithm is more complete and takes account of more information, such as echo findings, when this further information is available. However, particularly in primary care, many doctors favour the CHADS₂ system for its ease of applicability.

5. AF in the elderly

AF is of particular importance as a cause of stroke in the elderly. The prevalence of AF doubles with each advancing decade. As a consequence, the proportion of strokes attributable to AF increases with age.

The percentage of strokes attributable to AF has been estimated as:

- 1.5% for patients in their fifties
- 2.8% for patients in their sixties
- 18.8% for patients in their seventies
- 23.9% for patients in their eighties¹¹.

The importance of recognising and treating AF increases with age.

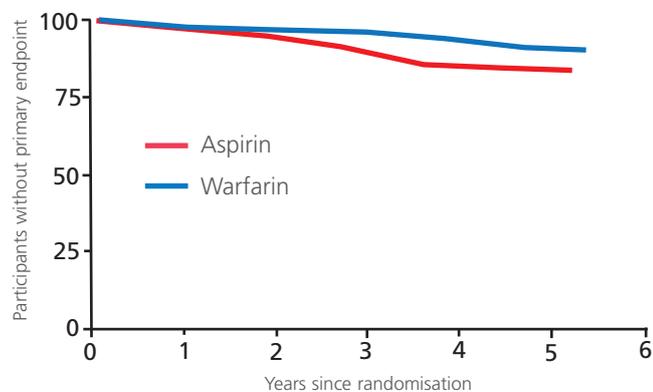
The benefits of warfarin which have been demonstrated in trials amongst younger patients also extend to the elderly. In a recent major trial from Birmingham, the **Birmingham Atrial Fibrillation Treatment of the Aged (BAFTA)** study¹²; patients over 75 with AF were randomised to treatment with warfarin or aspirin. The mean age in the trial was 82.



Figure 3: Strokes prevented in the BAFTA trial

BAFTA

- Primary endpoints
 - Fatal or non-fatal disabling stroke
 - Other intracranial haemorrhage
 - Arterial embolism
- Warfarin 1.8% year
Aspirin 3.8% year
Relative risk 0.48
(95% CI 0.28-0.8)



The benefits of warfarin over aspirin were confirmed. Stroke risk was halved in the warfarin group (fig 3). Most importantly, there was no increased bleeding risk with warfarin in comparison with aspirin.

In conclusion, warfarin protects the elderly against the risk of stroke associated with AF, the group with the highest incidence of stroke and highest prevalence of AF.

6. The cost efficacy of anti-coagulation in AF

The cost efficacy data referenced in this document is based on a recent Department of Health cost benefit analysis¹³ available from the NHS Improvement website at: www.improvement.nhs.uk.

Warfarin tablets are inexpensive. The main costs of anti-coagulation with warfarin relate to the cost of anti-coagulant monitoring.

- NICE estimates that the total cost of maintaining one patient on warfarin for one year, including monitoring, is £383.
- Number of patients needed to treat (NNT) for one year to prevent one stroke is approximately 37 for primary prevention and 12 for secondary prevention. NNT for one year for a mixed population comprising primary and secondary prevention patients is 25.
- Based on these figures and the cost of one year's anti-coagulant therapy, the cost of preventing one stroke is estimated at £10,000 to £14,000 per annum.

The cost benefits of stroke prevention are more difficult to calculate. The management of patients following stroke is very expensive for the NHS and Personal Social Services (PSS).

The Department of Health estimate that the total costs in the first year of care for treating the 12,500 strokes in England that are attributable to AF to be £148 million. This comprises:

- £103 million of direct hospital costs
- £45 million of additional costs for care requirements post-discharge, such as district nursing, community based rehabilitation and pharmaceuticals prescribed in the community¹³.

The National Audit Office reported in 2005 that stroke care costs the NHS about £2.8 billion a year in direct care costs. This is more than the cost of treating coronary heart disease and costs the wider economy some £1.8 billion more in lost productivity and disability. In addition, the annual informal care costs (costs of home nursing and care borne by patient's families) are around £2.4 billion¹⁴.

Based on the above figures, it is estimated that the cost of each stroke due to AF is £11,900 in the first year after stroke.

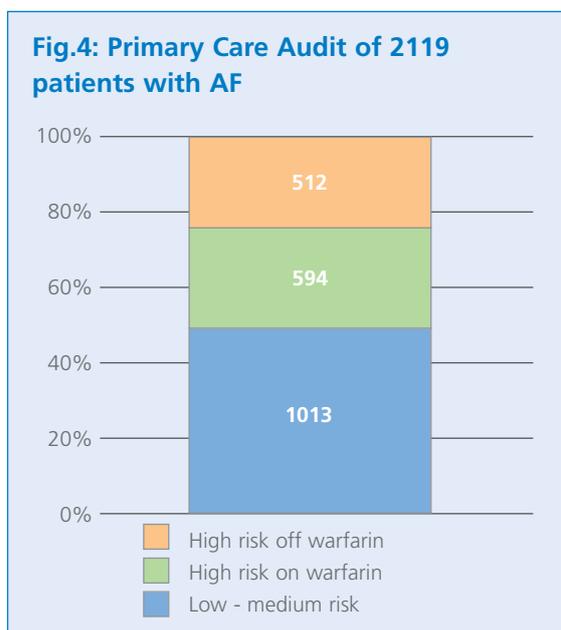
These figures suggest that anti-coagulant treatment of AF is not only cost effective but that it is associated with an overall cost saving when its benefits in stroke prevention are taken into account.

7. Is current treatment adequate?

The 2006 NICE guidance on AF costing report¹⁵ concluded that warfarin was underused: It was estimated that:

- 355,00 patients should have been receiving warfarin
- of these 189,000 were in fact receiving it
- 46% of patients who should have been on the drug were not receiving it.

A recent audit across 151,000 patients in primary care in Leeds (Fig 4) has shown that amongst patients with a CHADS₂ score of two or greater, who would be designated as a high risk group for stroke, some 44% of patients were not receiving warfarin.



Similar audits carried out by cardiac and stroke networks in other areas across England have reached similar conclusions.

These figures confirm that warfarin is currently substantially under used and that this problem persists despite the 2006 NICE guidelines. Applying these figures nationally, if all patients currently identified as having AF and being in a high risk category for stroke were to be appropriately treated with warfarin, this could prevent up to 6,000 strokes and 4,000 deaths each year.

Currently the Quality and Outcomes Framework (QOF) only requires GPs to have an AF register and to confirm the diagnosis of AF, its assessment of treatment giving an equal weighting to warfarin and aspirin. The current evidence base clearly shows a superiority of warfarin over aspirin and therefore QOF cannot be used as a strategy to ensure good management and good anti-coagulant practice in AF patients.

8. What can be done to improve AF detection?

In many patients AF does not cause overt symptoms and only comes to light after a pulse or ECG is recorded incidentally. Although it might be expected that there would be a value in systematic population screening in elderly patients to detect AF, this is not the case. This issue was addressed by the SAFE study from the University of Birmingham¹⁶. This study compared the value of systematic versus opportunistic screening for AF in primary care. Population screening provided no additional benefit and opportunistic screening provided a more cost-effective approach.

There are many ways to provide opportunistic screening to assist in targeting the patients most likely to be affected by AF. One is to flag up that a pulse should be taken (e.g. in patients over 65) on the practice database. Another, recently shown to be effective in the Bedfordshire and Hertfordshire Heart and Stroke Network, is to assess the regularity of the pulse when patients attend a flu vaccination clinic.

While taking a pulse is not one of the routine checks in the NHS Health Check Programme, the addition of pulse checks is suggested as an option which individual PCTs might wish to endorse locally. This endorsement should be encouraged¹.

9. Assessment of risk in patients already known to have AF

A database interrogation tool, GRASP-AF² (Guidance on Risk Assessment and Stroke Prevention in Atrial Fibrillation) has been developed by the West Yorkshire Cardiac and Stroke Network to aid the identification of patients already known to have AF who are at increased risk of stroke and not on warfarin.

The programme is compatible with all major primary care databases. It identifies patients with a READ code for AF and calculates their CHADS₂ score based on existing database information. It then identifies those patients designated as at high risk with a CHADS₂ score of two or more who are not on warfarin for case note review to assess individually whether that patient should be considered for warfarin or whether there are specific contra-indications.

This tool will be freely available for use nationally through the NHS Improvement website from June 2009.

10. The decision to commence warfarin in primary care

Despite the weight of evidence favouring warfarin in management of patients with AF, there is often a reluctance on the part of many GPs to take the decision themselves to commence warfarin. This is understandable, given that adverse effects or complications of warfarin are identifiable and readily attributable to the drug, whereas one cannot identify patients who have benefited from the drug through having a stroke prevented.

Although it is inappropriate to regard this decision as necessitating a secondary care opinion, it is important to recognise that natural reservations do exist in primary care.

Systems should be in place within a PCT to support individual GPs in risk stratification and in the decision to commence warfarin, including confirmation of the original ECG diagnosis and subsequent risk assessment.

Local arrangements for assistance are likely to vary. However, a computerised system, The 'Auricle'³, developed by Suffolk GP, Dr John Havard, provides an assessment of stroke risk and how this might be reduced with warfarin. The programme additionally facilitates secondary care confirmation of the diagnosis and the decision to commence warfarin. Using the programme can avoid the need for formal secondary care referral.

11. Resources to support implementation

The National Heart Improvement and Stroke Improvement Programmes have led pilot work through the cardiac and stroke networks working with primary care trusts (PCTs) and target cohorts of practices across England to progress improvement for patients with AF. Early learning and resources were published in May 2008. Further resources, case studies, tools and signposts to additional materials will be made available from June 2009, through the NHS Improvement website to support the identification, diagnosis and optimal treatment of patients with AF to reduce risk of stroke in primary care.



References

- 1 Putting prevention first. Vascular Checks: risk assessment and management: Next Steps Guidance for Primary Care Trusts. 2008. www.dh.gov.uk
- 2 GRASP-AF toolkit. www.improvement.nhs.uk
- 3 The Auricle tool. www.theauricle.co.uk
- 4 AFA toolkit. www.atrialfibrillation.org.uk
- 5 Chapter 8 CHD National Service Framework: Arrhythmias and Sudden Cardiac Death. www.dh.gov.uk
- 6 The National Stroke Strategy. 2007. www.dh.gov.uk
- 7 Darzi Review: High Quality Care for All. 2008. www.dh.gov.uk
- 8 Hart R, Pearce L, Aguilar M. Meta analysis: antithrombotic therapy to prevent stroke in patients who have non-valvular atrial fibrillation. *Ann Intern Med* 2007; 146: 857-867.
- 9 Atrial fibrillation. National clinical guideline for management in primary and secondary care. Royal College of Physicians. 2006.
- 10 Cage B, Waterman A, Shannon W et al. Validation of clinical classification schemes for predicting stroke. Results from the National registry of Atrial Fibrillation. *JAMA* 2001; 285: 2864-2870.
- 11 Wolf PA et al. Atrial fibrillation as an independent risk factor for stroke: The Framingham Study. *Stroke* 1991; 22: 8.
- 12 Mant J, Hobbs F, Fletcher K et al. Warfarin versus aspirin for stroke prevention in an elderly community population with atrial fibrillation (the Birmingham Atrial Fibrillation Treatment of the Aged Study, BAFTA) a randomised controlled trial. *Lancet* 2007; 370: 493-503.
- 13 Department of Health Atrial Fibrillation cost benefit analysis. Marion Kerr, 2008. www.improvement.nhs.uk
- 14 National Audit Office. 2005. www.nao.org.uk
- 15 Atrial fibrillation. The management of atrial fibrillation costing report. NICE 2006.
- 16 Hobbs FD, Fitzmaurice DA, Mant J et al. A randomised controlled trial and cost-effectiveness study of systematic screening (targeted and total population screening) and routine practice for the detection of atrial fibrillation in people aged 65 and over. The SAFE study. *Health Technology Assessment* 2005; 9: 1-74.

This document has been written in partnership with:

Dr Campbell Cowan, Consultant Cardiologist and National Clinical Lead, Heart Improvement Programme
Sue Hall, National Improvement Lead, Stroke Improvement Programme.

With support from:

Dr Matthew Fay, GP and National Clinical Lead, Stroke Improvement Programme
Richard Longbottom, Commissioning Advisor, NHS Improvement.

For further information, please email: info@improvement.nhs.uk

the 1990s, the number of publications on the topic has increased steadily, and the number of authors has increased from 1 to 100.

The first article in this special issue, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The second article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The third article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The fourth article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The fifth article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The sixth article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The seventh article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The eighth article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The ninth article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.

The tenth article, by van't Hof and van't Hof (2000), is a review of the literature on the effects of the environment on the development of the brain. The authors discuss the effects of prenatal and postnatal environmental factors on the development of the brain, and the effects of these factors on the development of mental health problems.



NHS Improvement

With nearly ten years practical service improvement experience in cancer, diagnostics and heart, NHS Improvement aims to achieve sustainable effective pathways and systems, share improvement resources and learning, increase impact and ensure value for money to improve the efficiency and quality of NHS services.

Working with clinical networks and NHS organisations across England, NHS Improvement helps to transform, deliver and build sustainable improvements across the entire pathway of care in cancer, diagnostics, heart and stroke services.

NHS Improvement

3rd Floor | St John's House | East Street | Leicester | LE1 6NB
Telephone: 0116 222 5184 | Fax: 0116 222 5101

www.improvement.nhs.uk



Delivering tomorrow's
improvement agenda
for the NHS

