

<b>Institution: University of Birmingham</b>
<b>Unit of Assessment: UoA2</b>
<b>Title of case study: Atrial fibrillation: Developing anticoagulation management and therapy for atrial fibrillation through primary care</b>
<p><b>1. Summary of the impact</b></p> <p>Atrial fibrillation (AF) is the commonest heart rhythm abnormality, affecting around 8.8 million people in the European Union, and conferring a substantial risk of stroke and death. Up to 2% of the UK population, some 1.2 million individuals, take oral anticoagulation medication.</p> <p>The University of Birmingham is an internationally-respected centre of excellence for research in AF, and has made crucial impacts in international clinical practice guidelines and improvements in patient care. Primary care research at the University of Birmingham has led to the transfer of oral anticoagulation services from secondary to primary care, and latterly patient self-management, resulting in improved clinical outcomes. In addition, the BAFTA trial has provided evidence to support the use of anticoagulation therapy (warfarin) for people aged over 75 who have atrial fibrillation, resulting in changes in clinical management of these patients.</p>
<p><b>2. Underpinning research</b></p> <p>Around 2% of the UK population take oral anticoagulation (mainly warfarin in the UK) with around 75% of these having atrial fibrillation (AF) as the main indication. AF increases in prevalence with age and presents in 12% of people aged over 75 years; 56% of patients with this arrhythmia are over the age of 75. AF is a major risk factor for stroke, leading to a five-fold increase in risk. As risk of stroke increases with age, stroke prevention in elderly people with atrial fibrillation is a key aspect of management for this group. Anticoagulation therapy with warfarin is highly effective in reducing stroke risk but is associated with monitoring costs and higher risk of haemorrhage compared with other treatments. Work on this area has focused on service re-design, screening and treatment for AF and has included generation of robust primary evidence through RCTs [1-5], economic evaluation [4,6] and systematic review [6].</p> <p><b>Shifting service delivery into primary care</b></p> <p>Until a decade ago, patients in the UK who received oral anticoagulation management were managed in secondary care because of the need for monitoring via a laboratory blood test, the international normalised ratio (INR). UoB UoA2 has undertaken an extensive primary care research programme within the area of service delivery for oral anticoagulation management (Professor David <b>Fitzmaurice</b>, Professor of Primary Care, UoB; Dr Kate <b>Fletcher</b>, Stroke Prevention Programme Manager UoB; Professor Richard <b>Hobbs</b>, Professor of Primary Care, UoB until April 2011; Mr Roger <b>Holder</b>, Medical Statistician, UoB; Dr Susan <b>Jowett</b>, Senior Lecturer in Health Economics, UoB; Professor Gregory <b>Lip</b>, Consultant Cardiologist and Professor of Cardiovascular Medicine, UoB [UoA1]; Professor Jonathan <b>Mant</b>, Professor of Primary Care, UoB until September 2008; Dr Ellen <b>Murray</b>, Senior Lecturer in Primary Care, UoB; Mrs Andrea <b>Roalfe</b>, Senior Lecturer in Primary Care, UoB) led by <b>Fitzmaurice</b> (NHS national R&amp;D Primary Care Career Scientist Award (CSA99/025)) to investigate the integration and evaluation of new technologies &amp; the Birmingham model, comprising computerised decision support dosing software, and point of care INR testing within primary care, to facilitate oral anticoagulation management [1].</p> <p><b>Self-monitoring of oral anticoagulation</b></p> <p>In 1999, UoB's primary care grouping within UoA2 began the SMART (Self-Management of Anticoagulation: a Randomised Trial) study (PI: <b>Fitzmaurice</b>, £285K, MRC, 1999-2002). SMART demonstrated the effectiveness of self-management for approximately 25% of patients receiving warfarin, compared with routine care whether provided through primary or secondary care [2]. These data were the first UK RCT data and the first in the world from primary care and have underpinned subsequent meta-analyses demonstrating the clinical and cost-effectiveness of this model of care (Garcia-Alamino et al Cochrane review 2010). Different models of managing long-term oral anticoagulation therapy have also been assessed [6]. More recently the Patient Self-Management registry (PI: <b>Fitzmaurice</b> £50k, NIHR National School for Primary Care Research 2011-2014) has been developed. As more people undertake self-monitoring or self-management of their oral anticoagulation it is important to ensure that therapeutic control is maintained. This electronic central register provides a valuable tool for studying the safety and effectiveness of this</p>

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method of service delivery. This study is evaluating the feasibility of patients with AF who self-monitor or self-manage their conditions entering their data onto a website to produce a register.

**Screening for AF**

The Screening for Atrial Fibrillation in the Elderly (SAFE) study (**Fitzmaurice** (PI), **Hobbs, Mant**, £485k HTA funded 1999-2003) was a trial of systematic screening (targeted and total population screening) versus routine practice for the detection of AF in 15,000 patients aged over 65 [3,4]. SAFE determined the optimal method of AF diagnosis & ECG interpretation [3] and established the incremental cost-effectiveness (**Jowett**) of different screening options compared with routine clinical practice, determining that opportunistic screening was most cost-effective [4].

**Management of AF**

Meta-analysis has demonstrated that anticoagulants are significantly more effective than aspirin at preventing stroke, but that this benefit is at the cost of higher risk of major bleeding (van Walraven C, Hart RG, Singer DE, Laupacis A, Connolly S, Petersen P et al. Oral anticoagulants vs aspirin in nonvalvular atrial fibrillation: an individual patient meta-analysis. *JAMA* 2002 ; 288(19) : 2441-8.). However, there were concerns as to the applicability of this research to elderly patients with AF, particularly in primary care settings.

In view of these uncertainties, the primary care grouping within UoB's UoA2 conducted the BAFTA (Birmingham Atrial Fibrillation Treatment of the Aged) study (PIs: **Fitzmaurice, Hobbs**, £740k MRC, 1999-2004). This compared the efficacy of warfarin with that of aspirin for the prevention of stroke in a primary care population of 973 patients with AF aged 75 years or over.

The effect on stroke prevention reported in the BAFTA study [5] was similar to that reported in the 2002 meta-analysis. However, the key difference between the two results is that the meta-analysis showed a doubling of risk of major haemorrhage in people on oral anticoagulants compared with those on aspirin, whereas the BAFTA study found no such difference. The BAFTA study provided accurate data on the risk of haemorrhage, which appears to be an important factor in physicians' decisions whether to prescribe warfarin. In addition, the study demonstrated the actual benefits of warfarin compared to aspirin and reported data showing improved efficacy and equivalent safety of warfarin versus aspirin in stroke prevention in the very elderly. The study provided evidence to support the use of anticoagulation therapy (warfarin) for people aged over 75 with AF unless there are contraindications or the patient chooses otherwise [5].

**3. References to the research**

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#### 4. Details of the impact

##### Shifting delivery of anticoagulation services

###### Impact on Clinical Practice and Patient Health

Primary care research within UoB UoA2 has led to the transfer of oral anticoagulation services from secondary to primary care, and latterly patient self-management resulting in improved clinical outcomes for patients throughout the 2008-13 REF impact period. The Birmingham Model for oral anticoagulation management (a primary care based service utilising near patient testing and computerised decision support software) was adopted within the NHS through the inclusion of anticoagulation services as a Nationally Enhanced Service (NES) within the GP contract in 2004 (GSM Contract for Anticoagulation in Primary Care). The research also informed the 2006 recommendations of the NHS National Patient Safety Agency on making anticoagulation therapy safer, recommendations that are still current [1] and that have, together with the contract changes, enabled transfer of oral anticoagulation management from secondary to primary care, leading to significant improvements in both patient experience and clinical outcome.

##### Changes in the management of AF

###### Impact on Public Policy

SAFE demonstrated the effectiveness of opportunistic screening for AF in UK primary care, whilst BAFTA established superior efficacy and safety of warfarin as compared to aspirin in patients aged 75 and over. These studies have influenced the UK policy framework during the 2008-13 REF impact period, both through clinical guidelines and NHS GP contracting. Clinical guidelines published in 2011 by The British Committee for Standards in Haematology 'Guidelines on oral anticoagulation' 2011 [2] recommend computer assisted dosing, referencing the Computerised Decision Support research. The work has also informed the increasing awareness of AF as a serious cause of morbidity and has directly influenced indicators within the NHS Quality and Outcomes Framework throughout the REF period, with indicators to directly influence, through funding arrangements, provision of anti-coagulation drug therapy for AF patients [3, 4].

###### Impact on UK Clinical Practice and Patient Health

There has been impact on patient management throughout the 2008-2013 REF impact period resulting from the policy changes described above, but also from important NICE guidelines that were produced prior to this, but were still current during this time. The 2006 NICE National Atrial Fibrillation Clinical Guideline for Management in Primary and Secondary Care [5] references the SAFE study. This guidance remained current throughout the period 2008-2013.

###### Impact on International Policy and Clinical Practice

As well as influencing UK clinical practice, the work of the Birmingham team has also influenced guidelines in Europe and the USA: These include: the European Society of Cardiology guidelines, produced in 2010 and updated in 2012 [6] - the updated guidelines, referencing the work of the Birmingham group, indicated that "*We therefore recommend that, in patients aged 65 years or over, opportunistic screening for AF by pulse palpation, followed by recording of an ECG to verify diagnosis, should be considered for the early detection of AF*"; the European Stroke Organisation Guidelines for the Management of Ischaemic Stroke and Transient Ischaemic Attack, 2008 [7]; the American College of Chest Physicians guidelines, June 2008 [8].

###### Impact on Education and CPD

Research in this area has led to the establishment of the National Centre for Anticoagulation Training within UoB, which provides accredited training for health care professionals involved in the management of patients receiving anticoagulation treatment [9]. 42 CPD courses were run between January 2008 and June 2013, with 1,234 participants.

Following publication of the research on anticoagulation **Fitzmaurice** and **Murray** have provided two in-depth learning modules for the BMJ available from 2008 (**Fitzmaurice**, Cousins, Clark) and updated (**Fitzmaurice**, **Murray**) during the 2008-13 period [10]. BMJ Learning offers high-quality (peer reviewed, up-to-date, and evidence-based) continuing medical education in an economical and time efficient manner, for general practitioners, hospital doctors and other healthcare professionals. The anticoagulation modules are accredited by a number of associations, including Australian Practice Nurses Association, Austrian Academy of Physicians, The Royal New

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Zealand College of General Practitioners, The Colleges of Medicine of South Africa, Oman Medical Specialty Board, and Kuwait Institute for Medical Specialization. Comments on BMJ Learning suggest the modules are received positively.

**Screening for AF**

This work has informed the increasing awareness of AF as a serious cause of morbidity and there is on-going work within the NHS Health Improvement Service to improve detection of AF with parallel efforts being undertaken to ensure optimum treatment of those patients with appropriate therapy [11]. The SAFE & BAFTA trials have resulted in a debate (2012) amongst the Royal College of Physicians around developing a national screening programme for AF [12].

**5. Sources to corroborate the impact**

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