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The use of anticoagulants in the management of atrial fibrillation among general practices in England

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ABSTRACT

Objectives To investigate the use of oral anticoagulants (AC) and antiplatelet agents (AP) in the management of atrial fibrillation (AF) among patients in primary care in England.

Design Epidemiological study.

Setting 1857 general practices in England representing a practice population of 13.1 million registered patients.

Patients 231 833 patients with a history of AF.

Main outcome measures The primary outcome was AC and AP use by $CHADS_2$ score and age groups <30 years, 30–49 years, 50–64 years, 65–79 years and >79 years.

Results 231 833 patients with a history of AF were identified, giving a prevalence among uploading practices of 1.76%. Prevalence of AF varied markedly between practices, related to differing practice age profiles. The total number of patients with AF in a practice was strongly predicted by the number of patients aged 65 years and over in the practice. 57.0% of the AF population had a $CHADS_2$ score ≥2 and 83.7%≥1. 114 212 (49.3%) patients received AC therapy. AC uptake increased with increasing $CHADS_2$ score up to a score of 3, but thereafter reached a plateau. Among 132 099 patients with a $CHADS_2$ score ≥2, 72 211 (54.7%) received an AC, 14 987(11.3%) were recorded as having a contraindication or having declined AC therapy, leaving 44 901 (34.0%) not on AC therapy and without a recorded contraindication or recorded refusal. Among patients not prescribed an AC, 79.9% were prescribed an AP. The use of AC declined in the elderly (for $CHADS_2$≥2, 47.4% of patients ≥80 years, compared with 64.5% for patients aged <80 years, p<0.001). By contrast, AP uptake was more prevalent among elderly patients.

Conclusions Over one-third of patients with AF and known risk factors who are eligible for AC do not receive them. There is a high use of AP among patients not receiving AC. Uptake of AC is particularly poor among patients aged 80 years and over.

INTRODUCTION

Atrial fibrillation (AF) is a major preventable cause of stroke.[1] Despite the fact that anticoagulation is very effective in preventing strokes due to AF,[2] there is extensive evidence that anticoagulants (AC) remain underused.[3–11] This underuse of AC is reflected in the low utilisation among patients with known AF presenting with stroke.[12] Appropriate AC is particularly important among the elderly, as this group is at greatest risk of strokes attributable to AF.[13]

Risk factors for stroke among patients with AF are well recognised.[14] Many of these risk factors are based on simple clinical information from the patient's history that is readily available in primary care databases. Database interrogation, therefore, has the potential to identify patients at increased risk of stroke and to determine whether these patients are treated with AC therapy.

The *G*uidance on *R*isk *A*ssessment and *S*troke *P*revention in *A*trial *F*ibrillation (GRASP-AF) tool is a software suite which searches general practice clinical information systems to enable practices to identify patients with a history of AF and review the risk profile of individual patients. The tool is based on the widely used $CHADS_2$ risk evaluation system.[15] The aggregated uploaded information from GRASP-AF is the basis of the present study which provides insights into the prevalence and contemporary management of AF in England.

METHODS

The GRASP-AF registry

The GRASP-AF tool is based on the use of MIQUEST (Morbidity Information QUery and Export SynTax), a common query process supported by all the primary care databases in England. The tool, which was developed jointly by the West Yorkshire Cardiovascular Network and PRIMIS (Primary Care Information Services) from The University of Nottingham, is managed by NHS Improvement in conjunction with PRIMIS. It is based on the $CHADS_2$ risk evaluation system. Practice participation and uploading of data to the central server is voluntary.

Study population

A set of Read codes was identified (see online supplementary appendix 1) to search for patients with a history of AF, or atrial flutter, occurring at any time in a patient's history. In a subgroup of patients, interrogation additionally included a search for an AF resolved code, where this had been recorded. Patients listed as AF resolved were still included in the overall analysis.

Further searches were undertaken to identify Read codes of clinical characteristics related to stroke risk (see online supplementary appendix 1). In the initial iteration of the tool reported here, estimation of stroke risk was based on the individual components of $CHADS_2$ score, namely a history of heart failure, a history of hypertension, the patient's age, a history of diabetes and a history of stroke or transient ischaemic attack. All

diagnoses were considered positive for $CHADS_2$ scoring if the patient had a history of these conditions at any time in the past.

The database was additionally interrogated to determine whether the patient had been issued with a prescription for AC within the last 6 months (initially warfarin, acenocoumarol and phenindione, but later expanded to include the new oral AC, dabigatran, rivaroxaban and apixaban), or whether an AC had been prescribed by a third party. Interrogation was also undertaken to detect whether the patient had an existing coding for a contraindication to AC, or if a patient had declined AC therapy. Interrogation similarly assessed prescription issue for antiplatelet agents (AP) therapy (aspirin, clopidogrel or dipyridamole), and whether an AP agent had been coded as contraindicated or declined.

Data uploading

The GRASP-AF tool is designed to provide patient-level data on the $CHADS_2$ score and AC and AP prescribing within a practice. Additionally, the data are summarised at practice level as a dashboard (see online supplementary appendix 2). Practices also have the opportunity to upload anonymised aggregated data to a central server. Uploaded data were aggregated by age bands (less than 30 years, 30–49 years, 50–64 years, 65–79 years and 80 years and over), use of AC or AP drugs and by $CHADS_2$ score. Population data for the practice, aggregated along the same age bands, was also uploaded for AF prevalence analysis.

Practices were encouraged to send data on first using the GRASP-AF tool in order to obtain a baseline set of results, which they could then use to compare with later uploads to assess any changes. Only the initial upload was considered for the current analysis. This report relates to data uploaded between 25 July 2009 and 31 March 2012.

Cohort analysis

Using the total number of patients with AF as the numerator and the total number of patients registered in practices as the denominator, we calculated the prevalence of AF by age group. The use of AC and AP for each $CHADS_2$ score was calculated from the number of AF patients issued a prescription for an AC or AP divided by the number of AF patients with that $CHADS_2$ score.

For each age group and for combinations of age groups, the relationship between the total number of patients with AF in an individual practice, and the total number of registered patients in that practice was depicted using scatter plots, quantified using generalised linear models with heteroskedasticity-consistent estimation, and the linear dependence measured using Pearson's correlation coefficient, to identify the age group which had the strongest association with total AF burden in the practice.

The relationship between the proportion of patients with AF on AC and AP was investigated using generalised linear models with a logit link and binomial distribution. For AC and AP, sequential models were fitted which regressed the proportion of patients with AF on an anticoagulant on age group, $CHADS_2$ score, age group*$CHADS_2$ score interaction, and compared with the null model. All analyses were performed using R V.2.10.1 (http://www.r-project.org/). Ethical approval was not required under NHS research governance arrangements for the project.

RESULTS

Prevalence of AF

In total, 1857 general practices uploaded their data during the period of the study. Among an overall practice population of 13.1 million patients, 231 833 patients with a history of AF were detected by the tool. The overall prevalence of patients with a history of AF was 1.76%. Interrogation for an AF resolved code was undertaken in a subgroup of 389 general practices. In these practices, an AF-resolved code, with no later AF diagnosis code, was recorded in 6.1% of all patients with a history of AF.

Figure 1 shows that the prevalence of AF varied between practices and increased substantially with age. Considering all age groups combined, the median prevalence among uploading practices was 1.70% (IQR 1.28%–2.08%).

The overall number of patients in a practice was a relatively poor predictor of the total number of patients with AF in that practice. By contrast, the total number of patients aged 50 years and over, 65 years and over and 80 years and over in individual practices, each strongly correlated with the total number of patients with AF for that practice. The strongest association between age group and total number of patients with AF was observed for patients aged 65 years and over—an increase in 1000 patients aged 65 years and over in a practice was associated with, on average, an increase of 101.5 patients with AF (95% CI 100.7 to 102.2) (figure 2).

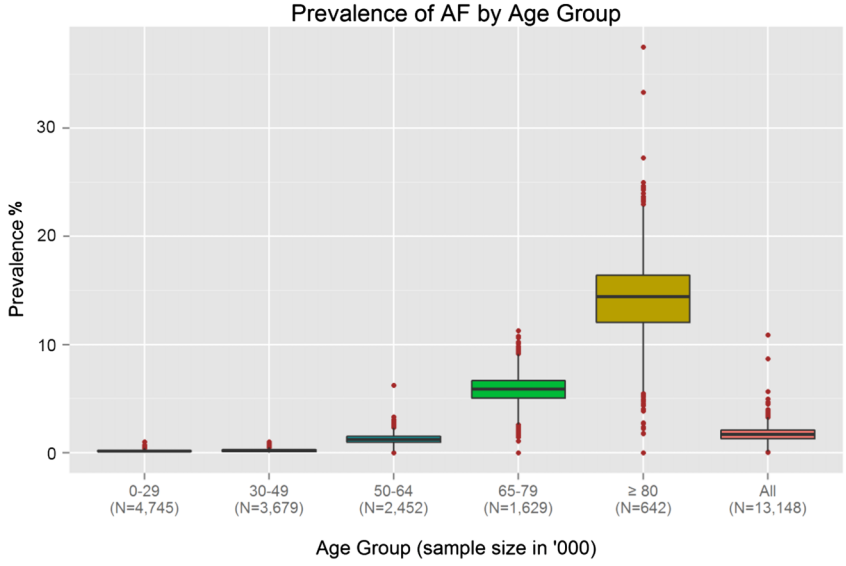

Figure 1 Prevalence of atrial fibrillation by age group. For each age group, the box plot represents the IQR, and the whiskers extend by a further 1.5 times the IQR. Individual outlying practices beyond this are shown as individual points.

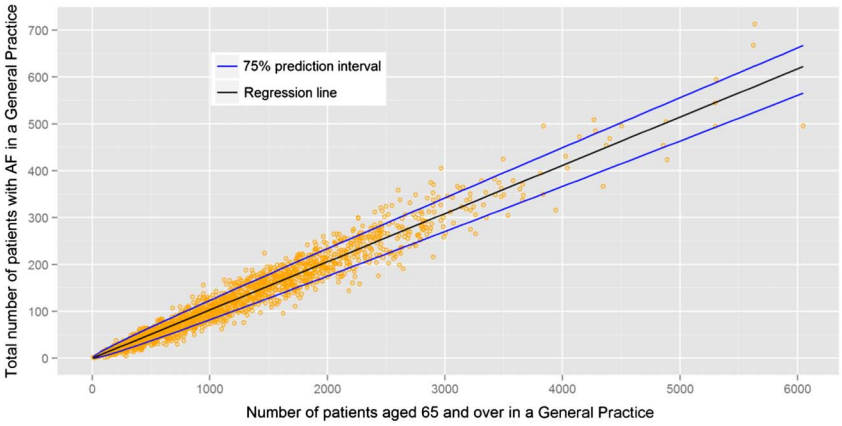

Figure 2 Scatter plot of the total number of patients with atrial fibrillation in a practice related to the number of patients in a practice, aged 65 years and over. Each dot represents an individual practice. Black line: regression line, β=0.1015 (95% CI 0.1007 to 0.1022). Blue lines: 75% prediction interval. Modelling was performed using a square root transform of both variables to account for heteroskedasticity. Pearson's correlation coefficient, R=0.98, p<0.001.

Prescription of AC and AP

Overall, the proportion of patients with AF who were prescribed AC and AP was 49.3% and 42.5%, respectively, with 6.9% of patients being prescribed both AC and AP. The proportion of patients with AF who were prescribed AC and AP varied by practice (IQR: AC 44.4–55.1%; AP 37.7–47.8%). For both AC and AP, a greater proportion of patients was recorded as therapy contraindicated than therapy declined (AC: contraindicated 8.7%, declined 1.9%; AP: contraindicated 14.0%, declined 0.5%). The proportion of patients in whom there was a recorded contraindication to the therapies varied considerably by practice (IQR: AC 2.6–12.0%; AP 6.1–20.0%). Among the AF-resolved subgroup, 9.4% were prescribed AC, 30.2% an AP and 1.9% both.

$CHADS_2$ scores and anticoagulation

In total, 57.0% of the AF population had a $CHADS_2$ score of ≥2 and 83.7%≥1. The proportion of patients with a $CHADS_2$ score of ≥2 varied by practice (IQR 52.4–61.9%). Table 1 shows that the prescription of both AC and AP increased with increasing $CHADS_2$ score for scores 0–3, and plateaued thereafter to reach 58.1% for AC and 46.5% for AP at a score of 6.

Among patients with a $CHADS_2$ score ≥2, 54.7% were prescribed an AC, 9.2% were listed as AC contraindicated and 2.2% were recorded as having declined AC therapy. In total, 34.0% of patients with AF who had a $CHADS_2$ score ≥2 were, therefore, not recorded as having been prescribed an AC with no recording of a contraindication or having declined AC therapy.

The uptake of AP also increased with $CHADS_2$ score. Among patients with a $CHADS_2$ score ≥2, 36.2% were prescribed solely an AP, with 90.9% being prescribed either an AC or AP or both. Among patients who did not receive an AC, 79.9% were prescribed an AP.

Age and prescription of AC and antiplatelet therapy

Figure 3A shows that the uptake of AC therapy increased with age for patients aged less than 80 years, but decreased in patients aged 80 years and over. By contrast, AP use continued to increase with age in patients aged 80 years and over (figure 3B).

This age-dependent difference in the prescription of anticoagulant therapy for AF was explored further by assessing AC and AP use across the range of $CHADS_2$ scores in relation to age (figure 4). For $CHADS_2$ scores 1–6, the proportion prescribed an AC was lower in those aged 80 years and over, than in those aged less than 80 years. Conversely, for patients with a $CHADS_2$ score from 1 to 6, the proportion with AF prescribed an AP was higher in those aged 80 years and over and remained relatively constant across scores (figure 4B). In the generalised linear models, the evidence for an effect of age group on the prescription of AC and AP by $CHADS_2$ score was strong (AC p<0.001, AP p<0.001). Overall, among high-risk patients with $CHADS_2$≥2, the prescription of AC was 47.4% for patients aged 80 years and over compared with 64.5% for patients aged under 80 years. This difference was only partly accounted for by differences in recorded contraindications to AC (≥80 years, 11.2% vs <80 years, 6.5%) or patients declining AC (≥80 years, 2.7% vs <80 years, 1.5%).

Figure 5 shows how the proportion of patients with a $CHADS_2$≥2 prescribed AC varied between practices. The

Table 1 Frequency of prescriptions, contra-indications and declines for anticoagulant therapy and antiplatelet therapy by $CHADS_2$ score

$CHADS_2$ score	Number with $CHADS_2$ score (% of all AF patients)	Oral anticoagulant			Oral antiplatelet			Anticoagulant or antiplatelet (%)	Anticoagulant and antiplatelet (%)
		Prescribed, (%)	Contraindicated, (%)	Declined, (%)	Prescribed, (%)	Contraindicated, (%)	Declined, (%)		
0	37771 (16.29)	12857 (34.04)	3206 (8.49)	497 (1.32)	13238 (35.05)	3641 (9.64)	233 (0.62)	24325 (64.40)	1770 (4.69)
1	61963 (26.73)	29144 (47.03)	4777 (7.71)	1059 (1.71)	27109 (43.75)	7189 (11.60)	307 (0.50)	52371 (84.52)	3882 (6.27)
2	67494 (29.11)	35431 (52.50)	5711 (8.46)	1582 (2.34)	29537 (43.76)	9664 (14.32)	283 (0.42)	60318 (89.37)	4650 (6.89)
3	34927 (15.07)	20105 (57.56)	3202 (9.17)	710 (2.03)	15016 (42.99)	6340 (18.15)	138 (0.40)	32123 (91.97)	2998 (8.58)
4	21481 (9.27)	12076 (56.22)	2294 (10.68)	433 (2.02)	9830 (45.76)	3931 (18.30)	78 (0.36)	19950 (92.87)	1956 (9.11)
5	7084 (3.06)	3952 (55.79)	798 (11.26)	116 (1.64)	3381 (47.73)	1392 (19.65)	13 (0.18)	6642 (93.76)	691 (9.75)
6	1113 (0.48)	647 (58.13)	123 (11.05)	18 (1.62)	517 (46.45)	260 (23.36)	3 (0.27)	1046 (93.98)	118 (10.60)

AF, atrial fibrillation.

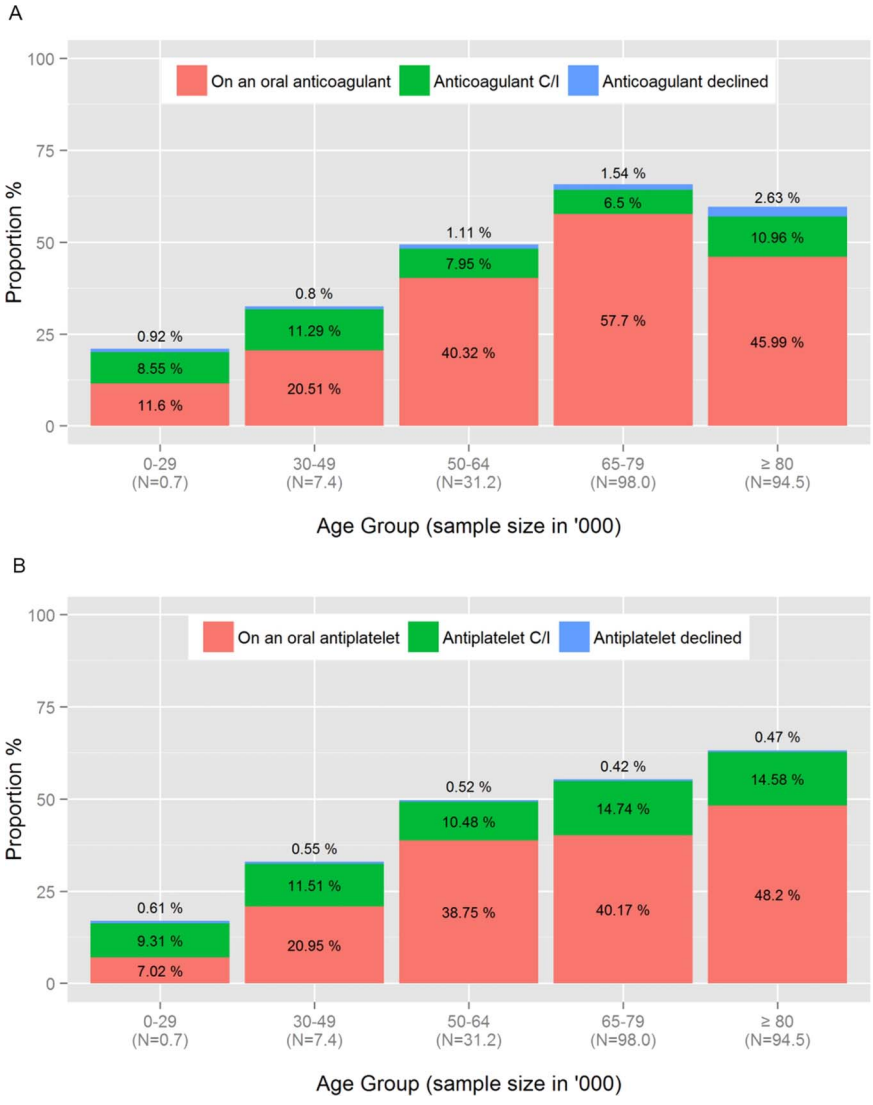

Figure 3 The proportion of atrial fibrillation patients prescribed anticoagulant therapy (A) and antiplatelet therapy (B) by age group.

uptake of AC was higher among patients aged under 80 years than in those aged 80 years and over. Approximately one-quarter of practices (23.5%) prescribed AC to 56.5% or more of eligible patients aged 80 years and over, whereas for patients aged less than 80 years, three-quarters of practices (76.5%) achieved this same level of AC uptake.

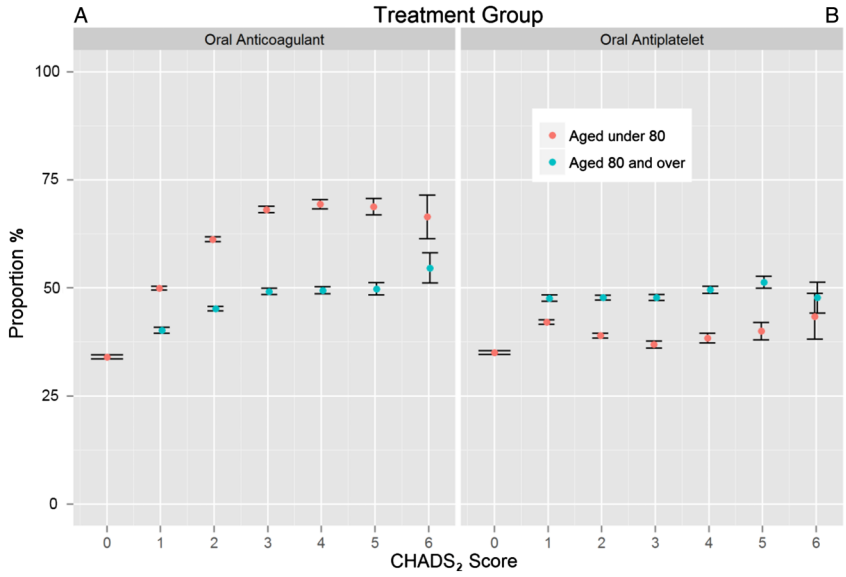

Figure 4 Proportion (95% CI) of atrial fibrillation patients prescribed anticoagulant therapy (A) and antiplatelet therapy (B) by $CHADS_2$ score for patients aged 80 years and over, and for patients aged under 80 years.

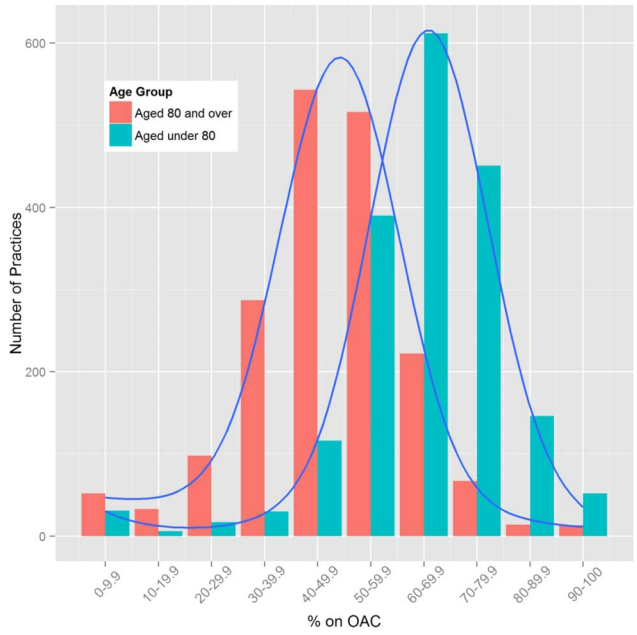

Figure 5 Proportion of patients with $CHADS_2 \geq 2$ prescribed anticoagulant therapy by age under 80 years and age 80 years and over, with kernel density estimates for each age group distribution.

DISCUSSION

AF prevalence

This study of AF in general practices in England reveals that the overall prevalence of AF among practices uploading data from 2009 through 2012 was 1.76%. This estimate is higher than previous reports. In 2006, NICE (National Institute for Health and Clinical Excellence) estimated the prevalence of AF was 1.28%.[16] This was based on a 1998 survey of 211 general practices representing a total population of 1.4 million patients in England and Wales.[7]

It is not surprising that the prevalence estimate in the current study exceeds previous UK-based estimates. This may partly reflect a recognised trend for AF prevalence to increase over time.[6 17] It also may reflect the methodology of the current study which included patients with a diagnosis of AF at any time in their patient record. In designing the interrogation tool it was decided from the outset to include all episodes of AF and not to make any attempt based on database interrogation to assess whether susceptibility to AF might have resolved. This was left to clinician judgement and individual case review. While it is certainly true that there are situations in which AF may be regarded as resolved, many patients with a single episode of AF are susceptible to recurrence, and a case can, therefore, be put forward for both regular review and for continuing AC despite apparent resolution.

The marked effect of age on AF prevalence observed in the present study is well recognised. This effect largely accounted for apparent differences in prevalence between individual practices. The total number of patients with AF in a practice could be predicted as 10.15% of the number of patients aged 65 years and over. This relation provides a potential tool for practices to benchmark their individual AF prevalence value in relation to their practice age profile. It also provides a means of projecting the increase in AF prevalence which will be associated with ageing of the population.

Anticoagulant uptake among patients with AF

The GRASP-AF tool provides an estimate of the number of patients with AF who are currently receiving an AC. Overall, just less than half (49.3%) the number of patients with a history of AF received an AC.

The study also provides an estimate of the number of patients eligible for treatment in relation to risk stratification strategies. If treatment were to be targeted on patients with a $CHADS_2 \geq 2$, this would cover 57% of the AF population. This is almost identical to a recent estimate of 56.9% which was based on 583 UK general practices.[6] If the treatment threshold for AC therapy is reduced to $CHADS_2 \geq 1$, this would target 84% of the AF population. It is not possible to retrospectively analyse our data to assess the consequences of using the more sensitive CHA_2DS_2VASc risk stratification system.[14] The tool has now been modified to additionally make a CHA_2DS_2VASc risk score available to users.

It is clear from the current data that there is a relationship between patients' degree of risk as determined by $CHADS_2$ score and AC uptake. Our study clearly shows that AC uptake increased through $CHADS_2$ scores 0–3, and thereafter reached a plateau. A very similar relation is apparent in the recently reported study of UK practices.[6] These findings differ from the observations of Gallagher *et al*,[18] which were based on observations on 41 910 patients with chronic AF in a UK general practice database. Data collection in their study commenced in 2000. They found that patients with a lower $CHADS_2$ score were more likely to be prescribed warfarin than patients with a higher $CHADS_2$ score. Our findings also differ from those of Sandhu *et al*[19] who assessed the uptake of AC in relation to risk among 42 834 Canadian patients with non-valvular AF assessed during the period 2000–2005. They found that AC uptake did not vary across $CHADS_2$ risk categories. Our study, together with that of Holt *et al*, suggest that risk stratification plays a greater role in contemporary therapy than was the case a decade ago, and may indicate that the 2006 NICE guideline has had some impact on therapy among general practices in England.

Gallagher *et al*[18] reported that approximately 60% of patients with a $CHADS_2$ score ≥2 in the UK did not receive warfarin. Holt *et al*[6] found that this had reduced to 47.0%, and our own study suggests further improvement to 45.3%. After allowing for patients in whom AC was contraindicated or declined, 34.0% of patients with $CHADS_2 \geq 2$ in the current study did not receive an anticoagulant.

The fact that 36.2% of patients with $CHADS_2 \geq 2$ were prescribed AP without AC suggests an over-reliance on AP for stroke prevention in AF. The superiority of warfarin over aspirin for stroke prevention in high-risk patients was clearly recognised in the NICE guidance which applied throughout the duration of the study.[16] The high use of AP may partly reflect the recommendations of the Quality and Outcomes Framework (QOF) of the NHS (National Health Service) which provided equal emphasis on AC and AP in stroke prevention throughout the study period. This may have contributed to the fact that 90.9% of patients with $CHADS_2 \geq 2$ were treated with either an AC or AP or both, thereby fulfilling the stated objectives of QOF at that time.

Our data shows an age-dependent inequality in the prescription of AC and AP. Reduced prescribing of AC among elderly patients with AF has been observed in previous studies.[4 11 18–22] A recent survey of UK general practices database records from 2000 to 2009 showed that this underuse of AC therapy in the elderly is not adequately explained by either an increase in comorbidities or in bleeding risk.[23] The current study has shown that there is an increase in prescribing of AP agents for elderly patients. This is in stark contrast with the results of the Birmingham Atrial Fibrillation Treatment of the Aged (BAFTA)

study[24] demonstrating superiority of warfarin over aspirin in stroke prevention in the elderly and, perhaps, represents a misconception that aspirin is safer than warfarin in a more elderly population. It illustrates the risk-treatment paradox previously reported in AF management,[19] that patients at higher risk of stroke, and more likely to benefit from AC therapy, are not receiving appropriate treatment—perhaps because of a perceived increased risk of side effects associated with warfarin therapy in the elderly.

The GRASP-AF data also demonstrate the considerable variation between practices both in the uptake of AC among high-risk patients and in the coded contraindications to AC therapy. That such variation exists, suggests that there is substantial scope to improve AC uptake in AF. Based on the observations from the current study of the proportion of patients who are high-risk ($CHADS_2 \geq 2$), and the proportion of these patients who are not on AC with no documentation of contraindication or therapy decline, combined with Office of National Statistics (ONS) population estimates for England,[25] we estimate that there were approximately 169 000 such patients in England between 2009 and 2012. Most of these patients were taking aspirin. Based on a number needed to treat from the BAFTA study of 50 to prevent one thromboembolic event or intracranial haemorrhage,[24] in excess of 3000 strokes could potentially be prevented annually if these individuals were commenced on AC in preference to AP.

Limitations of the current study

The data in this report represent uploaded information from 21.2% of general practices in England. In that practices that elected to upload their data, GRASP-AF is not a random sample, and it is possible that the sample, although large, is not representative of the primary care population in England. The proportion of patients aged 65 years and over in the population of practices uploading GRASP-AF data, is higher than that reported by the ONS 2010 estimate for England (17.3% vs 16.5%).[25] There may, therefore, be a slight over-representation of elderly patients among practices uploading data.

The GRASP-AF tool interrogates general practice records, and is limited by the accuracy of coding in these records. The results reported in this study may under-represent comorbidities and, hence, overall stroke risk.[6] For recorded contraindications, coding may once again be an under-representation, but as it represents perceived contraindications, there is the additional possibility for over-representation. The modelling of aggregated data to quantify the relationship between AF burden and age, and to study the interaction between AC use by $CHADS_2$ score in the elderly may be biased by mathematical coupling of the data. Nonetheless, we explored a number of model strategies to find good model fits and robust estimates.

CONCLUSIONS

Over 20% of general practices in England have uploaded data on their AF patients using the GRASP-AF tool. Analysis of these data show that uptake of AC has improved in comparison with previous studies, but even so, over one-third of high-risk patients remain untreated. AP agents are very frequently used as an alternative, particularly among the elderly. Education on the benefits of AC in comparison with AP offers great potential for stroke prevention.

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Contributors CC, original concept, pilot, initial national roll-out and writing. RH, overall national supervision of GRASP-AF. IR, national data collection. WRL, data analysis and statistical assistance. JB, coordination at PRIMIS and data analysis. MF, primary care advice. KT, initial development and pilot study. CPG overview of data analysis and writing. Guarantors CC, CPG.

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Competing interests MF has received honoraria and travel grants from Boehringer-Ingleheim, Bayer, Bristol Myers Squibb, INRStar, Pfizer and Roche. Apart from this, and the involvement of NHS Improvement, the authors have no competing interests.

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Data sharing statement Practices uploading to GRASP-AF did so under a guarantee of anonymity, and the data is subject to a data collection agreement which states that only contributing practices, PCT information facilitators, PRIMIS staff and other workers validated by NHS Improvement will have access to the data. Therefore, practice-level data is only available to individuals meeting these criteria. However, the data collection agreement also states that the data will be used for the purposes of comparative analysis and that anonymised data may be used by NHS Improvement to understand and monitor the management of stroke risk in AF. To this end, NHS Improvement will consider release of the highest-level aggregated data on request. Any such requests should be submitted to RH for consideration.

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GRASP-AF Read Code List

Atrial Fibrillation Diagnosis

Read code	Read term
G573.	Atrial fibrillation and flutter
G5730	Atrial fibrillation
G5731	Atrial flutter
G5732	Paroxysmal atrial fibrillation
G5733	Non-rheumatic atrial fibrillation
G5734	Permanent atrial fibrillation
G5735	Persistent atrial fibrillation
G573z	Atrial fibrillation and flutter NOS

Atrial Fibrillation Resolved

Read code	Read term
212R.	Atrial fibrillation resolved

Congestive Heart Failure

Read code	Read term
662f.	New York Heart Association classification - class I
662g.	New York Heart Association classification - class II
662h.	New York Heart Association classification - class III
662i.	New York Heart Association classification - class IV
G1yz1	Rheumatic left ventricular failure
G58..	Heart failure
G580.	Congestive heart failure
G5800	Acute congestive heart failure
G5801	Chronic congestive heart failure
G5802	Decompensated cardiac failure
G5803	Compensated cardiac failure
G5804	Congestive heart failure due to valvular disease
G581.	Left ventricular failure
G5810	Acute left ventricular failure
G582.	Acute heart failure
G583.	Heart failure with normal ejection fraction
G584.	Right ventricular failure
G58z.	Heart failure NOS

Hypertension

Read code	Read term
G2...	Hypertensive disease
G20..	Essential hypertension
G200.	Malignant essential hypertension
G201.	Benign essential hypertension
G202.	Systolic hypertension
G203.	Diastolic hypertension
G20z.	Essential hypertension NOS
G24..	Secondary hypertension
G240.	Secondary malignant hypertension
G2400	Secondary malignant renovascular hypertension
G240z	Secondary malignant hypertension NOS
G241.	Secondary benign hypertension
G2410	Secondary benign renovascular hypertension
G241z	Secondary benign hypertension NOS
G244.	Hypertension secondary to endocrine disorders
G24z.	Secondary hypertension NOS
G24z0	Secondary renovascular hypertension NOS
G24zz	Secondary hypertension NOS
G2y..	Other specified hypertensive disease
G2z..	Hypertensive disease NOS
Gyu2.	[X]Hypertensive diseases
Gyu20	[X]Other secondary hypertension
Gyu21	[X]Hypertension secondary to other renal disorders

Diabetes

Read code	Read term
66AJ1	Brittle diabetes
C10..	Diabetes mellitus
C100.	Diabetes mellitus with no mention of complication
C1000	Diabetes mellitus, juvenile type, with no mention of complication
C1001	Diabetes mellitus, adult onset, with no mention of complication
C100z	Diabetes mellitus NOS with no mention of complication
C101.	Diabetes mellitus with ketoacidosis
C1010	Diabetes mellitus, juvenile type, with ketoacidosis
C1011	Diabetes mellitus, adult onset, with ketoacidosis
C101y	Other specified diabetes mellitus with ketoacidosis
C101z	Diabetes mellitus NOS with ketoacidosis
C102.	Diabetes mellitus with hyperosmolar coma
C1020	Diabetes mellitus, juvenile type, with hyperosmolar coma
C1021	Diabetes mellitus, adult onset, with hyperosmolar coma

Read code	Read term
C102z	Diabetes mellitus NOS with hyperosmolar coma
C103.	Diabetes mellitus with ketoacidotic coma
C1030	Diabetes mellitus, juvenile type, with ketoacidotic coma
C1031	Diabetes mellitus, adult onset, with ketoacidotic coma
C103y	Other specified diabetes mellitus with coma
C103z	Diabetes mellitus NOS with ketoacidotic coma
C104.	Diabetes mellitus with renal manifestation
C1040	Diabetes mellitus, juvenile type, with renal manifestation
C1041	Diabetes mellitus, adult onset, with renal manifestation
C104y	Other specified diabetes mellitus with renal complications
C104z	Diabetes mellitus with nephropathy NOS
C105.	Diabetes mellitus with ophthalmic manifestation
C1050	Diabetes mellitus, juvenile type, with ophthalmic manifestation
C1051	Diabetes mellitus, adult onset, with ophthalmic manifestation
C105y	Other specified diabetes mellitus with ophthalmic complications
C105z	Diabetes mellitus NOS with ophthalmic manifestation
C106.	Diabetes mellitus with neurological manifestation
C1060	Diabetes mellitus, juvenile type, with neurological manifestation
C1061	Diabetes mellitus, adult onset, with neurological manifestation
C106y	Other specified diabetes mellitus with neurological complications
C106z	Diabetes mellitus NOS with neurological manifestation
C107.	Diabetes mellitus with peripheral circulatory disorder
C1070	Diabetes mellitus, juvenile type, with peripheral circulatory disorder
C1071	Diabetes mellitus, adult onset, with peripheral circulatory disorder
C1072	Diabetes mellitus, adult with gangrene
C1073	IDDM with peripheral circulatory disorder
C1074	NIDDM with peripheral circulatory disorder
C107y	Other specified diabetes mellitus with peripheral circulatory complications
C107z	Diabetes mellitus NOS with peripheral circulatory disorder
C108.	Insulin dependent diabetes mellitus
C1080	Insulin-dependent diabetes mellitus with renal complications
C1081	Insulin-dependent diabetes mellitus with ophthalmic complications
C1082	Insulin-dependent diabetes mellitus with neurological complications
C1083	Insulin dependent diabetes mellitus with multiple complications
C1084	Unstable insulin dependent diabetes mellitus
C1085	Insulin dependent diabetes mellitus with ulcer
C1086	Insulin dependent diabetes mellitus with gangrene
C1087	Insulin dependent diabetes mellitus with retinopathy
C1088	Insulin dependent diabetes mellitus - poor control
C1089	Insulin dependent diabetes maturity onset
C108A	Insulin-dependent diabetes without complication
C108B	Insulin dependent diabetes mellitus with mononeuropathy
C108C	Insulin dependent diabetes mellitus with polyneuropathy

Read code	Read term
C108D	Insulin dependent diabetes mellitus with nephropathy
C108E	Insulin dependent diabetes mellitus with hypoglycaemic coma
C108F	Insulin dependent diabetes mellitus with diabetic cataract
C108G	Insulin dependent diabetes mellitus with peripheral angiopathy
C108H	Insulin dependent diabetes mellitus with arthropathy
C108J	Insulin dependent diabetes mellitus with neuropathic arthropathy
C108y	Other specified diabetes mellitus with multiple complications
C108z	Unspecified diabetes mellitus with multiple complications
C109.	Non-insulin dependent diabetes mellitus
C1090	Non-insulin-dependent diabetes mellitus with renal complications
C1091	Non-insulin-dependent diabetes mellitus with ophthalmic complications
C1092	Non-insulin-dependent diabetes mellitus with neurological complications
C1093	Non-insulin-dependent diabetes mellitus with multiple complications
C1094	Non-insulin dependent diabetes mellitus with ulcer
C1095	Non-insulin dependent diabetes mellitus with gangrene
C1096	Non-insulin-dependent diabetes mellitus with retinopathy
C1097	Non-insulin dependent diabetes mellitus - poor control
C1099	Non-insulin-dependent diabetes mellitus without complication
C109A	Non-insulin dependent diabetes mellitus with mononeuropathy
C109B	Non-insulin dependent diabetes mellitus with polyneuropathy
C109C	Non-insulin dependent diabetes mellitus with nephropathy
C109D	Non-insulin dependent diabetes mellitus with hypoglycaemic coma
C109E	Non-insulin dependent diabetes mellitus with diabetic cataract
C109F	Non-insulin-dependent diabetes mellitus with peripheral angiopathy
C109G	Non-insulin dependent diabetes mellitus with arthropathy
C109H	Non-insulin dependent diabetes mellitus with neuropathic arthropathy
C109J	Insulin treated Type 2 diabetes mellitus
C109K	Hyperosmolar non-ketotic state in type 2 diabetes mellitus
C10A.	Malnutrition-related diabetes mellitus
C10A0	Malnutrition-related diabetes mellitus with coma
C10A1	Malnutrition-related diabetes mellitus with ketoacidosis
C10A2	Malnutrition-related diabetes mellitus with renal complications
C10A3	Malnutrition-related diabetes mellitus with ophthalmic complications
C10A4	Malnutrition-related diabetes mellitus with neurological complications
C10A5	Malnutrition-related diabetes mellitus with peripheral circulatory complications
C10A6	Malnutrition-related diabetes mellitus with multiple complications
C10A7	Malnutrition-related diabetes mellitus without complications
C10AW	Malnutrition-related diabetes mellitus with unspecified complications
C10AX	Malnutrition-related diabetes mellitus with other specified complications
C10B.	Diabetes mellitus induced by steroids
C10B0	Steroid induced diabetes mellitus without complication
C10C.	Diabetes mellitus autosomal dominant
C10D.	Diabetes mellitus autosomal dominant type 2

Read code	Read term
C10E.	Type 1 diabetes mellitus
C10E0	Type 1 diabetes mellitus with renal complications
C10E1	Type 1 diabetes mellitus with ophthalmic complications
C10E2	Type 1 diabetes mellitus with neurological complications
C10E3	Type 1 diabetes mellitus with multiple complications
C10E4	Unstable type 1 diabetes mellitus
C10E5	Type 1 diabetes mellitus with ulcer
C10E6	Type 1 diabetes mellitus with gangrene
C10E7	Type 1 diabetes mellitus with retinopathy
C10E8	Type 1 diabetes mellitus - poor control
C10E9	Type 1 diabetes mellitus maturity onset
C10EA	Type 1 diabetes mellitus without complication
C10EB	Type 1 diabetes mellitus with mononeuropathy
C10EC	Type 1 diabetes mellitus with polyneuropathy
C10ED	Type 1 diabetes mellitus with nephropathy
C10EE	Type 1 diabetes mellitus with hypoglycaemic coma
C10EF	Type 1 diabetes mellitus with diabetic cataract
C10EG	Type 1 diabetes mellitus with peripheral angiopathy
C10EH	Type 1 diabetes mellitus with arthropathy
C10EJ	Type 1 diabetes mellitus with neuropathic arthropathy
C10EK	Type 1 diabetes mellitus with persistent proteinuria
C10EL	Type 1 diabetes mellitus with persistent microalbuminuria
C10EM	Type 1 diabetes mellitus with ketoacidosis
C10EN	Type 1 diabetes mellitus with ketoacidotic coma
C10EP	Type 1 diabetes mellitus with exudative maculopathy
C10EQ	Type 1 diabetes mellitus with gastroparesis
C10ER	Latent autoimmune diabetes mellitus in adult
C10F.	Type 2 diabetes mellitus
C10F0	Type 2 diabetes mellitus with renal complications
C10F1	Type 2 diabetes mellitus with ophthalmic complications
C10F2	Type 2 diabetes mellitus with neurological complications
C10F3	Type 2 diabetes mellitus with multiple complications
C10F4	Type 2 diabetes mellitus with ulcer
C10F5	Type 2 diabetes mellitus with gangrene
C10F6	Type 2 diabetes mellitus with retinopathy
C10F7	Type 2 diabetes mellitus - poor control
C10F9	Type 2 diabetes mellitus without complication
C10FA	Type 2 diabetes mellitus with mononeuropathy
C10FB	Type 2 diabetes mellitus with polyneuropathy
C10FC	Type 2 diabetes mellitus with nephropathy
C10FD	Type 2 diabetes mellitus with hypoglycaemic coma
C10FE	Type 2 diabetes mellitus with diabetic cataract
C10FF	Type 2 diabetes mellitus with peripheral angiopathy

Read code	Read term
C10FG	Type 2 diabetes mellitus with arthropathy
C10FH	Type 2 diabetes mellitus with neuropathic arthropathy
C10FJ	Insulin treated Type 2 diabetes mellitus
C10FK	Hyperosmolar non-ketotic state in type 2 diabetes mellitus
C10FL	Type 2 diabetes mellitus with persistent proteinuria
C10FM	Type 2 diabetes mellitus with persistent microalbuminuria
C10FN	Type 2 diabetes mellitus with ketoacidosis
C10FP	Type 2 diabetes mellitus with ketoacidotic coma
C10FQ	Type 2 diabetes mellitus with exudative maculopathy
C10FR	Type 2 diabetes mellitus with gastroparesis
C10FS	Maternally inherited diabetes mellitus
C10G.	Secondary pancreatic diabetes mellitus
C10G0	Secondary pancreatic diabetes mellitus without complication
C10H.	Diabetes mellitus induced by non-steroid drugs
C10H0	Diabetes mellitus induced by non-steroid drugs without complication
C10L.	Fibrocalculous pancreatopathy
C10L0	Fibrocalculous pancreatopathy without complication
C10M.	Lipoatrophic diabetes mellitus
C10M0	Lipoatrophic diabetes mellitus without complication
C10N.	Secondary diabetes mellitus
C10N0	Secondary diabetes mellitus without complication
C10N1	Cystic fibrosis related diabetes mellitus
C10y.	Diabetes mellitus with other specified manifestation
C10y0	Diabetes mellitus, juvenile type, with other specified manifestation
C10y1	Diabetes mellitus, adult onset, with other specified manifestation
C10yy	Other specified diabetes mellitus with other specified complications
C10yz	Diabetes mellitus NOS with other specified manifestation
C10z.	Diabetes mellitus with unspecified complication
C10z0	Diabetes mellitus, juvenile type, with unspecified complication
C10z1	Diabetes mellitus, adult onset, with unspecified complication
C10zy	Other specified diabetes mellitus with unspecified complications
C10zz	Diabetes mellitus NOS with unspecified complication

History of Stroke or TIA

Read code	Read term
F4236	Amaurosis fugax
G61..	Intracerebral haemorrhage
G610.	Cortical haemorrhage
G611.	Internal capsule haemorrhage
G612.	Basal nucleus haemorrhage
G613.	Cerebellar haemorrhage
G614.	Pontine haemorrhage

G615.	Bulbar haemorrhage
G616.	External capsule haemorrhage
G618.	Intracerebral haemorrhage, multiple localized
G61X.	Intracerebral haemorrhage in hemisphere, unspecified
G61X0	Left sided intracerebral haemorrhage, unspecified
G61X1	Right sided intracerebral haemorrhage, unspecified
G61z.	Intracerebral haemorrhage NOS
G63..	Precerebral arterial occlusion
G63y0	Cerebral infarct due to thrombosis of precerebral arteries
G63y1	Cerebral infarction due to embolism of precerebral arteries
G64..	Cerebral arterial occlusion
G640.	Cerebral thrombosis
G6400	Cerebral infarction due to thrombosis of cerebral arteries
G641.	Cerebral embolism
G6410	Cerebral infarction due to embolism of cerebral arteries
G64z.	Cerebral infarction NOS
G64z0	Brainstem infarction
G64z1	Wallenberg syndrome
G64z2	Left sided cerebral infarction
G64z3	Right sided cerebral infarction
G64z4	Infarction of basal ganglia
G65..	Transient cerebral ischaemia
G650.	Basilar artery syndrome
G651.	Vertebral artery syndrome
G6510	Vertebro-basilar artery syndrome
G652.	Subclavian steal syndrome
G653.	Carotid artery syndrome hemispheric
G654.	Multiple and bilateral precerebral artery syndromes
G656.	Vertebrobasilar insufficiency
G65y.	Other transient cerebral ischaemia
G65z.	Transient cerebral ischaemia NOS
G65z0	Impending cerebral ischaemia
G65z1	Intermittent cerebral ischaemia
G65zz	Transient cerebral ischaemia NOS
G66..	Stroke and cerebrovascular accident unspecified
G660.	Middle cerebral artery syndrome
G661.	Anterior cerebral artery syndrome
G662.	Posterior cerebral artery syndrome
G663.	Brain stem stroke syndrome
G664.	Cerebellar stroke syndrome
G665.	Pure motor lacunar syndrome
G666.	Pure sensory lacunar syndrome
G667.	Left sided CVA
G668.	Right sided CVA

G669.	Cerebral palsy, not congenital or infantile, acute
G6760	Cerebral infarction due to cerebral venous thrombosis, nonpyogenic
G683.	Sequelae of cerebral infarction
G6W..	Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries
G6X..	Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries
Gyu62	[X]Other intracerebral haemorrhage
Gyu63	[X]Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries
Gyu64	[X]Other cerebral infarction
Gyu65	[X]Occlusion and stenosis of other precerebral arteries
Gyu66	[X]Occlusion and stenosis of other cerebral arteries
Gyu6F	[X]Intracerebral haemorrhage in hemisphere, unspecified
Gyu6G	[X]Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries
ZV12D	[V]Personal history of transient ischaemic attack

Anticoagulant Therapy

Read code	Read term
8B2K.	Anticoagulant prescribed by third party
bs...	ORAL ANTICOAGULANTS
bs1..	WARFARIN SODIUM
bs11.	MAREVAN 1mg tablets
bs12.	MAREVAN 3mg tablets
bs13.	MAREVAN 5mg tablets
bs14.	*WARFARIN WBP 1mg tablets
bs15.	*WARFARIN WBP 3mg tablets
bs16.	*WARFARIN WBP 5mg tablets
bs17.	WARFARIN SODIUM 1mg tablets
bs18.	WARFARIN SODIUM 3mg tablets
bs19.	WARFARIN SODIUM 5mg tablets
bs1A.	WARFARIN SODIUM 0.5mg tablets
bs1B.	MAREVAN 0.5mg tablets
bs1C.	WARFARIN SODIUM 1mg/1mL oral suspension
bs2..	ACENOCOUMAROL
bs21.	SINTHROME 1mg tablets
bs22.	*SINTHROME 4mg tablets
bs23.	ACENOCOUMAROL 1mg tablets
bs24.	*NICOUMALONE 4mg tablets
bs3..	PHENINDIONE
bs31.	*DINDEVAN 10mg tablets
bs32.	*DINDEVAN 25mg tablets
bs33.	*DINDEVAN 50mg tablets
bs34.	PHENINDIONE 10mg tablets
bs35.	PHENINDIONE 25mg tablets
bs36.	PHENINDIONE 50mg tablets
bs4..	DABIGATRAN ETEXILATE
bs41.	PRADAXA 75mg capsules
bs42.	PRADAXA 110mg capsules
bs43.	PRADAXA 150mg capsules
bs4x.	DABIGATRAN ETEXILATE 150mg capsules
bs4y.	DABIGATRAN ETEXILATE 110mg capsules
bs4z.	DABIGATRAN ETEXILATE 75mg capsules
bs5..	*DICOUMAROL [NO DRUGS HERE]
bs6..	RIVAROXABAN
bs61.	XARELTO 10mg tablets
bs62.	XARELTO 15mg tablets
bs63.	XARELTO 20mg tablets
bs6x.	RIVAROXABAN 20mg tablets
bs6y.	RIVAROXABAN 15mg tablets
bs6z.	RIVAROXABAN 10mg tablets

Read code	Read term
bs7..	APIXABAN
bs71.	ELIQUIS 2.5mg tablets
bs72.	APIXABAN 2.5mg tablets

Anticoagulant Contraindicated

Read code	Read term
14LP.	H/O: warfarin allergy
8I25.	Warfarin contraindicated
8I2R.	Anticoagulation contraindicated
8I2o.	Dabigatran contraindicated
8I71.	Warfarin not tolerated
8I7A.	Anticoagulation not tolerated
8I7R.	Dabigatran not tolerated
TJ42.	Adverse reaction to anticoagulants
TJ421	Adverse reaction to warfarin sodium
TJ422	Adverse reaction to nicoumalone
TJ423	Adverse reaction to phenindione
TJ42z	Adverse reaction to anticoagulants NOS
U6042	[X]Anticoagulants causing adverse effects in therapeutic use
ZV14A	[V]Personal history of warfarin allergy

Anticoagulant Declined

Read code	Read term
8I3E.	Warfarin declined
8I3d.	Anticoagulation declined
8IES.	Dabigatran declined

Antiplatelet Therapy

Read code	Read term
67I8.	Advice about taking aspirin
8B3T.	Over the counter aspirin therapy
8B63.	Salicylate prophylaxis
8B6C.	Anti-platelet prophylaxis
8B6P.	Clopidogrel prophylaxis
8B6W.	Dipyridamole prophylaxis
blm..	ISOSORBIDE MONONITRATE+ASPIRIN
blm1.	IMAZIN XL 60mg/75mg m/r tablets
blm2.	IMAZIN XL FORTE 60mg/150mg m/r tablets
blmy.	ISOSORBIDE MONONITRATE+ASPIRIN 60mg/150mg m/r tablets
blmz.	ISOSORBIDE MONONITRATE+ASPIRIN 60mg/75mg m/r tablets
bu1..	DIPYRIDAMOLE
bu11.	*PERSANTIN 25mg tablets
bu12.	PERSANTIN 100mg tablets
bu14.	DIPYRIDAMOLE 25mg tablets
bu15.	DIPYRIDAMOLE 100mg tablets
bu16.	*VASYROL 25mg tablets
bu17.	*VASYROL 100mg tablets
bu18.	*CEREBROVASE 25mg tablets
bu19.	*CEREBROVASE 100mg tablets
bu1A.	*MODAPLATE 100mg tablets
bu1B.	*MODAPLATE 25mg tablets
bu1C.	DIPYRIDAMOLE 200mg m/r capsules
bu1D.	PERSANTIN RETARD 200mg m/r capsules
bu1E.	DIPYRIDAMOLE 50mg/5mL oral suspension
bu2..	ASPIRIN [ANTIPLATELET]
bu21.	*ASPIRIN 100mg effervescent tablets
bu22.	*PLATET 100mg effervescent tablets
bu23.	ASPIRIN 75mg dispersible tablets
bu24.	*ANGETTES 75mg tablets
bu25.	*ASPIRIN 75mg tablets
bu26.	*PLATET 300mg effervescent tablets
bu27.	*ASPIRIN 300mg effervescent tablets
bu28.	*DISPRIN CV 100mg m/r tablets
bu29.	*ASPIRIN 100mg m/r tablets
bu2A.	NU-SEALS ASPIRIN 75mg e/c tablets
bu2B.	ASPIRIN 75mg e/c tablets
bu2C.	*POSTMI 300mg e/c tablets
bu2D.	*POSTMI 75mg dispersible tablets
bu2E.	*POSTMI 75mg e/c tablets
bu2F.	CAPRIN 75mg e/c tablets
bu2G.	*NU-SEALS CARDIO 75 e/c tablets

Read code	Read term
bu2H.	*ENPRIN 75mg e/c tablets
bu2I.	ASPIRIN 162.5mg m/r capsules
bu2J.	CASPAC XL 162.5mg m/r capsules
bu2K.	MICROPIRIN 75mg e/c tablets
bu2a.	*DISPRIN CV 300mg m/r tablets
bu2b.	*ASPIRIN 300mg m/r tablets
bu2c.	ASPIRIN 75mg soluble tablets
bu2d.	FLAMASACARD 162.5mg m/r capsules
bu4..	DIPYRIDAMOLE+ASPIRIN
bu41.	DIPYRIDAMOLE+ASPIRIN 200mg/25mg m/r capsules
bu42.	ASASANTIN RETARD m/r capsules
bu5..	CLOPIDOGREL
bu51.	CLOPIDOGREL 75mg tablets
bu52.	PLAVIX 75mg tablets
bu53.	PLAVIX 300mg tablets
bu54.	CLOPIDOGREL 300mg tablets
bu55.	GREPID 75mg tablets
di1..	ASPIRIN [CENTRAL NERVOUS SYSTEM USE]
di11.	ASPIRIN [CNS] 300mg tablets
di12.	ASPIRIN [CNS] 300mg dispersible tablets
di13.	*ASPIRIN 75mg dispersible tablets
di14.	*ASPERGUM 227mg chewing gum
di15.	*CLARADIN 300mg tablets
di16.	*LABOPRIN 300mg tablets
di17.	*PAYNOCIL 600mg tablets
di18.	*SOLPRIN 300mg dispersible tablets
di19.	*ASPIRIN 500mg m/r tablets
di1a.	*CAPRIN 324mg e/c tablets
di1b.	*LEVIUS 500mg m/r tablets
di1c.	NU-SEALS ASPIRIN 300mg e/c tablets
di1d.	*NU-SEALS ASPIRIN 600mg e/c tablets
di1e.	*PALAPRIN FORTE 600mg tablets
di1f.	ASPIRIN 300mg e/c tablets
di1g.	*ASPIRIN 600mg e/c tablets
di1h.	*ASPIRIN 324mg e/c tablets
di1i.	*ASPIRIN 600mg tablets
di1j.	*LABOPRIN DL 900mg sachets
di1k.	CAPRIN 300mg e/c tablets
di1m.	ASPIRIN 300mg soluble tablets
di1n.	ASPIRIN 300mg suppositories
di1o.	ASPIRIN 150mg suppositories
di1r.	DISPRIN 300mg dispersible tablets
j11..	ASPIRIN [MUSCULOSKELETAL USE]

Read code	Read term
j111.	ASPIRIN 300mg tablets
j112.	ASPIRIN 300mg dispersible tablets

Antiplatelet Contraindicated

Read code	Read term
14LK.	H/O: aspirin allergy
14LQ.	H/O: clopidogrel allergy
14LX.	H/O: dipyridamole allergy
8I24.	Aspirin prophylaxis contra-indicated
8I2K.	Clopidogrel contraindicated
8I2b.	Dipyridamole contraindicated
8I70.	Aspirin not tolerated
8I72.	Clopidogrel not tolerated
8I7J.	Dipyridamole not tolerated
TJ53.	Adverse reaction to salicylates
TJC44	Adverse reaction to dipyridamole
U6044	[X]Antithrombotic drugs [platelet-aggregation inhibitors] causing adverse effects in therapeutic use
U6051	[X]Salicylates causing adverse effects in therapeutic use
ZV148	[V]Personal history of aspirin allergy

Antiplatelet Declined

Read code	Read term
8I38.	Aspirin prophylaxis refused
8I3R.	Clopidogrel declined
8I3n.	Dipyridamole declined

Audit of Atrial Fibrillation and CHADS2 Scores

Please click on the Web Upload icon to send in your data

Classic View

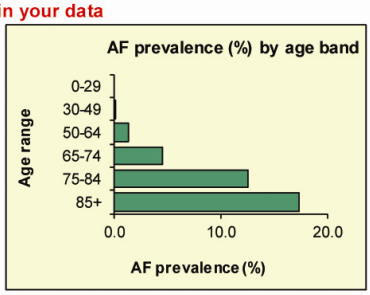
Select Risk Score CHADS2

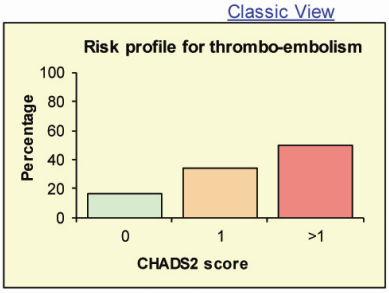
Practice:

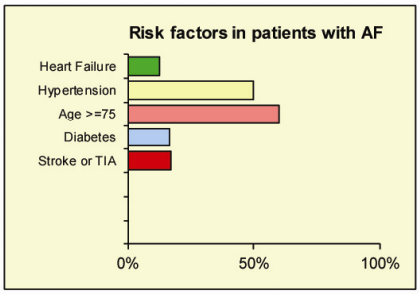
Total Practice Population 10924

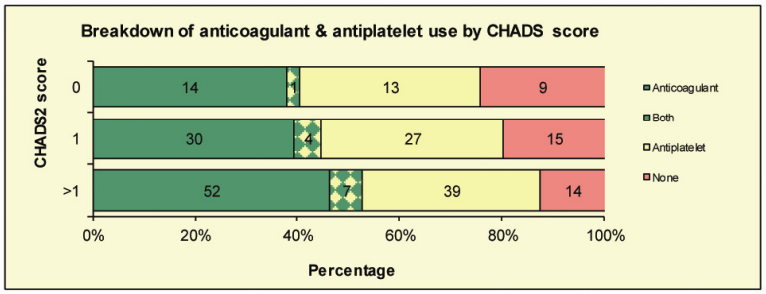
	Total	Percent
No. with Atrial Fibrillation	225	2.06
Age >= 65 yrs with AF	193	8.54

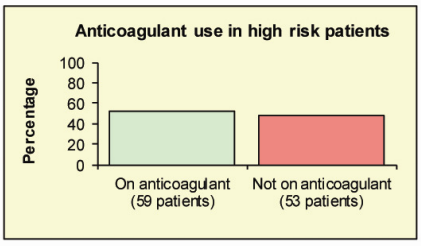
NB: Handling of anticoagulant exclusions







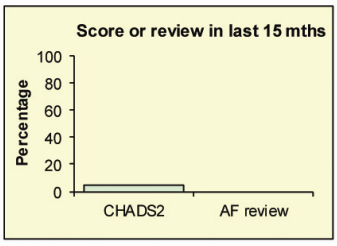




Strokes expected annually in the 53 high risk untreated

3.2

(95% CI 2.4 to 4.2)



HELP

OVERVIEW

PODCAST

This dashboard was developed by PRIMIS for use with CHART