



Westcliffe Cardiology Service
Shipley

Screening in Atrial Fibrillation

Dr Andreas Wolff



HRC2010

3rd – 6th October 2010

Hilton Birmingham Metropole Hotel, Birmingham, UK

Education
Technology
Diversity

www.heartrhythmcongress.com

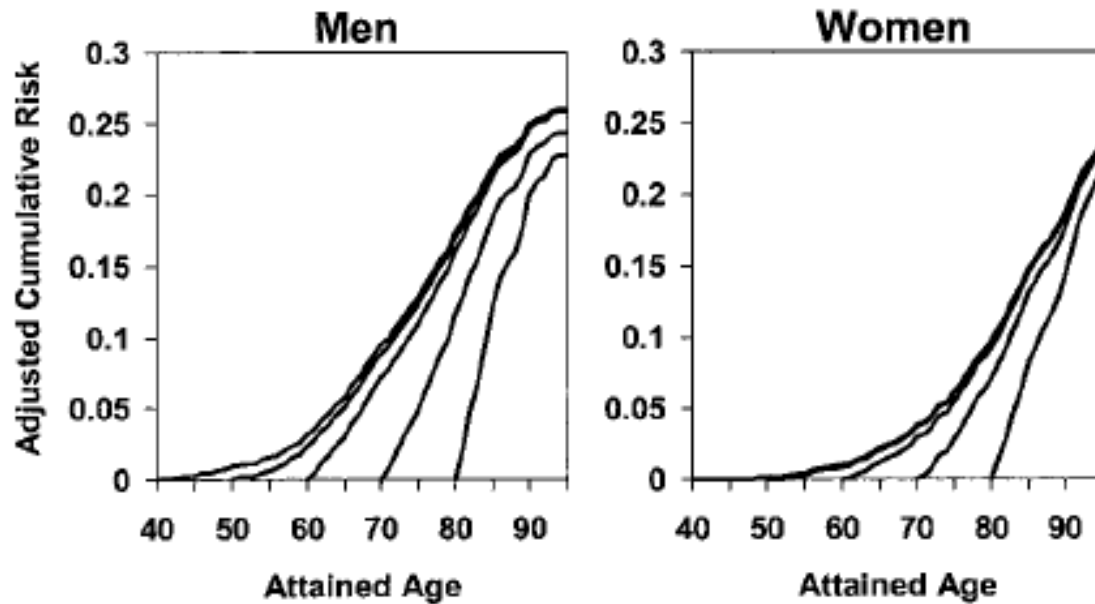


Figure 1. Cumulative risk for AF at selected index ages for men and women, with death free of AF considered a competing event. Lifetime risk for a given index age is cumulative risk through age 94 years.

AF Is Associated with Serious Events in Different Vascular Territories¹

Event	No. of patients (%) (n=3,298)
Stroke*	151 (4.6%)
Vascular death	177 (5.4%)
Transient ischemic attack	30 (0.9%)
Peripheral thromboembolism	26 (0.8%)
Myocardial infarction	46 (1.4%)

Data from meta-analysis of randomized controlled trials in patients with AF¹

*Fatal or at least moderately disabling. ¹Taylor FC *et al. BMJ* 2001; 322: 321–326.

Rationale behind AF screening

- **Common** condition
- Frequently **asymptomatic** or little symptoms
- Grave consequences if undetected:
 - **Thrombo-embolic disease**
 - Tachycardia induced cardiomyopathy
- **Effective treatment** is available
- Test is **acceptable** and non invasive

Secular Trends in Incidence of Atrial Fibrillation in Olmsted County, Minnesota, 1980 to 2000, and Implications on the Projections for Future Prevalence

TABLE 1. Baseline Characteristics of Incident AF Stratified by Calendar-Year of AF Diagnosis

Variable	Calendar-Year of AF Diagnosis					P*
	Overall (n=4618)	1980-1984 (n=826)	1985-1989 (n=938)	1990-1994 (n=1209)	1995-2000 (n=1645)	
Age, y	73.1±14.4	72.9±14.5	72.8±14.1	73.0±14.7	73.4±14.3	0.07
<55	477 (10)	90 (11)	89 (9.5)	137 (11)	161 (9.8)	0.28
55-64	543 (12)	100 (12)	114 (12)	132 (11)	197 (12)	0.93
65-74	1118 (24)	187 (23)	260 (28)	294 (24)	377 (23)	0.23
75-84	1514 (33)	284 (34)	289 (31)	389 (32)	552 (34)	0.86
≥85	966 (21)	165 (20)	186 (20)	257 (21)	358 (22)	<0.05
Men	2365 (51)	412 (50)	469 (50)	629 (52)	855 (52)	0.08
BMI, kg/m ²	27.1±6.2	25.8±5.3	26.2±5.5	27.2±6.3	28.0±6.6	<0.0001
Systolic blood pressure, mm Hg	138±21	137±22	143±21	140±20	135±19	<0.0001
Diastolic blood pressure, mm Hg	78±11	78±11	80±10	79±11	75±11	<0.0001
Total cholesterol, mg/dL	200±49	212±56	207±52	199±47	192±45	<0.0001
Triglycerides, mg/dL	135±140	150±351	126±89	133±93	138±83	0.90
Paroxysmal AF	3428 (74)	590 (71)	701 (75)	891 (74)	1246 (76)	<0.01
Silent AF	1152 (25)	218 (26)	237 (25)	316 (26)	381 (23)	0.06

Long-term risk of recurrent atrial fibrillation as documented by an implantable monitoring device: Implications for optimal patient care

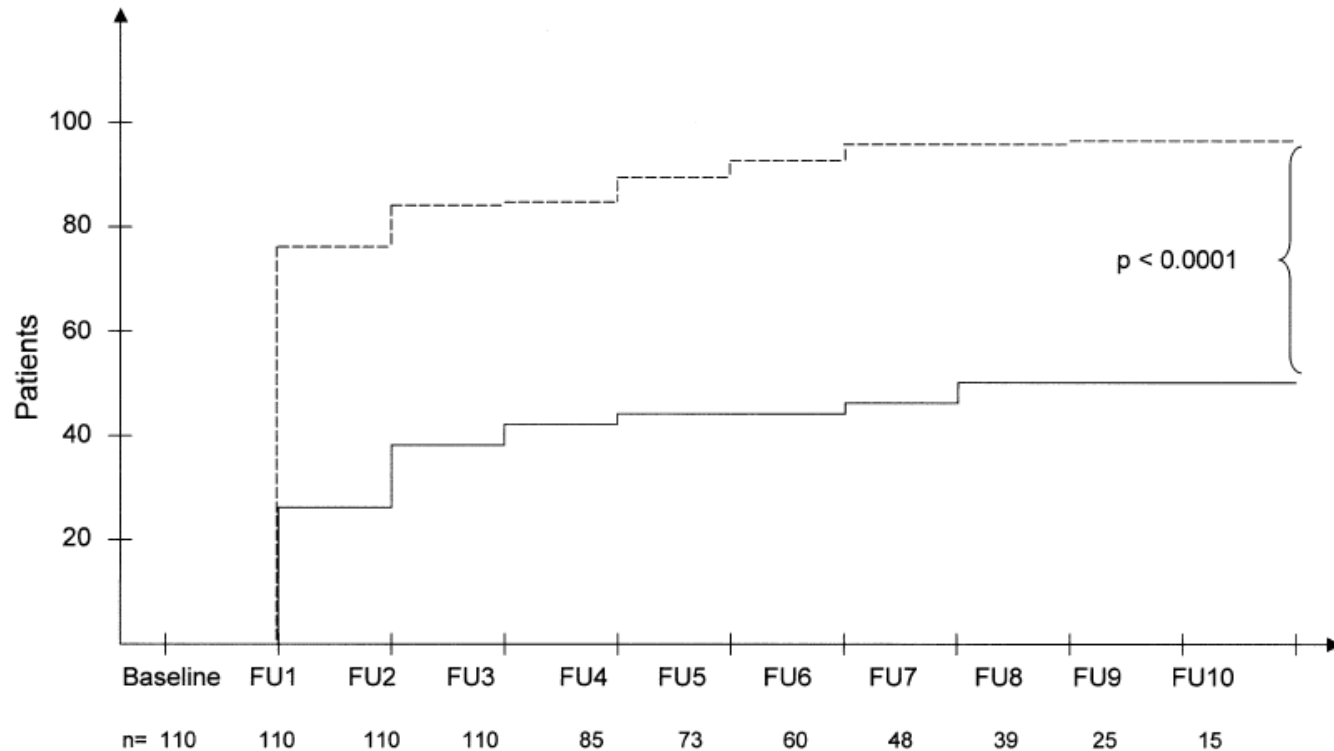


Figure 2. Cumulative incidence of detection of any atrial fibrillation recurrence by electrocardiographic recording during follow-up (FU) (solid line) versus information from the implanted device (dashed line). n = number of patients at risk.

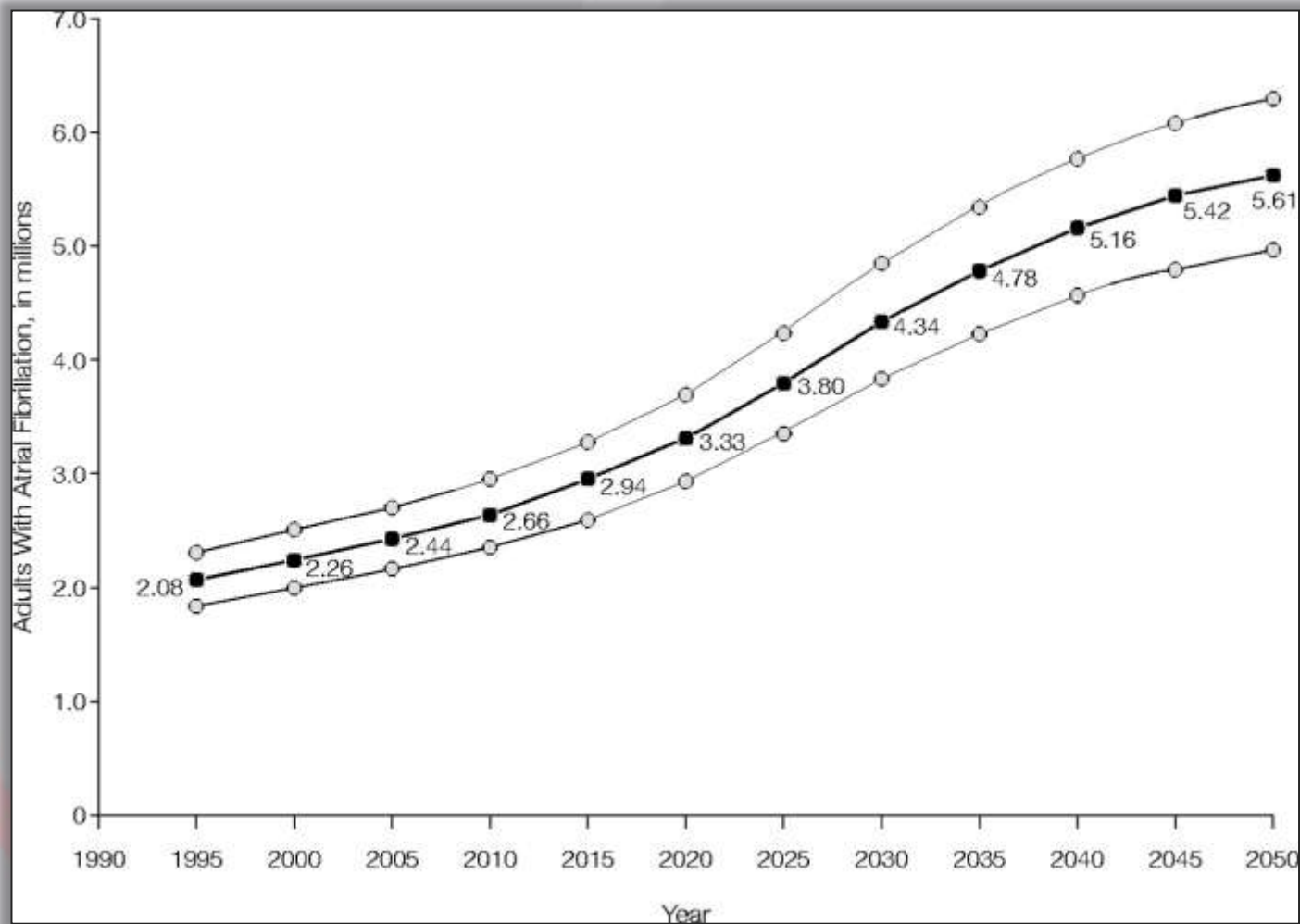
Newly Diagnosed Atrial Fibrillation and Acute Stroke The Framingham Study

Table 1. Distribution of Sex, Age, and Stroke Subtype in 115 Stroke Subjects Associated With AF

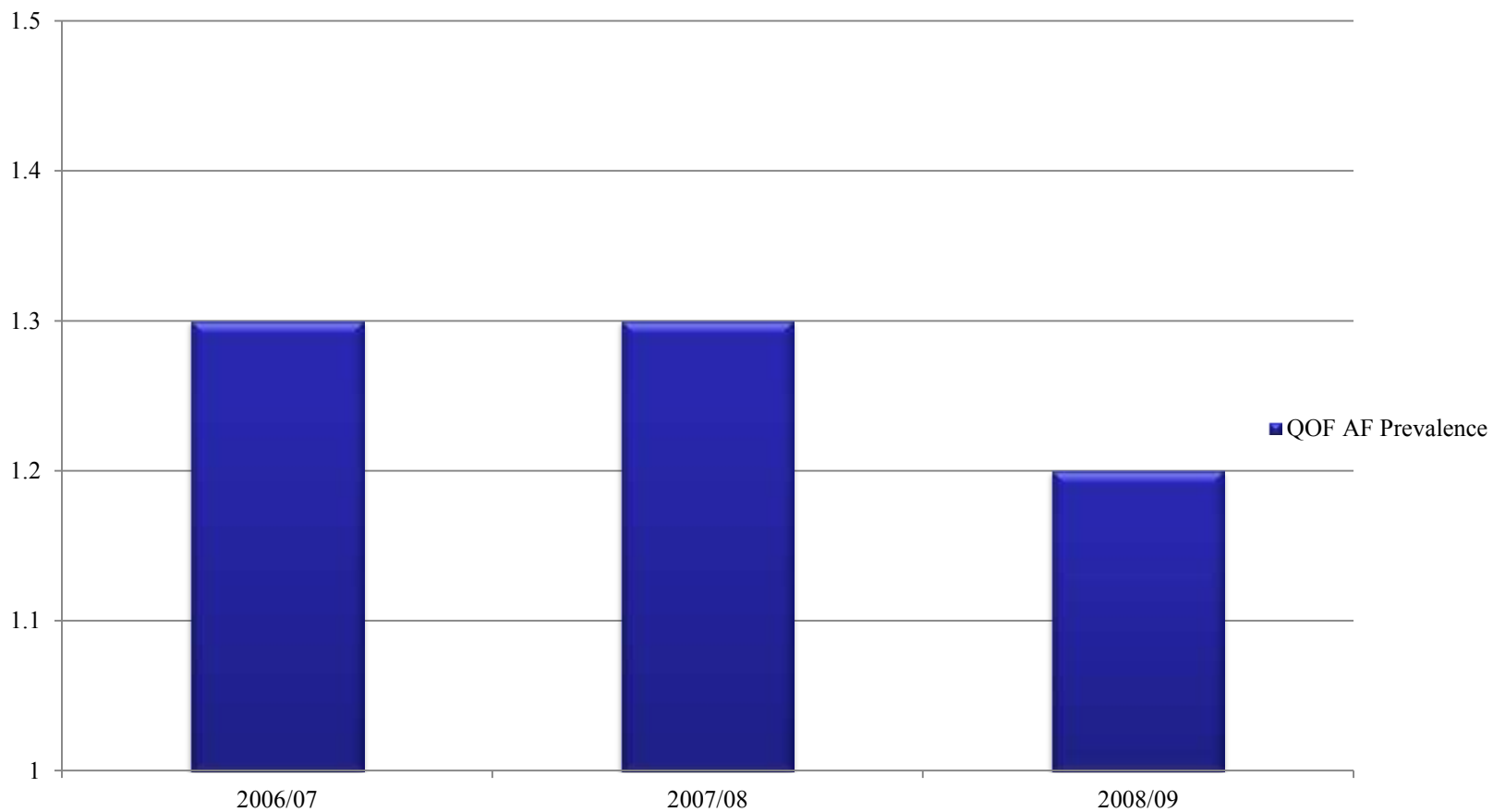
	Prior AF	AF on Admission	AF After Admission
No.	89	21	5
% men	37	48	60
Age range, y (median)	44-97 (75)	63-94 (82)	66-84 (72)
Stroke subtype, ischemic/hemorrhagic	86/3	20/1	5/0

AF indicates atrial fibrillation.

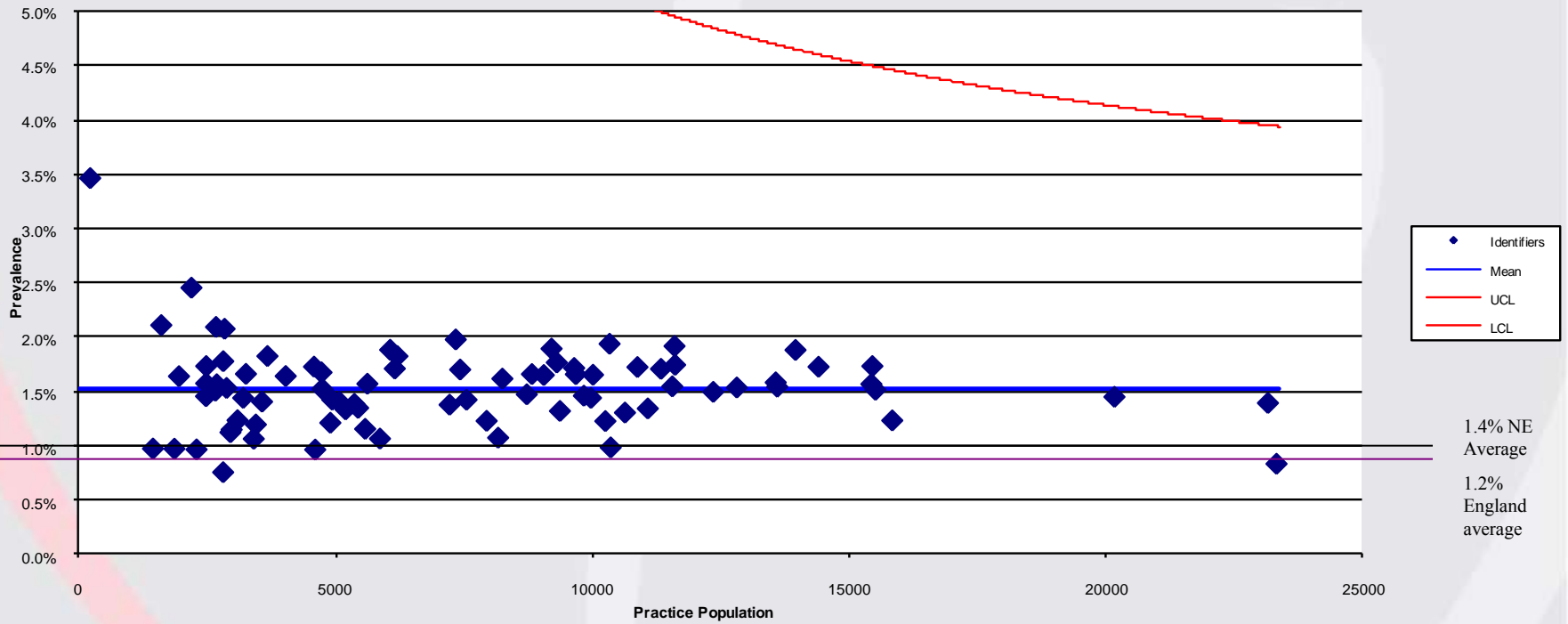
Projected Number of Adults With Atrial Fibrillation in the US Between 1995 and 2050



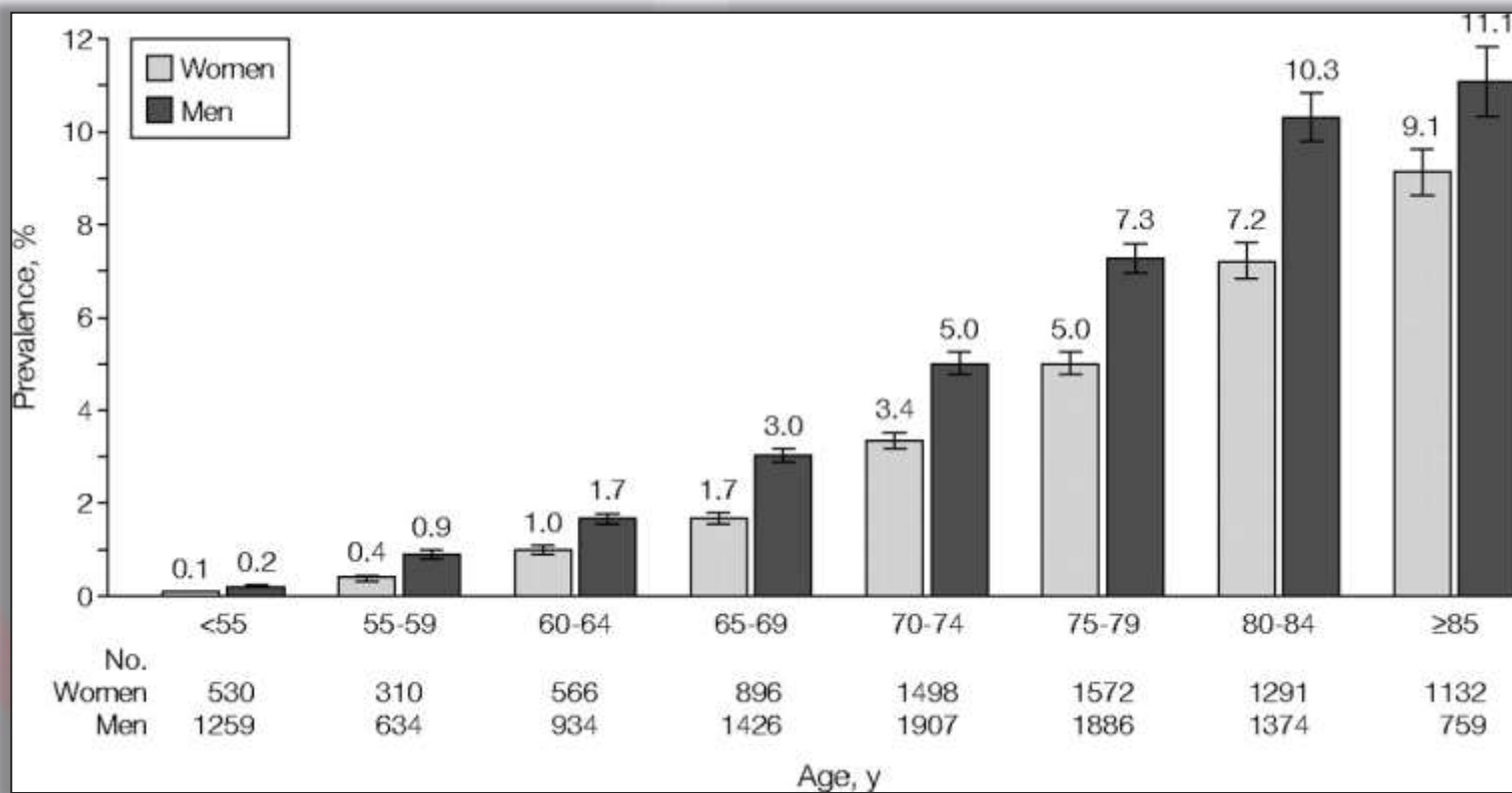
QOF AF Prevalence



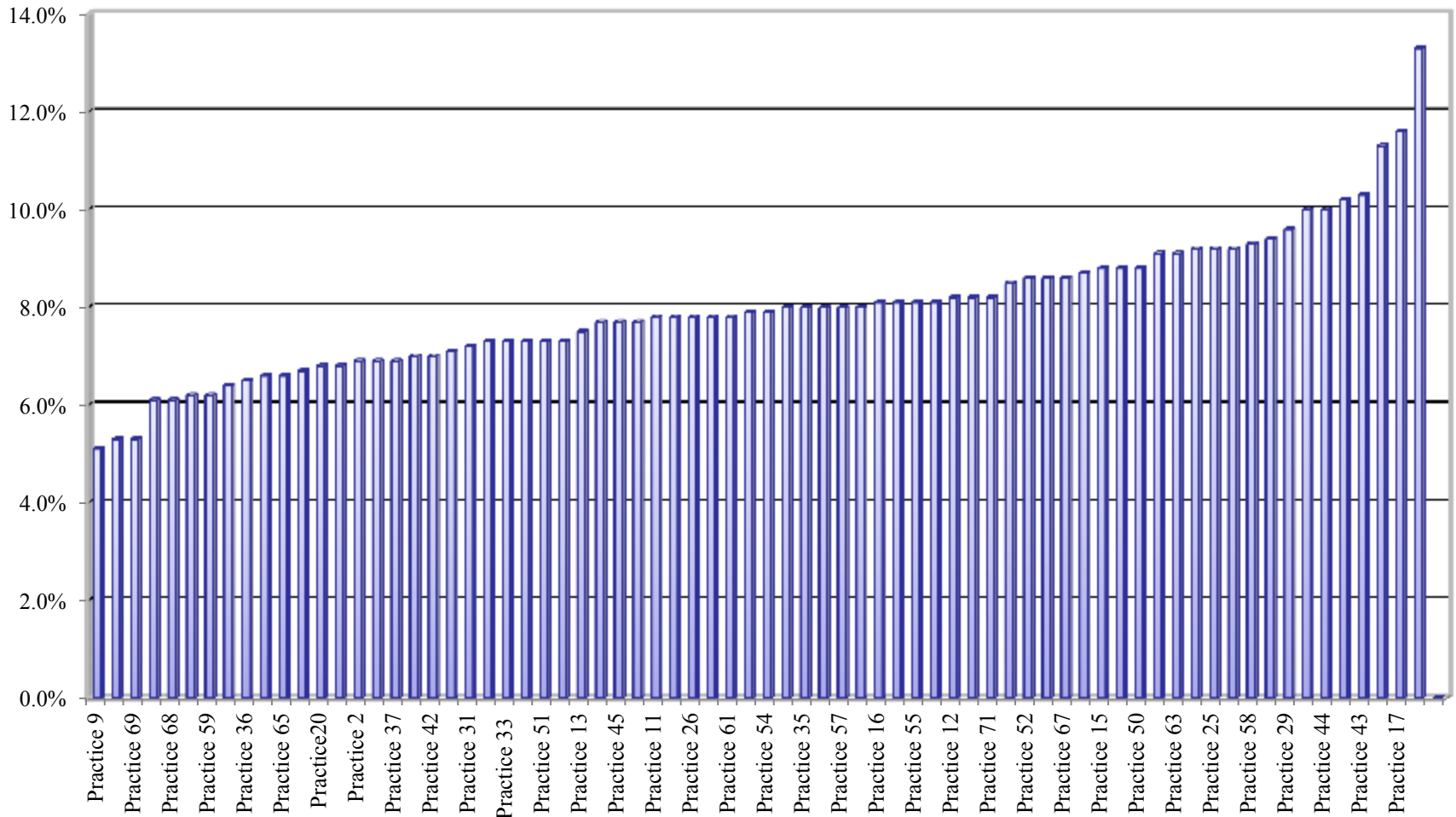
Prevalence of Atrial Fibrillation in Durham and Darlington - QOF 2008/09



Prevalence of diagnosed Atrial Fibrillation stratified by Age and Sex

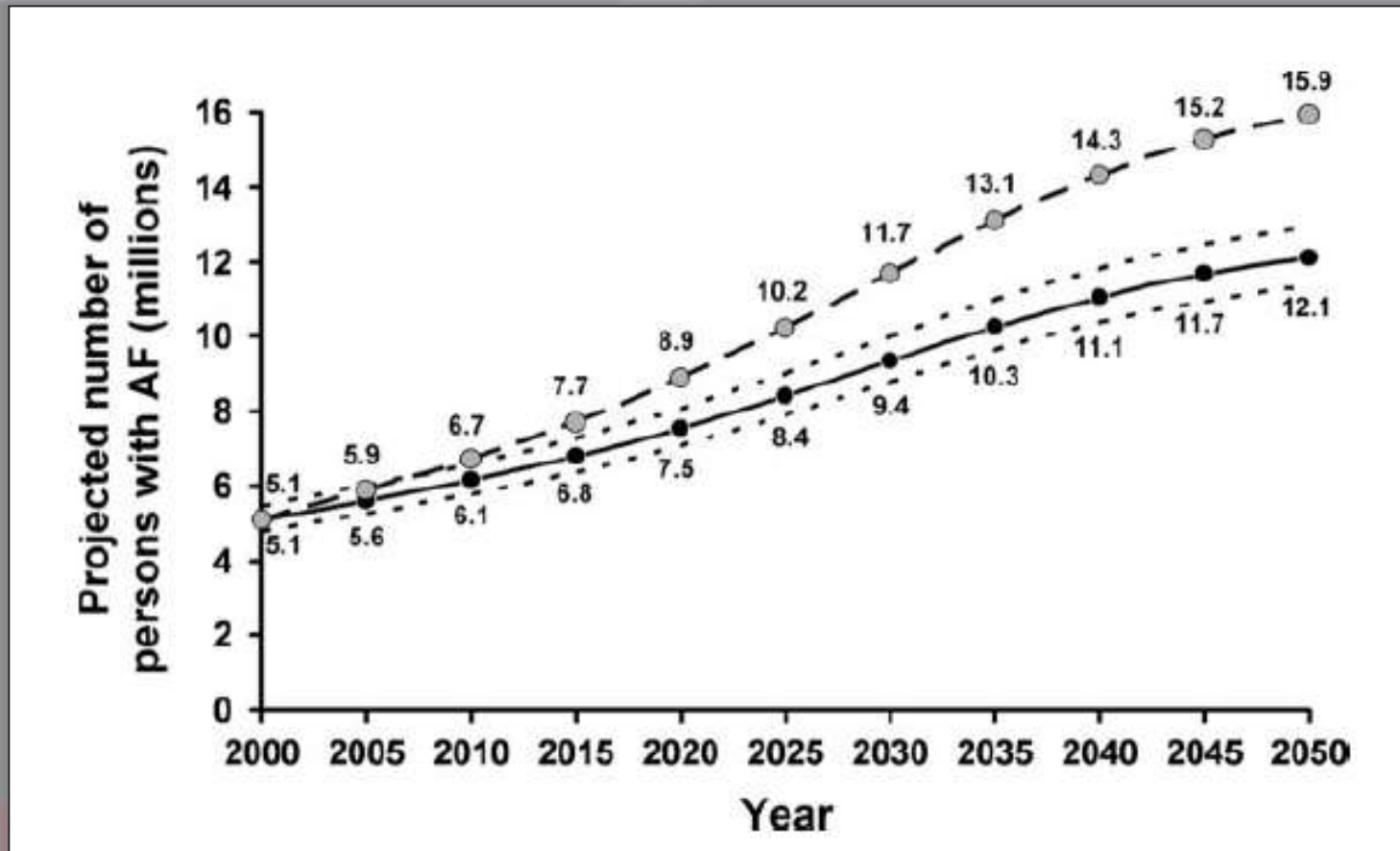


AF Prevalence / 65 yr old population County Durham



What's the true prevalence at present?

Secular Trends in Incidence of Atrial Fibrillation in Olmsted County, Minnesota, 1980 to 2000.



Projected number of persons with AF in the United States between 2000 and 2050, assuming no further increase in age-adjusted AF incidence (solid curve) and assuming a continued increase in incidence rate as evident in 1980 to 2000 (dotted curve).

Prevalence, incidence and lifetime risk of atrial fibrillation: the Rotterdam study

Table 2 Prevalence with 95% CI of AF at baseline by gender and age. The Rotterdam Study 1990-93 ($n = 6808$)

Age group (years)	All			Men			Women		
	<i>n</i>	Cases	Cases/ <i>n</i> ^a	<i>n</i>	Cases	Cases/ <i>n</i> ^a	<i>n</i>	Cases	Cases/ <i>n</i> ^a
55-59	1161	8	0.7 (0.4-1.4)	485	4	0.8 (0.3-2.1)	676	4	0.6 (0.2-1.5)
60-64	1411	24	1.7 (1.2-2.5)	620	16	2.6 (1.6-3.4)	791	8	1.0 (0.5-2.0)
65-69	1291	51	4.0 (3.0-5.2)	597	31	5.2 (3.7-7.3)	694	20	2.9 (1.9-4.4)
70-74	1130	68	6.0 (4.8-7.6)	464	32	6.9 (5.0-9.6)	666	36	5.4 (4.1-7.0)
75-79	855	77	9.0 (7.3-11.1)	330	43	13.0 (9.8-17.1)	525	34	6.5 (4.7-8.9)
80-84	533	72	13.5 (10.9-16.7)	164	25	15.2 (10.5-21.5)	369	47	12.7 (9.7-16.5)
≥85	427	76	17.8 (14.5-21.7)	95	17	17.9 (11.5-26.8)	332	58	17.5 (13.8-21.9)
All	6808	376	5.5 (5.0-6.1)	2590	165	6.0 (5.0-7.0)	4053	206	5.1 (4.5-5.8)

^aDenotes % (95% CI).

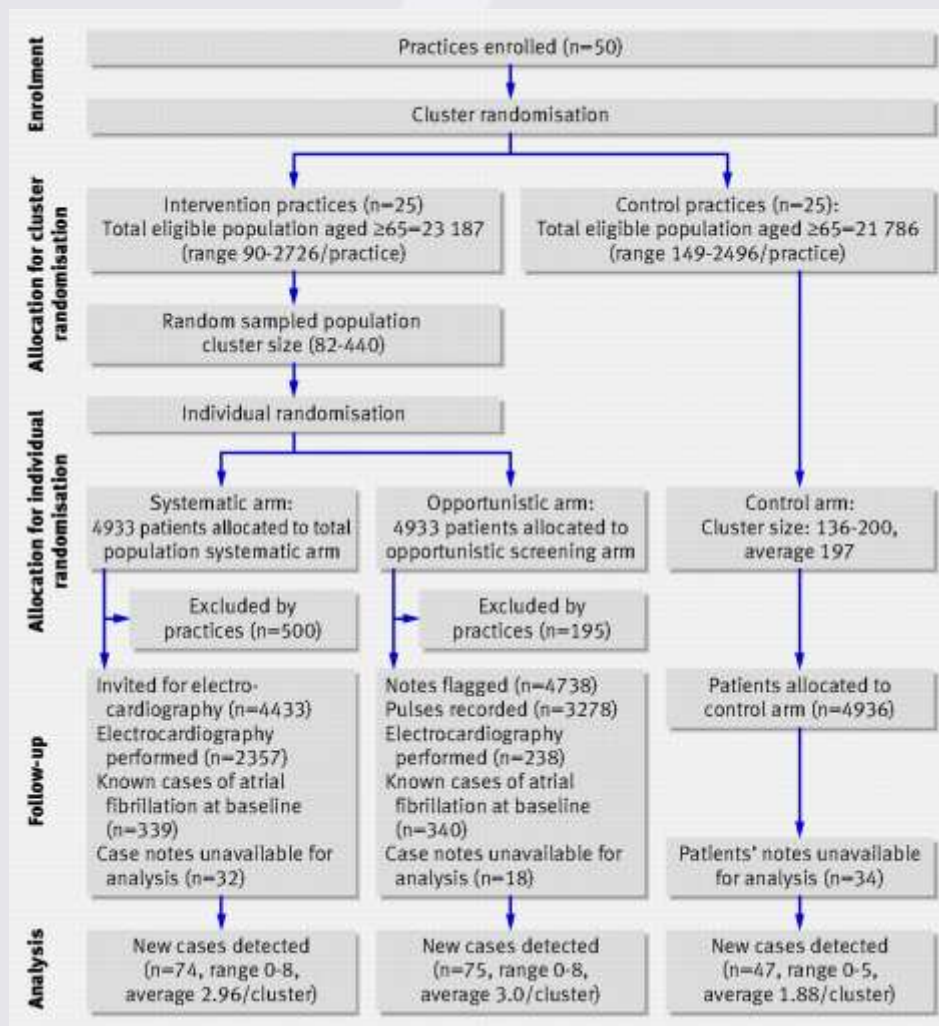
After 6.9 years mean follow up: prevalence 8.3%

Screening versus routine practice in detection of atrial fibrillation in patients aged 65 or over: SAFE

Table 3 | Prevalence and detection rate of new cases by age at start of study and sex. Figures are numbers (percentages)

Group	Men			Women			Total
	65-74	75-84	≥85	65-74	75-84	≥85	
Baseline prevalence							
Control	74/1216 (6.1)	84/703 (11.9)	25/156 (16.0)	44/1378 (3.2)	106/1050 (10.1)	56/420 (13.3)	389/4923 (7.9)
Opportunistic	70/1304 (5.4)	63/650 (9.7)	24/148 (16.2)	48/1448 (3.3)	91/1005 (9.1)	44/375 (11.7)	340/4930 (6.9)
Systematic	69/1318 (5.2)	67/647 (10.4)	15/154 (9.7)	68/1391 (4.9)	70/1022 (6.8)	50/396 (12.6)	339/4928 (6.9)
12 month prevalence							
Control	81/1213 (6.7)	91/699 (13.0)	27/151 (17.9)	55/1377 (4.0)	122/1044 (11.7)	60/418 (14.4)	436/4902 (8.9)
Opportunistic	90/1303 (6.9)	77/647 (11.9)	28/148 (18.9)	59/1443 (4.1)	109/1001 (10.9)	52/373 (13.9)	415/4915 (8.4)
Systematic	90/1312 (6.9)	82/643 (12.8)	23/154 (14.9)	77/1387 (5.6)	88/1012 (8.7)	53/398 (13.5)	413/4906 (8.4)
12 month new case detection							
Control	7/1139 (0.6)	7/615 (1.1)	2/126 (1.6)	11/1333 (0.8)	16/938 (1.7)	4/362 (1.1)	47/4513 (1.0)
Opportunistic	20/1233 (1.6)	14/584 (2.4)	4/124 (3.2)	11/1395 (0.8)	18/910 (2.0)	8/329 (2.4)	75/4575 (1.6)
Systematic	21/1243 (1.7)	15/576 (2.6)	8/139 (5.8)	9/1319 (0.7)	18/942 (1.9)	3/343 (0.9)	74/4562 (1.6)

Distribution of practices and participants through stages of study



Manual pulse palpation

Table 3. The test characteristics of clinical pulse assessment by the nurses in those systematically screened using different thresholds to define an abnormal pulse rhythm. Values are percentages (n = 1099) (95% confidence intervals).

	Threshold of nurse pulse assessment					
	n	Percentage with any irregularity (95% CI)	n	Percentage with frequent or continuous irregularity (95% CI)	n	Percentage with continuous irregularity (95% CI)
Sensitivity	61/67	91 (82–97)	48/67	72 (59–82)	36/67	54 (41–66)
Specificity	767/1032	74 (72–77)	972/1032	94 (93–96)	1009/1032	98 (97–99)
Positive predictive value	61/326	19 (15–23)	48/108	44 (35–54)	36/59	61 (47–73)
Negative predictive value	767/773	99 (98–100)	972/991	98 (97–99)	1009/1040	97 (96–98)
Positive likelihood ratio	–	3.6 (3.1–4.0)	–	12 (9.2–16)	–	24 (15–38)
Negative likelihood ratio	–	0.12 (0.06–0.26)	–	0.30 (0.28–0.32)	–	0.47 (0.36–0.62)

Morgan S, Mant D. *BJGP* 2002; 52: 373 -380

Sudlow M et al. *BMJ* 1998;317:327-328: **93% + sensitivity**

Screening versus routine practice in detection of atrial fibrillation in patients aged 65 or over: SAFE

Table 2 | New cases of atrial fibrillation (AF) by trial arm identified in case notes 12 months after baseline

Group	Patients	Baseline AF	Missing notes	Denominator	Newly identified cases	New case detection %
Control	4936	389	34	4513	47	1.04
Intervention:						
Total	9866	679	50	9137	149	1.63
Opportunistic*	4933	340	18	4575	75	1.64
Systematic*	4933	339	32	4562	74	1.62

*Subsets of total intervention population.

Choice of screening mode

- Systematic screening
- Opportunistic screening
 - Flu clinic
 - Flagging
 - Chronic disease management

Advantages

Disadvantages

Flagging records

Simple
High population coverage
Allows multiple pulse checks

Entire health care team needs to take part

Flu clinic

Simple
Fast

Limited population coverage
One pulse check
Increases stress of flu clinic

Chronic disease template

Simple
Good population coverage

Not everyone uses templates
Limited opportunities for pulse checks

AF screening in 'flu-clinics'

- Annual invitation in autumn
- Target population:
 - Patients aged 65 years +
 - Patients with chronic conditions
- High take up rate
- Dedicated clinics with high turnover

Detecting AF at Flu Vaccination:

The most cost-effective activity in the NHS?

Dr. Shane Gordon

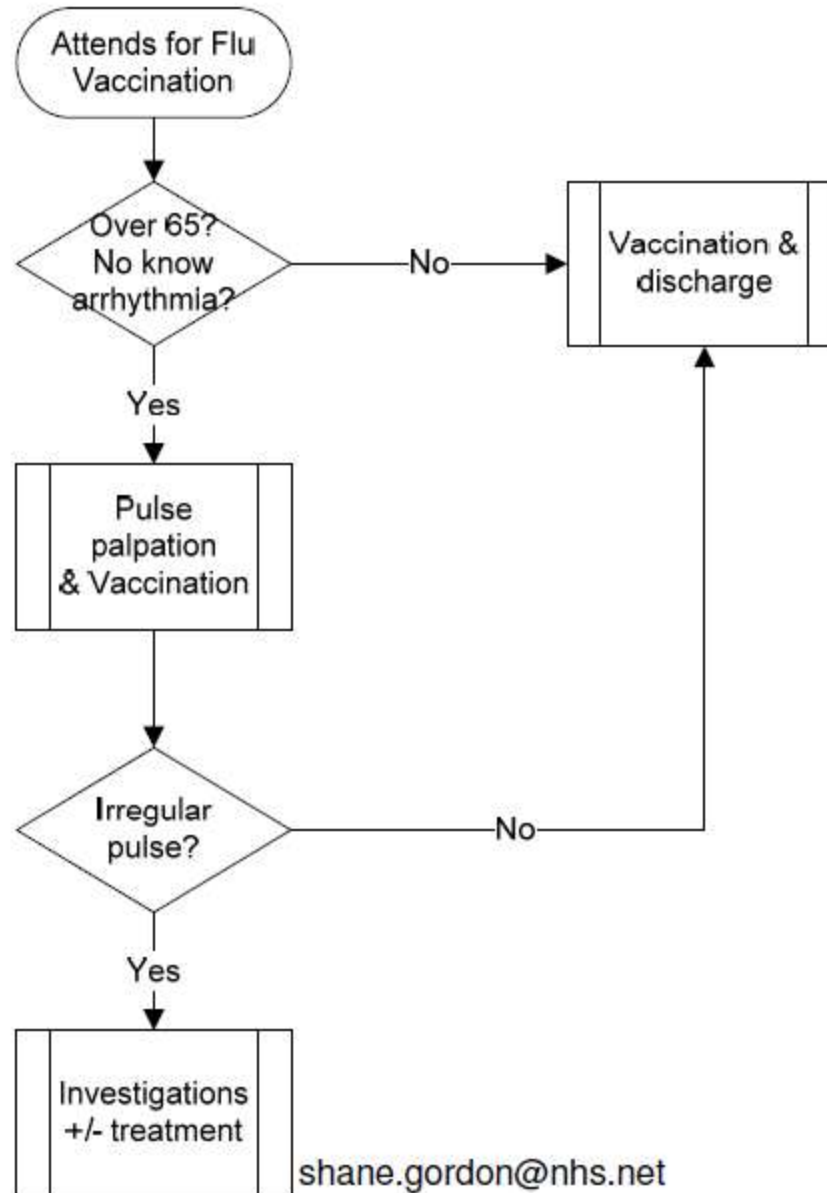
Associate Medical Director, NHS East of England

Undiagnosed AF



QoF Prevalences

- AF
 - National 1.2%
 - North East Essex 1.6% average (up to 4.8% in some practices)
- Stroke
 - National 1.6%
 - North East Essex 1.7% (up to 4% in some practices)



shane.gordon@nhs.net



Outcomes



37/43 practices in N E Essex Signed up to LES

- **34,201 patients screened** in 6 weeks
 - 3154 Patients found with irregular pulse (9.2%)
 - 189 Patients found with AF (0.55%)
 - 342 Patients found with other Arrhythmias (0.99%) including 2 in Complete H. Block!

Cost-Benefit Analysis



Outlay = £68,402k Diagnoses = 189

Cost per diagnosis = £362

Strokes prevented next year = **5** @ £44k

Annual cost saving (recurrent) = £220k

Return on investment = 322%

AF screening by ‘flagging’ patient records

Whinfield Surgery AF screening programme

Consultation Summary Guidelines Add List View Window Help

Patient Documents Workflow Intry

Copy of Copy of Initial View 4

Initial Filter

- 1 Problems
- 105 Consultation
- Drug Allergies & Adverse F
- 12 Recalls and Reviews
- Patient Preference
- 64 Medical History
- 33 Therapy
- 38 Lifestyle
- 40 Examination Findings
- 10 Immunisations
- 11 Miscellaneous
- 63 All Test Results
- New Registration Exam
- Well Person Clinic
- HP Interventions
- 84 Elderly
- Disease Registers
- Asthma
- Diabetes
- CV or Hypertension

Allergy Status not recorded

- Add Allergy
- Add No Allergy

Health promotion

- Clinical information missing

Current Recalls

Immunisations Due in Ne...

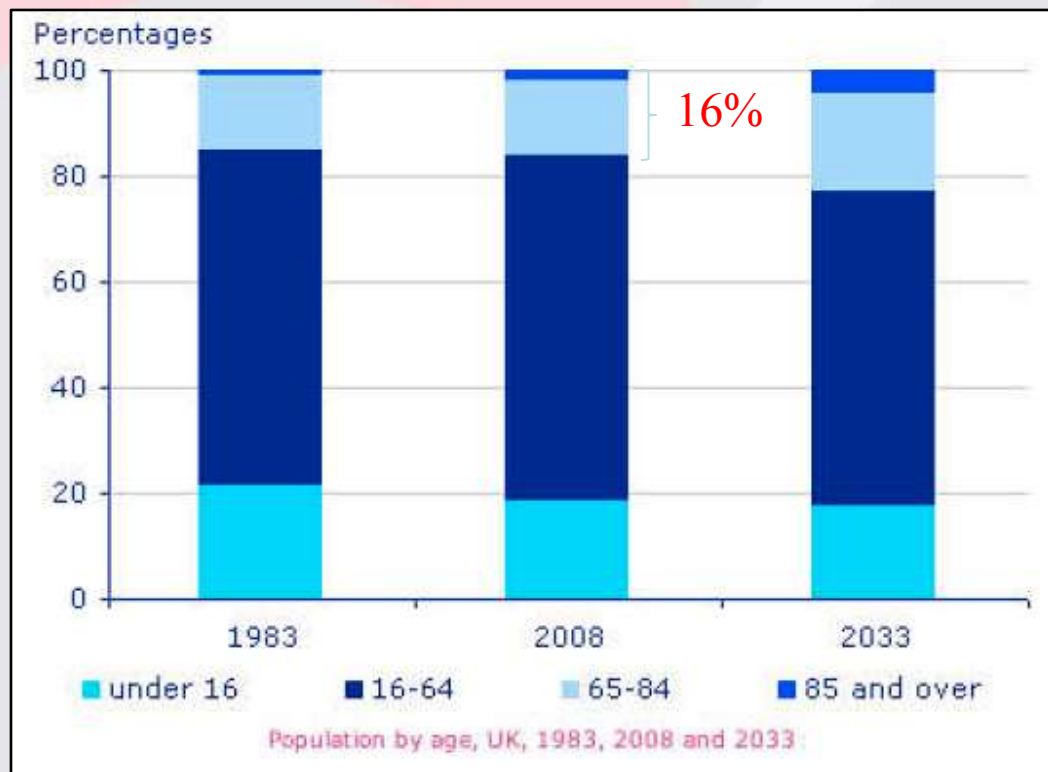
- Polio myelitis 1st 13/06/1925 o/d
- Tetanus 1st 13/06/1925 o/d

GMS13 Problems FLU

Appointments Patient Select Patient Details Consultations Journal Filtered List Summary

Date	Description		
26/05/09	Sample sent to lab. for test fbc.esr.rbs.lft.u&e. (AW)		
	H _s Abdominal pain almost one week of upper abd pain rad. to back. Slight nausea. Reg bowel mot o.e RUQ tenderness, mild, no guarding or rebound, no mass, not jaundiced T 36.0 p84 prob. GB, get bloods and U/S, counselled about alarm sympt.		
	LACTULOSE soln 3.1-3.7g/5ml Supply (500) mls 15ML TWICE DAILY		
	CODEINE PHOSPHATE tabs 15mg Supply (28) tablet(s) TAKE ONE 4 TIMES/DAY WHEN REQUIRED		
	CEFALEXIN caps 500mg Supply (15) capsule(s) TAKE ONE CAPSULE THREE TIMES A DAY		
07/10/08	AGRIPPAL vaccine Supply (1) 0.5ml pre-filled syringe AS DIRECTED		JB
	FLU Stage: 0 Given Routine Measure Due: 07/10/2009 consent no ci se discussed admin via pgd		MT
23/09/08	H _i Dressing of wound almost healed scab now come away rev 1 week or sos	4	SON
16/09/08	H _i Dressing of wound scab loosening but not ready for lifting. redressed primapore -review 1wk	4	AG
09/09/08	H _i Dressing of wound virtually healed small pin prick in middle of thick scab dry dressing applied she will change Friday rev Tues pt has dressings	4	SON
02/09/08	H _i Dressing of wound almost healed small open area in middle of wound redressed with Mepitel and pad rev 1 week or sos	4	
26/08/08	H _i Dressing of wound continues to heal redressed as before rev 1 week or sos as Mepitel can be left for 1 week and wound progressing well	4	
	Mepitel soft silicone wound dressing 8cm x 10cm [MOLNLYCKE] Supply (5) dressing(s)		JB
22/08/08	H _i Dressing of wound slow healing continues cleaned and redressed with Mepitel and pad rev Tues or sos	4	SON
19/08/08	H _i Dressing of wound redressed with mepitel, reports improving, has f/up appts	4	AG
15/08/08	H _i Dressing of wound wound continues to heal well, much improved since I last saw it. Reminder of scab from top wound removed. Scab around the existing wound lifting, but left in tact. Redressed with mepitel, pad and tubifast.	3	ANNA
12/08/08	H _i Dressing of wound slow healing continues wound shallower and smaller cleaned and redressed with Mepitel and pad rev Fri or sos	4	SON
08/08/08	H _i Dressing of wound redressed with Mepitel and pad rev Tues or sos	4	
05/08/08	H _i Dressing of wound slow healing continues redressed with mepitel and pad rev Fri	4	
	E45 crm Supply (500) g pump APPLY AS NEEDED		JB
01/08/08	H _i Dressing of wound continues to improve redressed with Mepitel and pad rev ITues or sos	4	SON
	Dressit sterile dress pk med/lge glo [RICHARDSON] Supply (10) pack		JB
	Tubifast blue line elast viscosc stock 7.5cm [MOLNLYCKE] Supply (1) 3 metre pack(s)		
	Mepitel soft silicone wound dressing 8cm x 10cm [MOLNLYCKE] Supply (5) dressing(s)		
29/07/08	H _i Dressing of wound slow healing continues redressed with Mepitel and pad rev Fri or sos	4	SON

1. 286799
2. Record #243.11 irregular pulse or #2431.1 regular pulse

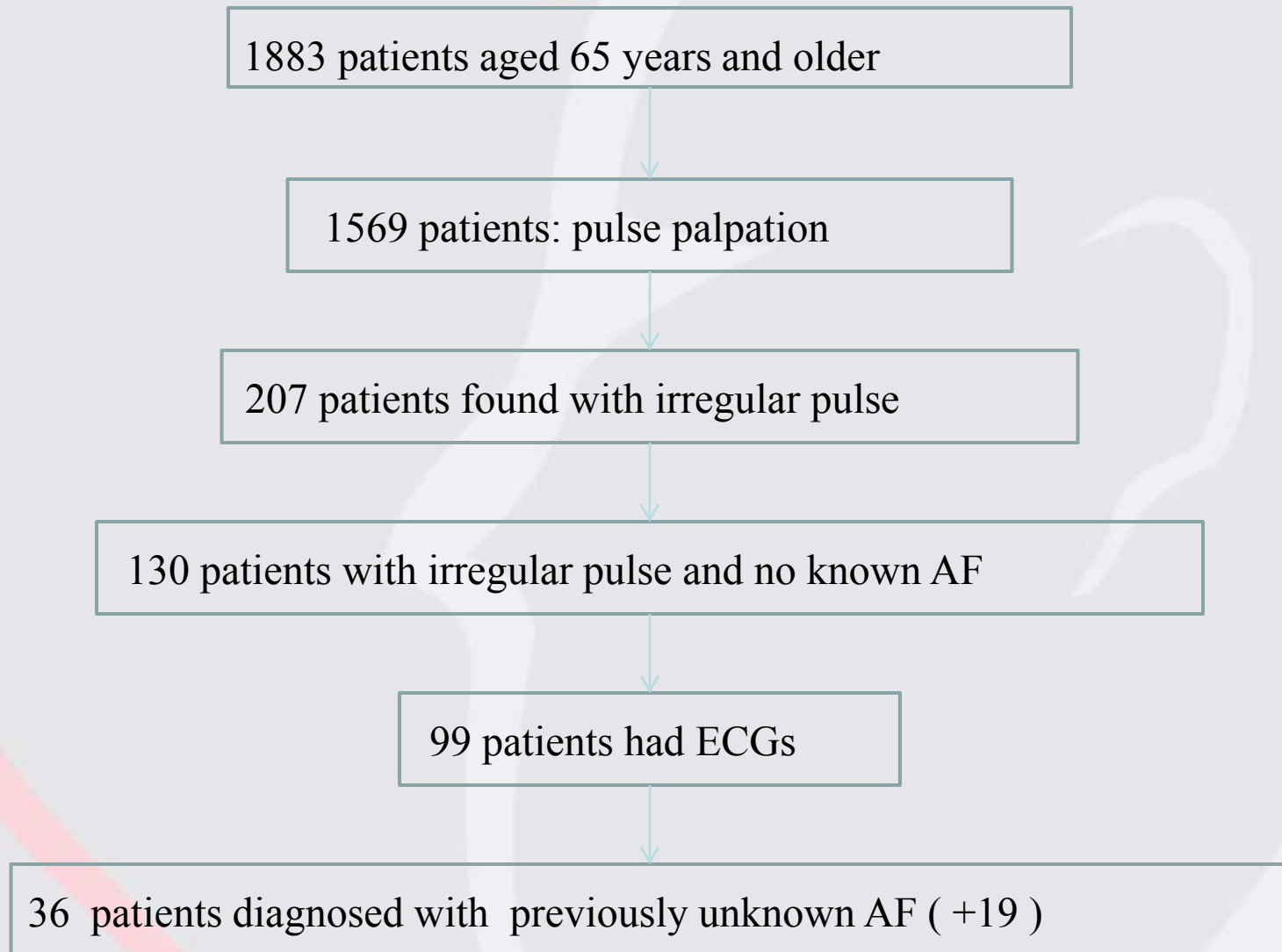


**National AF
Prevalence in 2008:
1.3%**

Whinfield Surgery: patients aged 65 and over = **16%**

Whinfield Surgery AF prevalence 2008 = **1.32%**

Opportunistic computer prompted screening 5/08 – 5/09



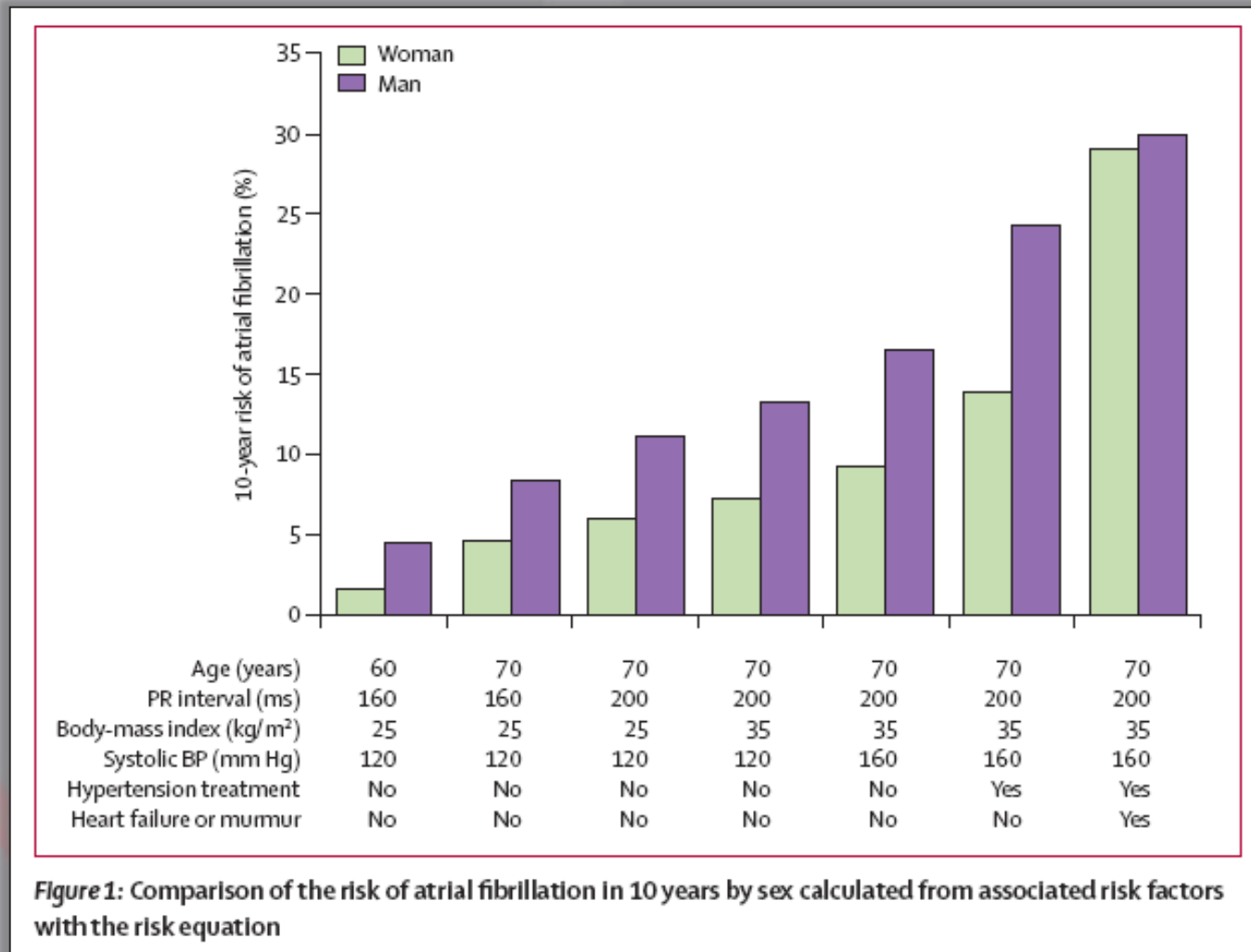
Key Facts

- 83.3% screened opportunistically
- 13% with irregular pulse
- 6.3% had ECGs
- 36% had AF on ECG
- Number needed to screen 43
- Change in prevalence 1.32 -> 1.82%
- Prevalence of 65ys and older: 10.9%

AF screening using chronic disease management templates

- Known risk factors for atrial fibrillation
- Chronic disease management systems
 - Recall
 - Regular review in dedicated clinic
 - Use of disease management templates
- NHS Health Check
- Good population coverage
- Lack of pulse check on many templates

Development of a risk score for atrial fibrillation (Framingham Heart Study): a community-based cohort study



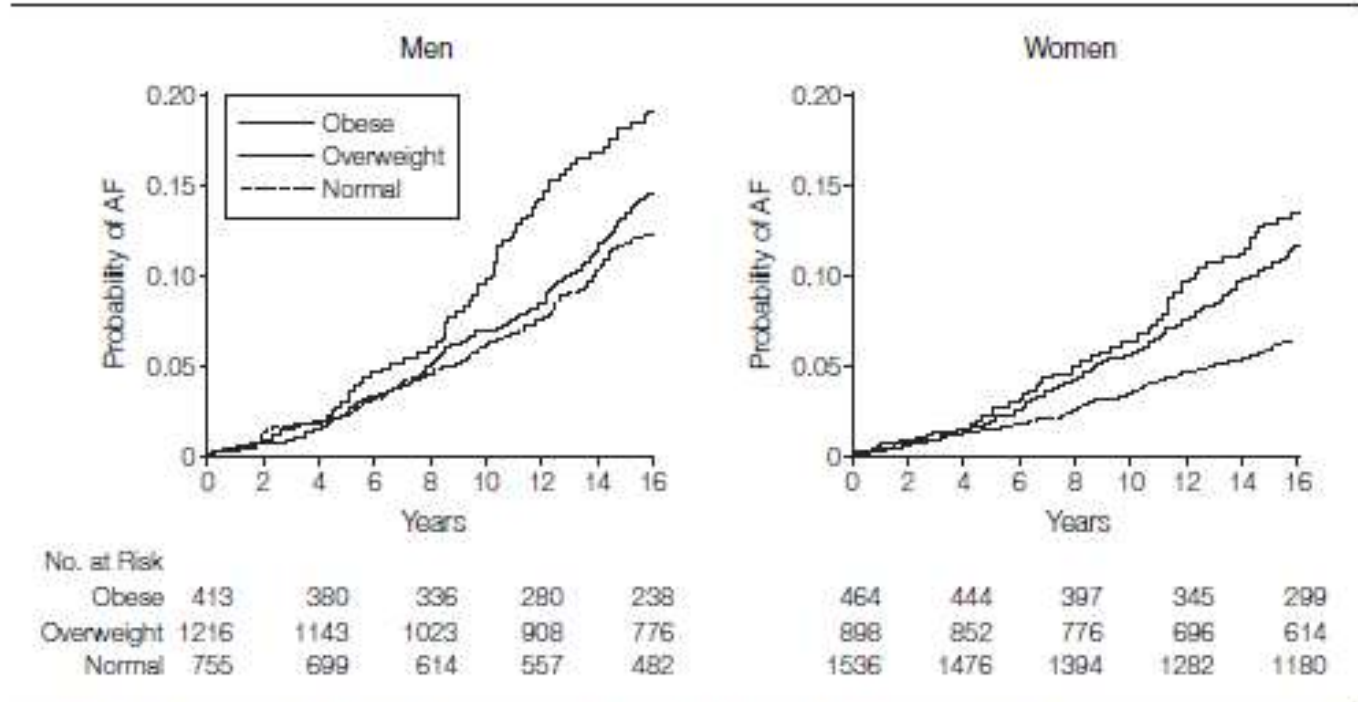
Chronic kidney disease and prevalent atrial fibrillation: The Chronic Renal Insufficiency Cohort (CRIC)

Table II. Prevalence of AF by eGFR, age, sex, and race/ethnicity

	N = 3267	AF n (%)	P value
All population	3267	602 (18.4%)	
eGFR (mL/[min 1.73 m ²])			.0010
<45	1795	367 (20.4%)	
≥45	1472	235 (16.0%)	
Age (y)			<.0001
<40	239	19 (7.9%)	
40-49	398	49 (12.3%)	
50-59	958	162 (16.9%)	
60-69	1217	256 (21.0%)	
≥70	455	116 (25.5%)	
Sex			.7807
Male	1775	324 (18.3%)	
Female	1492	278 (18.6%)	
Race/ethnicity			.0156
Non-Hispanic white	1627	273 (16.8%)	
Non-Hispanic black	1640	329 (20.1%)	

Obesity and the Risk of New-Onset Atrial Fibrillation

Figure. Kaplan-Meier Curves Showing Cumulative Hazards of Developing Atrial Fibrillation (AF) in Men and Women, by Baseline Body Mass Index Category



Horizontal axis represents time since the baseline examination. Body mass index categories were as follows: normal, <25.0; overweight, 25.0 to <30.0; and obese, ≥30.0.

AF screening in chronic disease management / health promotion

✓ Hypertension

✓ Heart failure

✓ CHD

✓ Stroke

✓ Diabetes

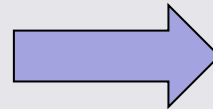
✓ CKD

✓ Over 75 checks

✓ COPD / Asthma

✓ Weight management

✓ NHS Health Check



**> 90% target
population
coverage**

FYI: Remittance Advice - Message (HTML)

LV for Windows (C) 2001 EMIS

File Edit View Macros Settings Favourites Help

Modules

nGMS Registers : 0 Alerts: 0 EDI: 0 PN: 27 Email: 0 Repeats Req: 0

No.23899. Mr Bishopgate Test, Bishopgate House 178 Newgate StreAge 36 years BISH

Template For Template Gms - Diabetes Mellit. (V16)

Prompt	Result	Date	Last Recorded Entry
DATE DIAGNOSED			DATE DIAGNOSED -----
*Diabet.resolved			*Diabet.resolved -----
Annual review			Annual review -----
Treatment mode			Treatment mode -----
Diabetes: practi			Diabetes: practi -----
O/E - height			178 cm 1.4.2009
O/E - weight			79 Kg 1.4.2009
*Body Mass Index			24.9 1.4.2009
O/E - pulse rate			60 /minute 26.11.2009
O/E - pulse rhyt			Irregular 26.11.2009

B
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P
R swine flu
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U
V
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X
Y
Z

Enter
Yes No

Network link CAP NUM Thu 16 Sep 2010 09:51 PJ-Mr P Jackson PDS-4.2 WS-N Line-536 Job-85 Tv-3

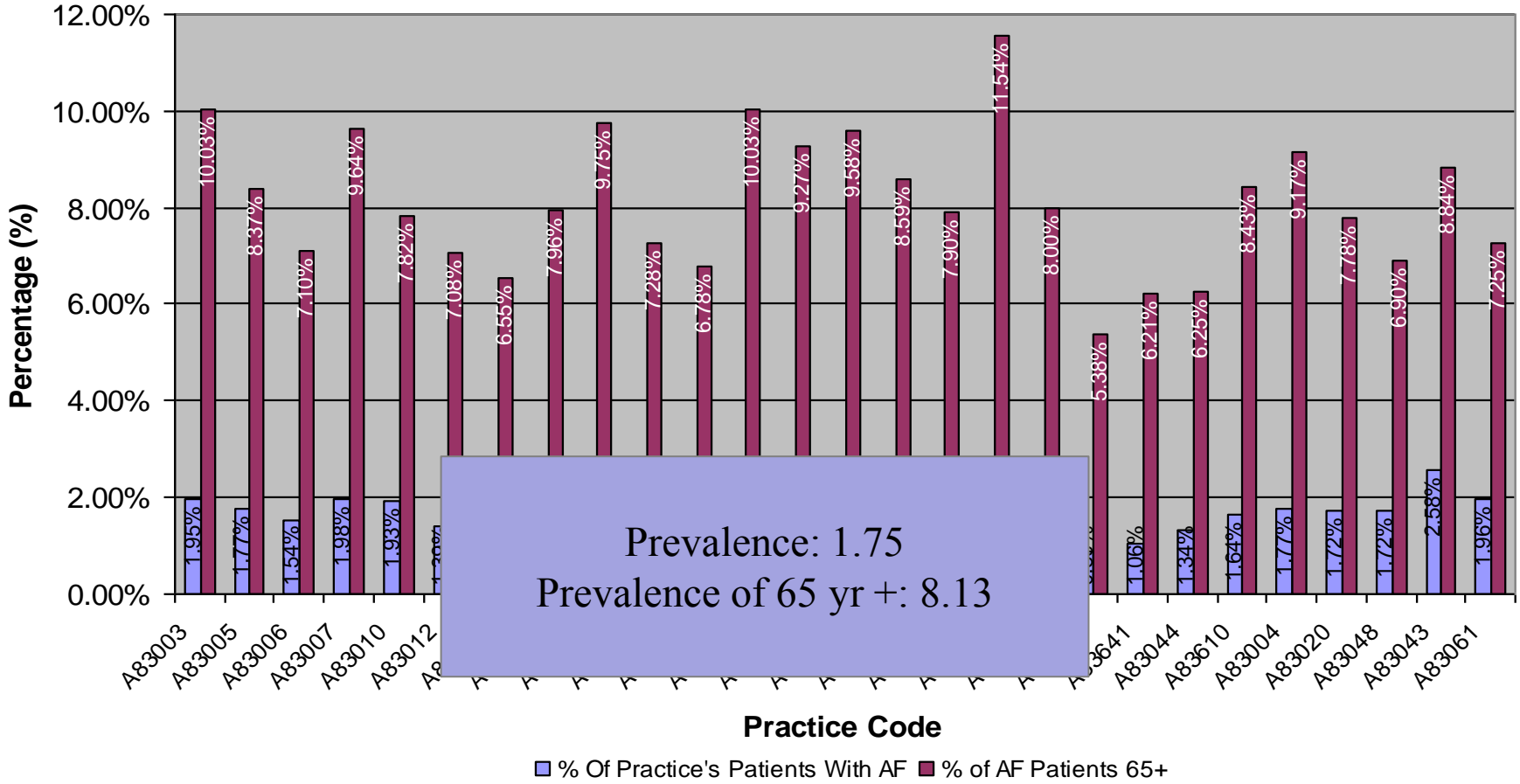
Start Inbox - Micros... HPV given at B... FYI: Remittanc... Network Viewe... LV5.2 Clinical 09:51

Interim report:



National Priority Project

Percentage Of Patients In Practices With AF



Conclusion

- Current QOF AF prevalence is a gross underestimation.
- Mode of screening is irrelevant.
Coverage counts!
- Requires little resources
- Requires virtually no training
- It really works
- It is cost effective

Thank you.

Questions: AndreasWolff@nhs.net