



# Repeat ischaemic heart disease audit of primary care patients (2002-2003): Comparisons by age, sex and ethnic group

## Baseline-repeat ischaemic heart disease audit of primary care patients: a comparison

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**Baseline-Repeat ischaemic heart disease audit of  
primary care patients: A comparison**

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## **Abstract**

A repeat clinical audit (2002-2003) of secondary prevention of IHD for patients on CHD registers was undertaken successfully in 17 GP practices, selected for having high proportions of patients of South Asian origin, and was a follow-up to the baseline clinical audit (2001-2002). The criteria for the audits related to the standards of the NSF: CHD.

The repeat audit identified aspirin (87.1%), beta-blockers (68.9%), statins (78.4%), and ACE-Inhibitors (55.8%) prescription levels for all patients. Checks for blood pressure, cholesterol, and HbAc1 in diabetics were identified in over 70% of patients. Advice on alcohol consumption, diets in diabetic and obese patients, and BMI checks were recorded at much lower levels. Mean cholesterol (4.43 mmol/L) and mean blood pressure levels (138.2/78.0 mmHg) indicated good control overall.

The baseline-repeat audit comparison based upon the 16 GP practices involved in the baseline clinical audit highlighted an overall increase in prescription levels for aspirin (81.2%:84.3%), beta-blockers (63.2%:68.9%), and statins (72.9%:76.4%) and in all subgroups.

Checks for blood pressure (75.2%:85.9%) rose in the repeat audit for all patients and in all subgroups. Cholesterol, BMI, smoking status, HbAc1 in diabetic checks, and advice on exercise, alcohol consumption, and on diets in diabetic and obese patients, were recorded at comparatively lower levels.

Mean cholesterol level decreased (4.72:4.45 mmol/L) in the repeat audit for all patients and in the subgroups, though not significant statistically.

Reductions in the proportion of patients with high cholesterol values (>5 mmol/L) (32.1%:23.5%), and high BMI values (>30 kg/m<sup>2</sup>) (39.7%:26.5%) were observed, though not significant statistically. The proportion of patients with high blood pressures (>150/90), and high HbAc1 levels in diabetics (>7.5), remained similar in both audits (6.8%:7.8%; 58.3%:63.9% respectively).

Both audits and their comparison revealed only few differences of IHD management between ethnic, sex, and age groups, but these were exceptions to the overall similarities of care. Improved prevention and management of patients registered with IHD in all practices over time has been observed, with some scope for further improvement in health status and life style monitoring.

## Introduction

This report details the repeat clinical audit (2002-2003) of secondary prevention for ischaemic heart disease (myocardial infarction, angina, IHD) and is a follow-up to the previously documented baseline clinical audit (2001-2002).<sup>1</sup> It presents findings of the repeat audit – examining IHD care overall, and between the ethnic groups (South Asians; White), sexes (men; women), and age groups (<65 years; ≥65 years). The report proceeds by comparing the findings between the baseline and repeat clinical audits with the aim of examining the quality of primary care IHD management over time. The audits form part of a larger research project that aims to examine the equity of access to primary care services between South Asian and non-South Asian patients with coronary heart disease.

The role of IHD as being the major cause of morbidity and mortality in the UK is well documented.<sup>2</sup> IHD also exemplifies inequalities in health, mortality rate is stated to be 46% higher for South Asian men and 51% higher for South Asian women than for the comparable indigenous White population.<sup>3</sup> This in turn has meant that ethnicity has become a key variable to describe patterns of IHD morbidity and mortality in the UK. There are also sex differences in IHD mortality rates; one in four of all men and one in six of all women die from IHD in the UK.<sup>2</sup> That age differences in IHD morbidity and mortality exist are well recognized. The Office for National Statistics stated 16,439 deaths from coronary heart disease amongst people aged below 65 years, compared to 104,452 deaths amongst those aged 65 years and over in the UK during 2001.<sup>4</sup>

The UK's National Service Framework for Coronary Heart Disease (NSF:CHD)<sup>5</sup> establishes clear standards and milestones that require primary health care to identify and institute preventive strategies for people with established IHD and for those with an absolute 10-year cardiovascular risk greater than 30%. More specifically, standards 1-3 of the NSF:CHD require primary health care teams in England to identify patients with established CHD, record their coronary risk factors and offer appropriate treatment that will lead to major improvements in the quality of and access to care.

Indeed, there is clear evidence that effective secondary prevention for CHD conditions can significantly reduce the risk of coronary events and death. Murchie et al<sup>6</sup> describe 'effective secondary prevention' as comprising of several elements which includes pharmacological interventions. Aspirin, beta-blockers, statins and angiotensin converting enzyme (ACE) inhibitors (for patients who have had a myocardial infarction) will reduce the incidence of cardiac events and improve survival, and should be prescribed unless contraindicated. In collaboration with pharmacotherapy, the importance of interventions to alter behavior and

modify lifestyle, such as regular physical activity, smoking cessation, healthy eating, and achieving and maintaining an ideal body weight are also highlighted. As the majority of patients with IHD are treated within the primary care setting, the onus is upon the primary health care team not only to provide such care, but also to ensure that there is an equitable provision of care for all groups of society regardless of age, sex or ethnic group origin.

Research studies and audits examining primary care management of IHD, both at national and local level, are scarce. Those that do exist have observed unmet auditable standards of care and differences in IHD management by age, sex and ethnicity. Stewart et al<sup>7</sup> conducted an audit of primary care angina management upon 358 patients from 15 practices and found that 66.5% of patients were taking aspirin, 62.1% nitrates, 58.4% beta-blockers and 40.5% had their cholesterol measured. They also observed that non-White patients were significantly less likely to receive nitrates, lifestyle advice and were less likely to have their blood pressure measured. Those aged 65 years and over were less likely to receive a cholesterol check and women were less likely than men to receive a beta-blocker prescription. An extensive study conducted by Hippisley-Cox et al<sup>8</sup> upon 5891 men and women with IHD found that men were significantly more likely to have height, weight, body mass index and smoking status recorded than women, and were significantly more likely to be prescribed aspirin.

Research studies and audits examining primary care management of IHD have tended to take a snapshot of their study sample at any one time. Few studies have conducted follow-up repeat audits upon components of secondary prevention of IHD in order to evaluate the quality of care provision over time. One such study is Murchie et al's evaluation of the effects of nurse-led clinics in primary care upon secondary prevention of CHD at baseline, one and four-year follow ups.<sup>6</sup> Nurse-led secondary prevention clinics showed significant improvements over time in all components of secondary prevention – with the exception of diet advice and smoking status recording, which did not vary with the length of exposure. Aspirin prescription increased from the baseline audit by just over 10% at the one-year follow-up (69%:81%), as did blood pressure recording (87%:97%).

At the local level, the Bristol North Primary Care Trust Coronary Heart Disease baseline (2001-2002)<sup>9</sup> and repeat (2002-2003)<sup>10</sup> audits involving 33 general practices have observed a continued provision of quality care to patients with established CHD, including improvements in aspirin (66%:85%) and statin (52%:73%) prescribing for patients with IHD over the two audits. Whilst the results showed that the recording of blood pressure monitoring remained at a consistently high level in both audits (84%), areas were also

identified where positive action for improvements could be made – particularly in relation to the data recording of smoking status.

The clinical audit of secondary prevention of IHD (2001-2002),<sup>1</sup> which forms the baseline for this current repeat audit, was undertaken in 16 practices in Bristol and included 351 patients – the data for which was collected shortly after the formation of the CHD registers. In comparison to the baseline audit of the whole of the Bristol North Primary Care Trust, the baseline data of the current study overall indicated more favorable monitoring and management of IHD patients. Aspirin (78.3%), beta-blockers (56.1%), statins (72.4%), and ACE-Inhibitors (61.1%) prescription levels were identified for all patients, and checks for blood pressure, cholesterol, and HbA1c (in diabetics) were identified in over 70% of all patients.

#### *Aims of the IHD audits*

The aims of both the baseline (2001-2002) and repeat (2002-2003) clinical audits are to assess the identification and treatment of coronary risk factors, and provision of lifestyle advice and drug therapy. The audits are designed to evaluate the local effectiveness of the NSF:CHD, following its initial implementation in 2001. The audits aim to examine care for all IHD patients, and between the sexes, age groups and ethnic groupings for the 12-month periods they represent (April-March 2001-2002; April-March 2002-2003), and over time (by directly comparing the findings of the baseline and repeat audits). A separate report of the baseline audit findings has been previously documented.<sup>1</sup>

### *Criteria and standards*

The criteria for the audits relate to the standards and milestones set out by the NSF:CHD, these include:

1. Patients should be given lifestyle advice on of the following: diet, exercise, alcohol and smoking <sup>i</sup>
2. Coronary risk factors (e.g. hypertension, diabetes, cholesterol, smoking) should be identified and treated.
3. The use of aspirin, unless contraindicated should be prescribed.
4. A statin should be prescribed, in the absence of contraindications.
5. A beta-blocker should be prescribed to all patients who have had a myocardial infarction, unless contraindicated.
6. An ACE-Inhibitor should be prescribed to all patients who have had a myocardial infarction, in the absence of contraindications. <sup>ii</sup>

In addition, referral rates for coronary artery bypass graft (CABG) and coronary artery venous graft (CAVG) were examined in both the baseline and repeat audits – and are therefore applicable to the baseline-repeat audit comparison analysis. Referral rates for a catalogue of other interventions were examined in the repeat audit only, and these are consequently not applied to the baseline-repeat audit comparison. These included referral to: rapid access chest pain clinic (RACPC), cardiologist, echocardiograph, exercise ECG, angioplasty graph, cardiac rehabilitation, support to stop smoking, and referral to a dietician.

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<sup>i</sup> For the purpose of this study, the criterion of ‘smoking status recording’ is utilized rather than recording of advice provision on how to stop smoking/use nicotine replacement therapy, as required by the NSF:CHD.

<sup>ii</sup> The denominator used for the prescription of ACE-Inhibitors in this study is all myocardial infarction patients, and not patients with myocardial infarction and left ventricular dysfunction as required in the NSF:CHD.

## **Methodology**

The baseline clinical audit involved sixteen general practices from Bristol with sizable South Asian populations. All 'new' patients listed onto the CHD registers of these practices were included in the repeat audit sample. Furthermore, an additional seventeenth GP practice from Bristol was invited to participate – the data of which contributed towards the repeat clinical audit. In an attempt to examine whether the management of IHD patients had improved since the baseline clinical audit, a baseline-repeat audit comparison was conducted. For a statistical comparison, the repeat audit sample consisted of all 'new' patients listed (since March 2002) on the IHD registers of the 16 GP practices that participated in the baseline audit.

For both audits, each practice provided their current IHD register. All patients of South Asian origin were selected as the South Asian sample by their surname, whilst White patients were randomly selected from the same registers. Patients from other minority ethnic groups were excluded from the study. Information regarding patients' age, sex was also obtained from the practice IHD registers.

The baseline and repeat audits involved patients registered with IHD by March 2002 and March 2003 respectively, with the reporting period for the baseline audit being 1<sup>st</sup> April 2001 to 31<sup>st</sup> March 2002, and for the repeat audit being 1<sup>st</sup> April 2002 to 31<sup>st</sup> March 2003.

For each patient, items of data were collected by the Research Associate and a list of these appears in Box 1. A combination of data collection methods (e.g. via computerized clinical system and manual paper trawl) was utilized where for example practices were still operating on a dual notes system (paper and electronic). Ethical approval for the study was obtained from two Local Research Ethics Committees.

### *Data Analysis*

Data entry and analysis was carried out using STATA 8 and Epi Info 2000 packages. The computer databases contained no identifiers that could formally be attributed to the patients.

### *Statistical Methods*

The chi<sup>2</sup> test was used for comparing proportions in two groups. Yates's continuity correction was used to reduce biases due to small-recorded values. Fisher's exact test was employed where numbers were small enough to produce values of <5 for expected values in the chi<sup>2</sup> calculation. For the chi<sup>2</sup> analysis, patients' ethnicity was arranged into two discrete groups (South Asian and White); ages were categorized into two discrete age groups (<65 and

≥65). Using these categories along with data collected on the patients' sex (male or female), each intervention variable was tested for association with ethnicity, age group and sex. For the purpose of the baseline-repeat clinical audit comparison, the variable 'audit' was also dichotomized (baseline; repeat). Each intervention variable for the ethnicity, sex and age sub-groupings was examined by the audit variable in order to examine potential variations in the provision of IHD care over time.

Relative risk (RR) was calculated for examining the proportions of interventions carried out. RR refers to the risk of one group not receiving a particular intervention relative to the other group not receiving it. For example, an RR of 1.00 means that there is no difference in risk between the two groups. An RR of 1.68 for ACE-Inhibitors in relation to ethnicity for the repeat clinical audit analysis means that South Asian patients are 1.68 times more likely to be prescribed ACE-Inhibitors than White patients. Whilst a RR of 1.64 for ACE-Inhibitors in relation to women in the baseline-repeat audit comparison means that women in the baseline audit are 1.64 times more likely to be prescribed ACE-Inhibitors than women in the repeat audit.

Box 1.

Patient data collected from clinical notes.

- IHD diagnoses (co-morbidity for diabetes, hypertension and obesity)
- Aspirin Rx/Aspirin OTC<sup>1</sup>
- Beta-blocker Rx<sup>1</sup>
- Statin Rx<sup>1</sup>
- ACE-Inhibitor Rx<sup>1</sup>
- Coronary artery bypass graft (CABG)/ venous graft (CAVG) <sup>1</sup>
- Height check<sup>2</sup>
- Weight check<sup>2</sup>
- Body mass index (BMI) check<sup>2</sup>
- Blood pressure check<sup>2</sup>
- Total cholesterol check<sup>2</sup>
- Smoking status recorded<sup>2</sup>
- Alcohol advice<sup>2</sup>
- Dietary advice<sup>2</sup>
- HbAc1 check<sup>2,3</sup>
- Mean no. of visits to GP/Practice nurse for IHD<sup>2</sup>

<sup>1</sup> Ever had the stated medication/management

<sup>2</sup> Monitoring/advice/visits within the 12-month audit period

<sup>3</sup> Conducted upon IHD patients who also have diabetes

## Results

The sixteen general practices involved in the baseline clinical audit contributed data on 351 patients. Their mean age was 60.8 years; 64.9% were men and 73.8% were White – the remainder being South Asian. The inclusion of the seventeenth GP practice as well as of all ‘new’ White and South Asian patients (from the sixteen baseline practices) listed on IHD registers since March 2002, increased the repeat audit sample to 495. The mean age of these patients rose to 64.0 years; 64.4% were men and 72.1% White – the remainder were of South Asian origin. Based upon statistical requirements, the repeat audit sample for the baseline-repeat clinical audit comparison, consisted of all ‘new’ patients (from the sixteen practices) listed on the IHD registers since March 2002, and included 106 patients. The mean age of patients in the comparative repeat audit sample rose to 66.6 years; 55.7% were men and 77.4% white – the remainder being of South Asian origin. Box 2 shows the demographic details of patients in the baseline and repeat clinical audit samples.

Box 2.			
<u>Demographics of patients included in the clinical audits (%)</u>			
	<b>Baseline audit (16 practices)</b>	<b>Repeat audit (17 practices)</b>	<b>Repeat audit* (16 practices)</b>
<b>Frequency</b>			
<i>Ethnicity</i>			
White	259 (73.8)	357 (72.1)	82 (77.4)
South Asian	92 (26.2)	138 (27.9)	24 (22.6)
<i>Sex</i>			
Men	228 (64.9)	319 (64.4)	59 (55.7)
Women	123 (35.1)	176 (35.6)	47 (44.3)
<i>Age group</i>			
< 65 years	233 (66.4)	255 (51.5)	43 (40.6)
≥ 65 years	118 (33.6)	240 (48.5)	63 (59.4)
<b>Total</b>	<b>351 (100.0)</b>	<b>495 (100.0)</b>	<b>106 (100.0)</b>
* Audit sample used in the baseline-repeat audit comparison analyses			

The remainder of this section of the report will be divided into two parts. The first part will present findings of the repeat clinical audit of primary care IHD patients (2002-2003), whilst the second part will highlight the comparative analyses of the baseline (2001-2002) and repeat (2002-2003) clinical audits of primary care IHD patients.

### **Repeat clinical audit of primary care IHD patients (2002-2003)**

#### *IHD diagnoses*

A summary and breakdown of patient IHD diagnoses for the repeat IHD clinical audit (2002-2003) can be found in Appendix 1. Overall, approximately a third (34.8%) of all IHD patients in the repeat clinical audit had a doctor diagnosis of myocardial infarction (MI). 26.1% of South Asian patients in the audit had a diagnosis of MI compared to 38.1% of White patients. 39.5% of all men in the audit had an MI diagnosis compared to 26.1% of all women, and 36.5% of all patients aged below 65 years had an MI diagnosed by the doctor compared to 32.9% of all patients aged 65 years and over.

43.2% of all IHD patients within the repeat clinical audit had a doctor diagnosis of angina. Overall, 45.7% of South Asian patients compared 42.3% of White patients had an angina diagnosis. A greater proportion of women (55.7%) than men (36.4%) had a diagnosis of angina, whilst rates for all patients aged below 65 years and those 65 years or above had rates that were not too dissimilar (41.2%:45.4% respectively).

Overall, 22.0% of all patients had a combination diagnosis for an MI and angina. More South Asian IHD patients (28.3%) than White patients (19.6%) in the audit had an MI and angina diagnosis. More men (24.1%) than women (18.2%) had a dual MI and angina doctor diagnosis. However, the proportions of IHD patients with a combination MI and angina diagnosis was similar for those aged below 65 years and those aged 65 years and above (22.3%:21.7%). South Asian patients with any angina (74.0%) were greater in proportion to White patients (61.9%), whilst South Asian patients with any MI (54.4%) were similar in proportion to White patients (57.7%).

IHD co-morbidity for conditions that increase the risk of IHD (e.g. diabetes, hypertension, and obesity) for both audits, are also shown in Appendix 1. Overall, South Asian patients had a greater prevalence of IHD and diabetes compared to Whites (47.8%:21.0%), whilst white patients were more likely to have an IHD and obesity diagnosis (a BMI value equal to or greater than 30kg/m<sup>2</sup>) (14.8%:8.7%). Overall, 48.3% of all women had an IHD and hypertension co-morbidity compared to 40.8% of all men. In relation to age group, a greater proportion of patients aged 65 years or above had an IHD and diabetes co-morbidity than those aged below 65 years (30.4%:26.7%), whilst the co-morbidity of IHD and obesity was greater amongst those aged below 65 years (15.3%) than those patients in the audit aged 65 years or above (10.8%).

### *Medication and management*

A summary of medication and management of IHD patients in the repeat clinical audit for all patients, by ethnicity, sex and age group is shown in Table 1. In all, 87.1% of IHD patients were prescribed aspirin or obtained over-the-counter (OTC) aspirin, excluding contraindications. There were no associations between ethnicity, sex or age group and aspirin prescribing. Overall, 68.9% of MI patients were prescribed beta-blockers (excluding contraindications), with no associations between ethnicity, sex or age group and beta-blocker prescribing. A total of 78.4% of IHD patients were recorded as being prescribed statins (excluding contraindications). 81.3% of all men were prescribed a statin compared to 73.3% of all women; this association between sex and having a statin prescription recording was statistically significant ( $p=0.039$ ,  $RR=1.19$ ). Overall, 55.8% of MI patients were recorded as being prescribed ACE-Inhibitors (excluding contraindications). In total, 68.0% of South Asian patients were recorded as being prescribed ACE-Inhibitors compared to 51.2% of all White patients; this association between ethnicity and having an ACE-Inhibitor prescription recording was significant ( $p=0.013$ ,  $RR=1.32$ ). No significant associations were observed for either sex or age group and ACE-Inhibitor prescription recording.

### *Monitoring and lifestyle advice*

A summary of patient monitoring and the provision of lifestyle advice is shown in Table 2. Overall, 24.4% of IHD patients had their height check recorded within the specified 12-month audit period, and 56.7% had their weight check recorded. 65.2% of South Asian patients had their weight check recorded compared to 53.5% of White patients. There was a statistically significant association between ethnicity and having a weight check recording ( $p=0.018$ ,  $RR=1.22$ ). A total of 60.8% of all men had their weight check recorded compared to 49.4% of all women. This association between the sex of the patient and having a weight check recording was statistically significant ( $p=0.014$ ,  $RR=1.22$ ). In all, 80.6% of all IHD patients had a blood pressure check, 38.0% had a body mass index (BMI) recorded and 74.1% had a cholesterol check recording. A total of 84.1% of South Asian patients received a cholesterol check recording compared to 70.3% of White patients; there was a statistically significant association between ethnicity and having a cholesterol check recording ( $p=0.002$ ,  $RR=1.20$ ). Overall, 33.5% of IHD patients had their smoking status monitored and recorded. A total of 21.7% of South Asian patients compared to 38.1% of White patients had their smoking status monitored. This association between ethnicity and having smoking status monitored and recorded was statistically significant ( $p=0.001$ ,  $RR=0.57$ ).

**Table 1. Repeat Clinical Audit of Primary Care IHD Patients: Medication and Management of IHD<sup>1</sup> (%)**

		Aspirin (Inc. OTC) IHD patients (excluding contraindicated)	Beta-blocker MI patients (excluding contraindicated)	Statins IHD patients (excluding contraindicated)	ACE-inhibitor MI patients (excluding contraindicated)
<b>All patients</b>		418 (87.1)	182 (68.9)	385 (78.4)	155 (55.8)
<b>Ethnicity</b>	South Asian	118 (87.4)	53 (75.7)	111 (81.0)	51 (68.0)
	White	300 (86.9)	129 (66.5)	274 (77.4)	104 (51.2)
	$\chi^2$	0.018	2.041	0.765	6.242
	p	0.895	0.153	0.382	0.013
	RR1	1.01	1.14	1.05	1.32
	95%CI	0.93-1.08	0.96-1.34	0.95-1.16	1.08-1.63
<b>Sex</b>	Men	276 (88.5)	131 (70.1)	256 (81.3)	115 (57.5)
	Women	142 (84.5)	51 (66.2)	129 (73.3)	40 (51.3)
	$\chi^2$	1.505	0.372	4.242	0.879
	p	0.220	0.542	0.039	0.348
	RR2	1.04	1.06	1.19	1.12
	95%CI	0.97-1.13	0.88-1.27	0.99-1.44	0.88-1.44
<b>Age group</b>	<65	213 (84.9)	103 (72.0)	206 (81.4)	90 (60.0)
	≥65	205 (89.5)	79 (65.3)	179 (75.2)	65 (50.8)
	$\chi^2$	2.311	1.389	1.758	2.379
	p	0.128	0.238	0.185	0.123
	RR3	0.95	1.10	1.08	1.18
	95%CI	0.88-1.02	0.93-1.30	0.99-1.19	0.95-1.46

<sup>1</sup> Ever had the stated medication/management (calculations based upon relative diagnosis)

RR1 means the risk of White people not receiving an intervention, relative to South Asians not receiving it

RR2 means the risk of women not receiving an intervention, relative to men receiving it

RR3 means the risk of people aged 65 or over not receiving an intervention, relative to people aged under-65 not receiving it

Data is from an audit of 17 GP practices in Bristol

In all, 26.5% of patients had received exercise advice and 25.9% of all patients had received alcohol advice that had been recorded. A total of 17.4% of South Asian patients compared to 29.1% of White patients received alcohol advice. This association between ethnicity and alcohol advice recording was statistically significant ( $p=0.008$ ,  $RR=0.60$ ). There was also a statistically significant association between sex and alcohol advice recording, with 30.4% of men receiving alcohol advice compared to 17.6% of women ( $p=0.002$ ,  $RR=1.73$ ).

Overall, 30.5% of all IHD patients in the audit, 46.2% of IHD patients with a BMI greater than 30kg/m<sup>2</sup>, and 37.6% of IHD patients with diabetes were recorded as having received advice regarding diet. A total of 39.9% of all South Asian IHD patients received dietary advice compared to 26.9% of all IHD patients; this difference achieved statistical significance (p=0.005, RR=1.48). Furthermore, a total of 46.9% of South Asian IHD patients with a diagnosis of diabetes received dietary advice compared to 29.3% of White patients with like diagnoses. This association between ethnicity and receiving a recording for dietary advice if the patient had a co-morbidity of diabetes was statistically significant (p=0.031, RR=1.60). Finally, 75.9% of all IHD patients with diabetes in the audit had an HbAc1 recording; there was no association between any of the socio-demographic sub-groups and receiving an HbAc1 recording.

**Table 2. Repeat Clinical Audit of Primary Care IHD Patients: IHD Monitoring and Advice<sup>1</sup> (%)**

			Height check	Weight check	Blood pressure check	BMI check	Cholesterol check	Smoking status	Alcohol advice	Exercise advice	Dietary advice	Dietary advice BMI ≥30 <sup>2</sup>	Dietary advice Diabetics <sup>3</sup>	HbAc1 check Diabetics <sup>3</sup>
<b>All patients</b>	(n=495)		121 (24.4)	281 (56.7)	399 (80.6)	188 (38.0)	367 (74.1)	166 (33.5)	128 (25.9)	131(26.5)	151 (30.5)	30 (46.2)	53 (37.6)	107 (75.9)
<b>Ethnicity</b>	(n=138)	South Asian	35 (25.4)	90 (65.2)	114 (82.6)	44 (31.9)	116 (84.1)	30 (21.7)	24 (17.4)	44 (31.9)	55 (39.9)	7 (58.3)	31 (46.9)	50 (75.8)
	(n=357)	White	86 (24.1)	191 (53.5)	285 (79.8)	144 (40.3)	251 (70.3)	136 (38.1)	104 (29.1)	87 (24.4)	96 (26.9)	23 (43.4)	22 (29.3)	57 (76.0)
		$\chi^2$	0.087	5.567	0.491	3.018	9.815	11.946	7.156	2.888	7.891	0.880	4.655	0.001
		p	0.768	0.018	0.484	0.082	0.002	0.001	0.008	0.089	0.005	0.348	0.031	0.973
		RR1	1.05	1.22	1.03	0.79	1.20	0.57	0.60	1.31	1.48	1.63	1.60	0.99
		95%CI	0.75-1.48	1.04-1.42	0.94-1.14	0.60-1.04	1.08-1.32	0.38-0.79	0.41-0.89	0.97-1.77	1.13-1.94	0.43-8.24	1.04-2.47	0.82-1.20
<b>Sex</b>	(n=319)	Men	84 (26.3)	194 (60.8)	259 (81.2)	130 (40.8)	238 (74.6)	113 (35.4)	97 (30.4)	93 (29.2)	103 (32.3)	17 (44.7)	38 (39.2)	73 (75.3)
	(n=176)	Women	37 (21.0)	87 (49.4)	140 (79.6)	58 (32.9)	129 (73.3)	53 (30.1)	31 (17.6)	38 (21.6)	48 (27.3)	13 (48.1)	15 (34.1)	34 (77.3)
		$\chi^2$	1.731	5.989	0.197	2.928	0.102	1.434	9.684	3.333	1.346	0.071	0.334	0.067
		p	0.188	0.014	0.658	0.087	0.750	0.231	0.002	0.068	0.246	0.785	0.564	0.796
		RR2	1.25	1.22	1.02	1.23	1.02	1.18	1.73	1.35	1.18	0.94	1.15	0.97
		95%CI	0.89-1.76	1.03-1.46	0.93-1.12	0.96-1.58	0.91-1.14	0.90-1.54	1.20-2.47	0.97-1.88	0.87-1.58	0.29-2.63	0.71-1.86	0.80-1.19
<b>Age group</b>	(n=255)	<65	64 (25.1)	148 (58.0)	204 (80.0)	107 (41.9)	193 (75.7)	85 (33.3)	61 (23.9)	76 (29.8)	85 (33.3)	16 (41.0)	29 (42.7)	53 (77.9)
	(n=240)	≥65	57 (23.8)	133 (55.4)	195 (81.3)	81 (33.8)	174 (72.5)	81 (33.8)	67 (27.9)	55 (2.9)	66 (27.5)	14 (53.8)	24 (32.9)	54 (73.9)
		$\chi^2$	0.121	0.347	0.124	3.539	0.655	0.009	1.029	3.014	1.985	1.032	1.433	0.303
		p	0.727	0.556	0.725	0.060	0.418	0.922	0.310	0.083	0.159	0.309	0.231	0.582
		RR3	1.06	1.05	0.98	1.24	1.04	0.99	0.87	1.30	1.21	0.81	1.30	1.05
		95%CI	0.77-1.44	0.89-1.22	0.90-1.07	0.99-1.56	0.94-1.16	0.77-1.27	0.64-1.16	0.96-1.75	0.93-1.59	0.19-1.82	0.85-1.99	0.87-1.27

<sup>1</sup> Monitoring and advice provided within the specified 12-month audit period

<sup>2</sup> Calculations conducted upon IHD patients with a body mass index of 30 kg/m<sup>2</sup> or higher

<sup>3</sup> Calculations conducted upon IHD patients who also had diabetes

RR1 means the risk of White people not receiving an intervention, relative to South Asians not receiving it

RR2 means the risk of women not receiving an intervention, relative to men receiving it

RR3 means the risk of people aged 65 or over not receiving an intervention, relative to people aged under-65 not receiving it

Data is from an audit of 17 GP practices in Bristol

### *Mean clinical measurements and consultation rates*

Clinical measurements for all IHD patients in the repeat audit were taken. These constituted the most recent systolic and diastolic blood pressure reading, BMI reading, cholesterol level, and HbAc1 reading for IHD patients with a co-morbidity of diabetes – recorded within the 12-month audit period. In addition, the numbers of IHD-related visits to the GP and practice nurse made by each patient were also examined. Table 3 shows differences by ethnicity, sex and age group for these continuous variables.

The overall mean systolic blood pressure for all IHD patients in the repeat audit was 138.24 (mmHg). There were associations between both ethnicity and age group with systolic blood pressure. South Asian patients had a lower mean systolic blood pressure (133.34) than White patients (140.20;  $p=0.003$ ). Patients aged below 65 years also had a lower mean systolic blood pressure (134.49) than those aged 65 years and above (142.09;  $p=0.001$ ). The overall mean diastolic blood pressure was 78.02. Patients aged below 65 years had a higher mean diastolic blood pressure (79.44) than patients aged 65 years and over (76.53).

The overall mean BMI for all IHD patients was 29.20 ( $\text{kg/m}^2$ ). There was an association between ethnicity and BMI level; South Asian patients had a statistically significant lower mean BMI value (27.62) than White patients (29.69;  $p=0.047$ ). There was also an association between the sex of the patient and BMI level; male patients in the audit had a statistically significant lower mean BMI level (28.31) than female patients (31.24;  $p=0.002$ ). The mean cholesterol level for all IHD patients was 4.43 (mmol/l), and the mean HbAc1 value (for IHD patients with a co-morbidity of diabetes) was 7.97. Neither variable was associated with ethnicity, sex or age group.

Finally, the mean numbers of IHD-related visits by patients to their GP and practice nurse were calculated. The overall mean numbers of visits paid to the GP and practice nurse were 1.72 and 1.45 respectively. Associations between ethnicity and visits to the GP and practice nurse were observed. Mean visits to the GP were more frequent amongst South Asian than White patients (1.92:1.65;  $p=0.019$ ). Similarly, mean visits to the practice nurse were more frequent amongst South Asian patients than whites (1.78:1.32;  $p=0.001$ ). Associations were also found between the sex of the patient and visits to the GP and practice nurse for IHD. Male patients made significantly more visits to the GP and practice nurse than female patients (GP - 1.83:1.54  $p=0.006$ ; practice nurse - 1.57:1.24  $p=0.005$ ).

**Table 3. Repeat Clinical Audit of Primary Care IHD Patients: Clinical Measurements and IHD Consultation Rates<sup>1</sup>**

			Mean blood pressure		Mean	Mean	Mean	Mean no. of	Mean no. of
			Systolic	Diastolic	BMI	Cholesterol	HbAc1 <sup>2</sup>	visits to GP	visits to
								for IHD	Practice Nurse
								for IHD	for IHD
<b>All patients</b>	(n=495)		138.24	78.02	29.20	4.43	7.97	1.72	1.45
<b>Ethnicity</b>	(n=138)	South Asian	133.34	77.60	27.62	4.33	8.11	1.92	1.78
	(n=357)	White	140.20	78.19	29.69	4.48	7.84	1.65	1.32
		t	-2.972	-0.463	-1.995	-1.180	0.716	2.348	3.598
		95%CI	-11.39--2.32	-3.08-1.90	-4.13--0.23	-0.39-0.99	-0.46-0.99	0.04-0.49	0.21-0.70
		p	0.003	0.644	0.047	0.238	0.476	0.019	0.000
<b>Sex</b>	(n=319)	Men	137.17	77.91	28.31	4.41	7.87	1.83	1.57
	(n=176)	Women	140.19	78.21	31.24	4.46	8.17	1.54	1.24
		t	1.372	0.252	3.104	0.400	0.761	-2.721	-2.793
		95%CI	-1.31-7.34	-2.06-2.66	1.07-4.79	-0.19-0.28	-0.48-1.08	-0.49--0.08	-0.57--0.09
		p	0.171	0.802	0.002	0.689	0.448	0.006	0.005
<b>Age group</b>	(n=255)	<65	134.49	79.44	29.49	4.52	7.91	1.80	1.54
	(n=240)	≥65	142.09	76.53	28.83	4.34	8.01	1.64	1.34
		t	-3.665	2.549	0.736	1.559	-0.256	1.569	1.792
		95%CI	-11.67--3.52	0.66-5.14	-1.11-2.43	-0.04-0.41	-0.82-0.63	-0.04-0.36	-0.02-0.43
		p	0.000	0.011	0.463	0.119	0.799	0.117	0.074

<sup>1</sup> Clinical measurements and consultations provided within the specified 12-month audit period

<sup>2</sup> HbAc1 calculations were conducted upon CHD patients who also had diabetes

p-values refer to the difference between mean values for the dichotomized ethnicity, sex and age group variables

Data is from an audit of 17 GP practices in Bristol

No associations were observed between age group and IHD-related visits to the GP or practice nurse.

### *Referrals*

Rates of referrals or clinical advice and interventions for all IHD patients, recorded within the 12-month repeat audit period were also examined. In all, 24.2% of all IHD patients had a cardiologist referral recording. A total of 27.6% of all male patients compared to 18.2% of female patients had a cardiologist referral; this difference was statistically significant ( $p=0.019$ ,  $RR=1.51$ ). Cardiac rehabilitation referral also showed a positive bias in referral rates for men. Overall, 4.4% of all patients had a cardiac rehabilitation recording; 6.3% of men compared to 1.1% of women had this recording ( $p=0.008$ ,  $RR=5.50$ ).

The overall total proportion of patients having a recording for the other referral interventions examined in the repeat audit were: 7.3% for coronary artery bypass graft (CABG) and/or coronary artery venous graft (CAVG); 0.6% for rapid access chest pain clinic (RACPC); 0.81% for echo cardiograph; 1.2% for angioplasty graph; 1.0% to the Support to Stop Smoking Service, and 1.8% to a dietician. None of these seven interventions were meaningfully different between the ethnic, sex or age groupings. A summary of referral interventions for all IHD patients in the repeat clinical audit, by ethnicity, sex, and age group is shown in Table 4.

**Table 4. Repeat Clinical Audit of Primary Care IHD Patients: IHD Referrals (%)**

			CABG/ CAVG	RACPC	Cardiologist	Echo	Exercise ECG	Angioplasty Graph	Cardiac Rehabilitation	Support to Stop Smoking	Dietician
<b>All patients</b>	(n=495)		36 (7.3)	3 (0.6)	120 (24.2)	4 (0.81)	22 (4.4)	6 (1.2)	22 (4.4)	5 (1.0)	9 (1.8)
<b>Ethnicity</b>	(n=138)	South Asian	10 (7.3)	0	36 (26.1)	0	8 (5.8)	2 (1.5)	6 (4.4)	2 (1.5)	0
	(n=357)	White	26 (7.3)	3 (0.8)	84 (23.5)	4 (1.1)	14 (3.9)	4 (1.1)	16 (4.5)	3 (0.8)	9 (2.5)
		$\chi^2$	0.000	1.167	0.355	1.559	0.824	0.089	0.004	0.369	3.543
		p	0.989	0.280	0.552	0.212	0.364	0.764	0.948	0.543	0.060
		RR1	0.99	n/a	1.10	n/a	1.47	1.29	0.97	1.72	n/a
		95%CI	0.49-2.00	n/a	0.80-1.55	n/a	0.63-3.45	0.24-6.98	0.39-2.43	0.29-10.21	n/a
<b>Sex</b>	(n=319)	Men	25 (7.8)	2 (0.6)	88 (27.6)	4 (1.3)	17 (5.3)	5 (1.6)	20 (6.3)	4 (1.3)	8 (2.5)
	(n=176)	Women	11 (6.3)	1 (0.5)	32 (18.2)	0	5 (2.8)	1 (0.6)	2 (1.1)	1 (0.6)	1 (0.6)
		$\chi^2$	0.423	0.007	5.462	2.225	1.654	0.946	7.037	0.533	2.390
		p	0.515	0.936	0.019	0.136	0.198	0.331	0.008	0.465	0.122
		RR2	1.25	1.10	1.51	n/a	0.87	2.78	5.50	2.20	4.41
		95%CI	0.63-2.48	0.10-12.08	1.06-2.18	n/a	0.70-4.99	0.32-23.43	1.30-23.33	0.25-19.59	0.56-35.00
<b>Age group</b>	(n=255)	<65	24 (9.4)	0	63 (24.7)	2 (0.7)	8 (3.1)	3 (1.2)	13 (5.1)	4 (1.6)	5 (1.9)
	(n=240)	≥65	12 (5.0)	3 (1.3)	57 (23.8)	2 (0.8)	14 (5.8)	3 (1.3)	9 (3.8)	1 (0.4)	4 (1.7)
		$\chi^2$	3.568	3.207	0.062	0.004	2.116	0.006	0.529	1.641	0.059
		p	0.059	0.073	0.804	0.951	0.146	0.940	0.467	0.200	0.807
		RR3	1.88	n/a	1.04	0.94	0.70	0.94	1.36	3.76	1.17
		95%CI	1.03-1.70	n/a	0.76-1.42	0.13-6.62	0.40-1.22	0.19-4.62	0.59-3.12	0.42-33.44	0.32-4.32

<sup>1</sup> Ever had the stated medication/management (calculations based upon relative diagnosis)

RR1 means the risk of White people not receiving an intervention, relative to South Asians not receiving it

RR2 means the risk of women not receiving an intervention, relative to men receiving it

RR3 means the risk of people aged 65 or over not receiving an intervention, relative to people aged under-65 not receiving it

Data is from an audit of 17 GP practices in Bristol

**Baseline (2001-2002) - Repeat (2002-2003) clinical audit of primary care IHD patients: comparison**

*IHD diagnoses*

A summary and breakdown of patient IHD diagnoses for both the baseline (2001-2002) - repeat (2002-2003) IHD clinical audit can be found in Appendix 2. Overall, the proportion of patients with a diagnosis of myocardial infarction (MI) showed a slight increase in the repeat clinical audit, from approximately a third (36.5%) of all IHD patients in both the baseline to 44.3% in the repeat clinical audit. The proportion of South Asian patients with a diagnosis of MI also increased in the repeat audit (33.7%:41.7%), as was the case for all White patients (37.5%:45.1%); all men (39.0%:49.2%); all women (31.7%:38.3%); patients aged below 65 years (37.3%:48.8%), and for patients aged 65 years and above (34.7%:41.3%). The diagnosis of angina showed no major differences overall (43.6%:40.6%), or for any of the ethnicity, sex or age sub-groupings between the two audits. The proportion of patients with a MI and angina diagnosis decreased slightly in the repeat clinical audit (19.7%:15.1%), with this pattern being reflected for each of the ethnicity, sex, and age sub-groupings, particularly so for South Asians (26.1%:16.7%), and for all patients aged below 65 years (18.9%:9.3%).

IHD co-morbidity for conditions that increase the risk of IHD (e.g. diabetes, hypertension, and obesity) for both audits, are also shown in Appendix 2. Overall for all patients, the prevalence of IHD and diabetes was greater in the baseline than in the repeat clinical audit (28.2%:17.9%). This pattern of diagnosis was reflected for the ethnicity, sex, and age sub-groupings, particularly so for South Asians (57.6%:29.2%), all women (26.8%:12.8%), and for patients aged 65 years or above (33.1%:17.5%). The co-morbidity of obesity (35.4%:35.5%) and hypertension (6.8%:5.6%) remained similar in both the baseline and repeat clinical audits for all patients, with this pattern reflected in the data for all sub-groupings.

*Medication and management*

The baseline-repeat clinical audit comparison of medication and management for all patients and for each of the ethnicity, sex, and age sub-groupings is shown in Table 5. Figure 1 shows the baseline-repeat audit comparison for medication and management for all patients. Results indicate an increase in the repeat audit for the prescription of aspirin, beta-blockers, and statins overall and a marginal increase in ACE-Inhibitors for all MI patients. This increase was reflected in most the socio-demographic sub-groupings, achieving 5% significance levels for aspirin prescription amongst all men (78.2%:91.4%,  $p=0.023$

RR=1.17). Table 7 also shows a general decrease in the prescription of aspirin (84.4%:78.3%) and ACE-Inhibitors (83.6%:64.3%; for all MI patients) amongst South Asians in the repeat clinical audit, though not significant statistically. The repeat audit also indicated a general decrease in the prescription of all drugs amongst women, yet not achieving statistical significance. The prescription levels of all four drugs remained similar across both audits for all patients aged 65 years or above.

Finally, referral rates for CABG/CAVG interventions showed a small decrease (6.8%:5.7%) from the baseline audit for all IHD patients. There was however an increase for South Asians by 6% (6.5%:12.5%), and a 4% increase for patients aged below 65 years (7.3%:11.6%). All other socio-demographic sub-groupings indicated a slight decrease in referral rates for CABG/CAVG. None of the differences observed achieved levels of statistical significance.

#### *Monitoring and lifestyle advice*

Interventions regarding monitoring and lifestyle advice for IHD patients were split into two categories: (i) those deemed as imperative for recording at least once within any 12-month period for any registered IHD patient (i.e. blood pressure, cholesterol, and HbAc1 for IHD patients who also have diabetes); and (ii) those interventions that may be viewed as not being essential for recording within every 12-month period for every IHD patient (i.e. height, weight, BMI, and the provision of lifestyle advice).

Recordings of blood pressure rose in the repeat audit, for all IHD patients (75.2%:85.9%,  $p=0.021$  RR=1.14) and in each of the demographic subgroups - achieving statistical significance for South Asians (80.4%:100.0%,  $p=0.018$  RR=1.24) and for patients aged 65 years and above (66.1%:85.7%,  $p=0.005$  RR=1.30). Recordings of cholesterol checks and checks for HbAc1 amongst patients with IHD and diabetes decreased for all patients, though not statistically significant. However, the decrease in cholesterol checks observed in the repeat audit for White patients (71.7%:91.7%,  $p=0.042$  RR=0.82), and for patients aged 65 years and above (69.5%:53.9%,  $p=0.038$  RR=0.65) were statistically significant at the 5% level of significance. In contrast however, there was a 20% increase in cholesterol checks for South Asian IHD patients in the repeat audit (71.7%:91.7%,  $p=0.042$  RR=1.28), which reached statistical significance. HbAc1 recordings amongst IHD patients with diabetes showed a decrease in the repeat audit for all patients in each of the socio-demographic subgroups (apart from for patients aged below 65 years – which showed a slight increase).

**Table 5. Medication and management of patients with ischaemic heart disease (IHD)<sup>1</sup> diagnoses at the baseline audit (2001-2002) and at the 12-month repeat audit (2002-2003) (%)**

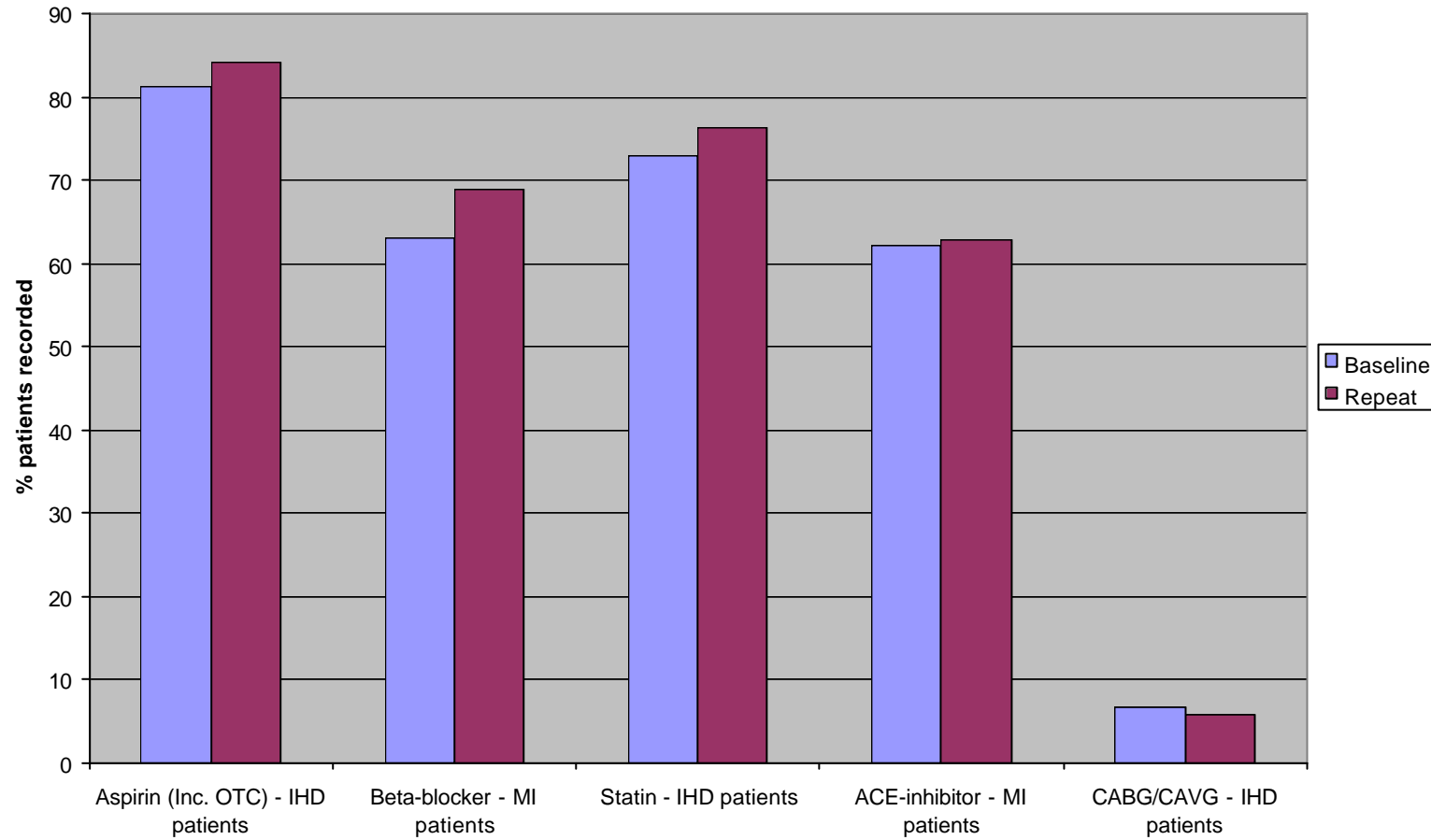
		Aspirin (Inc. OTC) IHD patients (excluding contraindicated)	Beta-blocker MI patients (excluding contraindicated)	Statins IHD patients (excluding contraindicated)	ACE-Inhibitor* MI patients (excluding contraindicated)	CABG/CAVG IHD patients
All patients	Repeat	86 (84.3)	42 (68.9)	81 (76.4)	39 (62.9)	6 (5.7)
	Baseline	272 (81.2)	117 (63.2)	254 (72.9)	121 (62.1)	24 (6.8)
	X <sup>2</sup>	0.514	0.631	0.493	0.015	0.184
	p	0.473	0.427	0.482	0.904	0.668
	RR	1.04	1.09	1.05	1.01	0.83
	95%CI	0.94-1.15	0.89-1.33	0.93-1.18	0.81-1.26	0.35-1.97
<b>Ethnicity</b>						
South Asian	Repeat	18 (78.3)	12 (85.7)	20 (83.3)	9 (64.3)	3 (12.5)
	Baseline	76 (84.4)	32 (61.5)	67 (73.6)	46 (83.6)	6 (6.5)
	X <sup>2</sup>	0.501	2.901	0.972	2.584	0.951
	p	0.479	0.089	0.324	0.108	0.330
	RR	0.93	1.39	0.76	0.77	1.92
	95%CI	0.73-1.17	1.03-1.87	0.59-0.96	0.51-1.16	0.52-7.11
White	Repeat	68 (86.1)	30 (63.9)	61 (74.4)	30 (62.5)	3 (3.7)
	Baseline	196 (80.0)	85 (63.9)	187 (72.7)	75 (53.6)	18 (6.9)
	X <sup>2</sup>	1.462	0.000	0.084	1.156	1.167
	p	0.227	0.992	0.772	0.282	0.280
	RR	1.08	0.99	1.02	1.17	0.53
	95%CI	0.97-1.20	0.78-1.28	0.88-1.18	0.89-1.53	0.16-1.74
<b>Sex</b>						
Men	Repeat	53 (91.4)	29 (78.4)	50 (84.8)	26 (68.4)	5 (8.5)
	Baseline	172 (78.2)	80 (62.5)	169 (74.7)	80 (58.4)	19 (8.3)
	X <sup>2</sup>	5.181	3.228	2.612	1.252	0.001
	p	0.023	0.072	0.106	0.263	0.972
	RR	1.17	1.25	1.13	1.17	1.02
	95%CI	1.05-1.30	1.01-1.56	0.99-1.29	0.91-1.51	0.40-2.61
Women	Repeat	33 (75.0)	13 (54.2)	31 (65.9)	13 (54.2)	1 (2.1)
	Baseline	100 (86.9)	37 (64.9)	85 (69.6)	41 (70.7)	5 (4.1)
	X <sup>2</sup>	3.326	0.826	0.217	2.061	0.374
	p	0.068	0.364	0.641	0.151	0.540
	RR	0.86	0.83	0.95	0.77	0.52
	95%CI	0.72-1.04	0.55-1.26	0.75-1.20	0.51-1.15	0.06-4.36
<b>Age group</b>						
<65 years	Repeat	33 (78.6)	20 (80.0)	36 (83.7)	18 (72.0)	5 (11.6)
	Baseline	180 (79.7)	76 (62.8)	173 (74.5)	81 (62.8)	17 (7.3)
	X <sup>2</sup>	0.025	2.719	1.666	0.774	0.928
	p	0.874	0.099	0.197	0.379	0.335
	RR	0.99	1.27	1.12	1.15	1.59
	95%CI	0.83-1.17	1.00-1.62	0.96-1.31	0.87-1.51	0.62-4.09
≥65 years	Repeat	53 (88.3)	22 (61.1)	45 (71.4)	21 (56.8)	1 (1.6)
	Baseline	92 (84.4)	41 (64.1)	81 (69.8)	40 (60.6)	7 (5.9)
	X <sup>2</sup>	0.491	0.086	0.050	0.145	1.835
	p	0.484	0.769	0.823	0.703	0.175
	RR	1.05	0.95	1.02	0.94	0.27
	95%CI	0.93-1.18	0.69-1.31	0.84-1.24	0.67-1.32	0.03-2.13

<sup>1</sup> Ever had the stated medication/management (calculations based upon relevant diagnosis)

\* The denominator for the prescription of ACE-Inhibitors is all myocardial infarction patients, and not patients with left ventricular dysfunction as required in the CHD:NSF

Data is from 16 GP practices located in inner-city Bristol.

**Figure 1. Baseline (2001-2002) and repeat (2002-2003) clinical audits of secondary prevention of ischaemic heart disease (IHD): Medication and management for all patients**



Recordings for BMI checks decreased in the repeat audit for all IHD patients and in all of but one demographic sub-grouping (under 65-years age group), yet none of the observed differences reached the 5% level of statistical significance. The repeat audit showed a decrease in height check recordings in all patients since the baseline audit (51.0%:29.3%,  $p=0.000$  RR=0.57). This decrease was also observed in all subgroups, achieving statistical significance for all White patients (51.3%:26.8%,  $p=0.000$  RR=0.52); all men (52.6%:33.9%,  $p=0.010$  RR=0.64); all women (47.9%:23.4%,  $p=0.004$  RR=0.49), and for patients in the over 65-years age group (46.6%:23.8%,  $p=0.003$  RR=0.51). Recordings of weight checks fell slightly in the repeat audit for all IHD patients. However, statistically significant decreases were observed for all White patients (59.9%:45.1%,  $p=0.019$  RR=0.75) and for patients in the over 65-years age group (65.3%:39.7%,  $p=0.001$  RR=0.61).

Both smoking status and alcohol advice recordings for all new IHD patients, in both the baseline and repeat audits, were similar (42.5%:39.6%, and 26.8%:26.4% respectively), this pattern was also reflected for all sub-groupings. Exercise advice recordings decreased significantly in the repeat audit for all new IHD patients overall (43.9%:28.3%,  $p=0.004$  RR=0.65); for all White patients (45.6%:23.2%,  $p=0.000$  RR=0.51); for all women (37.4%:19.2%,  $p=0.023$  RR=0.51), and for all patients in the 65-years and over grouping (41.5%:22.2%,  $p=0.009$  RR=0.54). The repeat audit showed a significant decrease in dietary advice recordings for all IHD patients (42.7%:30.2%,  $p=0.021$  RR=0.71), also for all White patients (45.2%:23.2%,  $p=0.000$  RR=0.51), and at the 5% significance level for patients in the 65-years and over subgroup (40.7%:22.2%, RR=0.55).

Dietary advice provision amongst IHD patient who also have diabetes, shows an increase in the repeat audit for all patients overall (49.5%:57.9%), and significantly so for South Asian patients (37.7%:85.7%,  $P=0.016$  RR=2.27). No significant associations were observed for any of the other subgroups. Finally, dietary advice given to IHD patients with a BMI score of 30 kg/m<sup>2</sup> or above, showed a statistically significant decrease in the repeat audit for all patients overall (59.4%:25.0%,  $p=0.000$  RR=0.42). A statistically significant decrease was also observed for all White patients (62.1%:16.1%,  $p=0.000$  RR=0.26); for all men (55.8%:27.3%,  $p=0.007$  RR=0.48); all women (68.2%:22.2%,  $p=0.001$  RR=0.33); all patients aged below 65-years (62.0%:37.9%,  $p=0.039$  RR=0.61), and for patients in the 65-years and over age subgroup (52.6%:17.7%,  $p<0.003$  RR=0.34). The South Asian subgroup showed a slight increase in dietary advice recordings for IHD patients with BMI scores of 30 kg/m<sup>2</sup> or above (45.5%:55.6%), although not significant statistically.

A summary of the baseline-repeat clinical audit comparison for the lifestyle monitoring and advice provision data can be found in Table 6. Figure 2 presents the findings for all patients.

**Table 6. Monitoring of patients<sup>1</sup> with ischaemic heart disease (IHD) diagnoses at the baseline audit (2001-2002) and at the 12-month repeat audit (2002-2003) (%)**

		Blood pressure check	Cholesterol check	HbA1c check Diabetics <sup>3</sup>	BMI check*	Height check*	Weight check*	Smoking status*	Alcohol advice*	Exercise advice*	Dietary advice*	Dietary advice Diabetics <sup>3*</sup>	Dietary advice BMI>30 <sup>3*</sup>
All patients	Repeat	91 (85.9)	68 (64.2)	12 (63.2)	42 (39.6)	31 (29.3)	56 (52.8)	42 (39.6)	28 (26.4)	30 (28.3)	32 (30.2)	11 (57.9)	20 (25.0)
	Baseline	264 (75.2)	243 (69.2)	71 (71.7)	162 (46.2)	179 (51.0)	220 (62.7)	149 (42.5)	94 (26.8)	154 (43.9)	150 (42.7)	49 (49.5)	41 (59.4)
	X <sup>2</sup>	5.311	0.966	0.559	1.405	15.509	3.301	0.268	0.006	8.209	5.347	0.450	18.153
	p	0.021	0.326	0.454	0.236	0.000	0.069	0.605	0.941	0.004	0.021	0.502	0.000
	RR	1.14	0.93	0.88	0.86	0.57	0.84	0.93	0.99	0.65	0.71	1.17	0.42
	95%CI	1.03-1.26	0.79-1.09	0.61-1.27	0.66-1.11	0.42-0.78	0.69-1.03	0.72-1.22	0.69-1.42	0.47-0.89	0.52-0.97	0.76-1.81	0.27-0.64
<b>Ethnicity</b>													
South Asian	Repeat	24 (100.0)	22 (91.7)	5 (71.4)	9 (37.5)	9 (37.5)	19 (79.2)	8 (33.3)	4 (16.7)	11 (45.8)	13 (54.2)	6 (85.7)	10 (55.6)
	Baseline	74 (80.4)	66 (71.7)	43 (81.1)	42 (45.7)	46 (50.0)	65 (70.7)	26 (28.3)	20 (21.7)	36 (39.1)	33 (35.9)	20 (37.7)	5 (45.5)
	X <sup>2</sup>	5.558	4.128	0.364	0.514	1.193	0.691	0.236	0.299	0.355	2.663	5.797	0.279
	p	0.018	0.042	0.546	0.474	0.275	0.406	0.627	0.585	0.551	0.103	0.016	0.597
	RR	1.24	1.28	0.88	0.82	0.75	1.12	1.18	0.77	1.17	1.51	2.27	1.22
	95%CI	1.12-1.38	1.07-1.52	0.54-1.43	0.47-1.44	0.43-1.31	0.88-1.43	0.61-2.27	0.29-2.03	0.71-1.94	0.95-2.39	1.43-3.60	0.56-2.63
White	Repeat	67 (81.7)	46 (56.1)	7 (58.3)	33 (40.2)	22 (26.8)	37 (45.1)	34 (41.4)	24 (29.3)	19 (23.2)	19 (23.2)	5 (41.7)	10 (16.1)
	Baseline	190 (73.4)	177 (68.3)	28 (60.9)	120 (46.3)	133 (51.3)	155 (59.9)	123 (47.5)	74 (28.6)	118 (45.6)	117 (45.2)	29 (63.0)	36 (62.1)
	X <sup>2</sup>	2.338	4.125	0.026	0.933	15.106	5.488	0.910	0.014	12.989	12.576	1.793	26.754
	p	0.126	0.042	0.873	0.334	0.000	0.019	0.340	0.903	0.000	0.000	0.181	0.000
	RR	1.11	0.82	0.96	0.87	0.52	0.75	0.87	1.02	0.51	0.51	0.66	0.26
	95%CI	0.98-1.26	0.67-1.01	0.56-1.63	0.65-1.17	0.36-0.76	0.58-0.98	0.6-1.16	0.70-1.51	0.34-0.77	0.34-0.78	0.33-1.34	0.14-0.47
<b>Sex</b>													
Men	Repeat	52 (88.1)	41 (69.5)	8 (61.5)	25 (42.4)	20 (33.9)	33 (55.9)	27 (45.8)	20 (33.9)	21 (35.6)	20 (33.9)	8 (61.5)	12 (27.3)
	Baseline	176 (77.2)	158 (69.3)	46 (69.7)	114 (50.0)	120 (52.6)	148 (64.9)	99 (43.4)	66 (28.9)	108 (47.4)	99 (43.4)	32 (48.5)	26 (55.8)
	X <sup>2</sup>	3.437	0.001	0.334	1.092	6.583	1.623	0.104	0.547	2.626	1.751	0.740	7.35
	p	0.064	0.977	0.563	0.296	0.010	0.203	0.747	0.459	0.105	0.186	0.390	0.007
	RR	1.14	1.00	0.88	0.85	0.64	0.86	1.05	1.17	0.75	0.78	1.27	0.48
	95%CI	1.02-1.28	0.83-1.21	0.56-1.40	0.61-1.17	0.44-0.94	0.67-1.10	0.77-1.44	0.78-1.77	0.52-1.09	0.53-1.15	0.77-2.09	0.27-0.83
Women	Repeat	39 (82.9)	27 (57.5)	4 (66.7)	17 (36.2)	11 (23.4)	23 (48.9)	15 (31.9)	8 (17.0)	9 (19.2)	12 (25.5)	3 (50.0)	8 (22.2)
	Baseline	88 (71.5)	85 (69.1)	25 (75.8)	48 (39.0)	59 (47.9)	72 (58.5)	50 (40.6)	28 (22.8)	46 (37.4)	51 (41.5)	17 (51.5)	15 (68.2)
	X <sup>2</sup>	2.353	2.057	0.220	0.117	8.471	1.271	1.098	0.672	5.175	3.700	0.005	12.053
	p	0.125	0.152	0.639	0.732	0.004	0.260	0.295	0.412	0.023	0.054	0.946	0.001
	RR	1.16	0.83	0.88	0.93	0.49	0.84	0.79	0.75	0.51	0.62	0.97	0.33
	95%CI	0.98-1.38	0.63-1.09	0.48-1.60	0.60-1.44	0.28-0.84	0.60-1.16	0.49-1.25	0.37-1.52	0.27-0.96	0.36-1.05	0.41-2.30	0.17-0.64
<b>Age group</b>													
<65 years	Repeat	37 (86.1)	34 (79.1)	6 (75.0)	22 (51.2)	16 (37.2)	31 (72.1)	18 (41.9)	13 (30.2)	16 (37.2)	18 (41.9)	6 (75.0)	11 (37.9)
	Baseline	186 (79.8)	161 (69.1)	41 (68.3)	113 (48.5)	124 (53.2)	143 (61.4)	105 (45.1)	65 (27.9)	105 (45.1)	102 (43.8)	31 (51.7)	31 (62.0)
	X <sup>2</sup>	0.905	1.741	0.147	0.103	3.722	1.790	0.151	0.098	0.909	0.054	1.549	4.27
	p	0.342	0.187	0.701	0.748	0.054	0.181	0.698	0.755	0.340	0.816	0.213	0.039
	RR	1.08	1.14	1.09	1.05	0.70	1.17	0.93	1.08	0.82	0.96	1.45	0.61
	95%CI	0.94-1.24	0.96-1.36	0.71-1.70	0.77-1.45	0.47-1.05	0.95-1.45	0.64-1.36	0.66-1.78	0.55-1.25	0.65-1.40	0.91-2.32	0.37-1.02
≥65 years	Repeat	54 (85.7)	34 (53.9)	6 (54.6)	20 (31.8)	15 (23.8)	25 (39.9)	24 (38.1)	15 (23.8)	14 (22.2)	14 (22.2)	5 (45.5)	9 (17.7)
	Baseline	78 (66.1)	82 (69.5)	30 (76.9)	49 (41.5)	55 (46.6)	77 (65.3)	44 (37.3)	29 (24.6)	49 (41.5)	48 (40.7)	18 (46.2)	10 (52.6)
	X <sup>2</sup>	8.002	4.300	2.131	1.665	9.003	10.919	0.011	0.013	6.744	6.212	0.002	8.567
	p	0.005	0.038	0.144	0.197	0.003	0.001	0.915	0.909	0.009	0.013	0.967	0.003
	RR	1.30	0.65	0.71	0.76	0.51	0.61	1.02	0.97	0.54	0.55	0.98	0.34
	95%CI	1.10-1.53	0.50-0.85	0.40-1.25	0.50-1.16	0.32-0.83	0.44-0.85	0.69-1.51	0.56-1.67	0.32-0.89	0.33-0.91	0.47-2.05	0.16-0.69

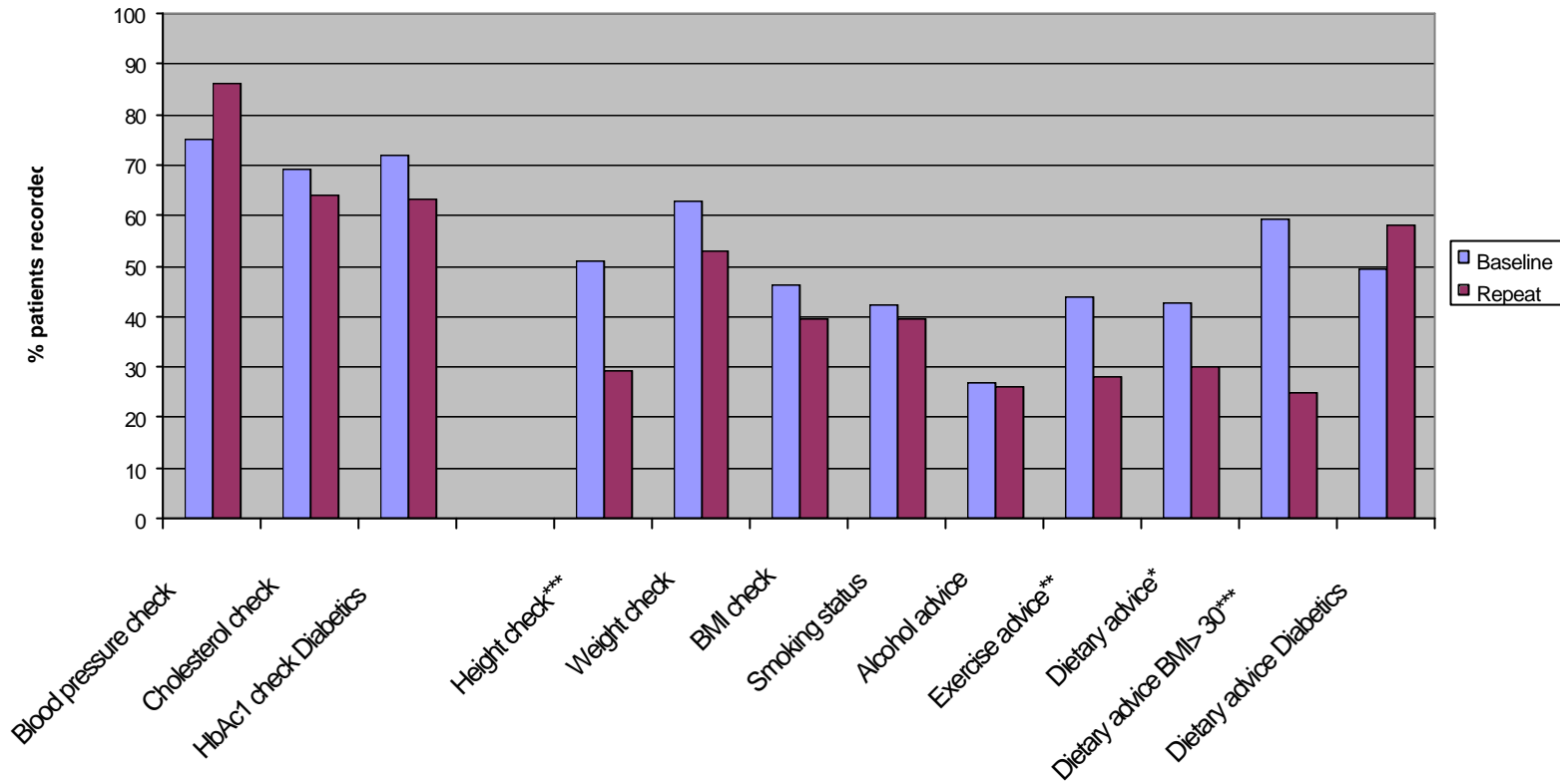
Data is from 16 GP practices located in inner-city Bristol

1 Monitoring and advice provided within the specified 12-month audit period

3 Calculations conducted upon IHD patients with a body mass index of 30 kg/m<sup>2</sup> or higher

2 Calculations conducted upon IHD patients who also had diabetes

**Figure 2. Baseline (2001-2002) and repeat (2002-2003) clinical audits of secondary prevention of ischaemic heart disease (IHD): Lifestyle monitoring and advice for all patients<sup>a</sup>**



Data is from an audit of 16 GP practices in inner-city Bristol  
 \*p<0.05 \*\*p<0.01 \*\*\*p<0.001

**Table 7. Clinical measurements and consultation rates of patients with ischaemic heart disease (IHD)<sup>1</sup> diagnosis at the baseline audit (2001-2002) and at the 12-month repeat audit (2002-2003)**

		Mean blood pressure		Mean BMI	Mean cholesterol	Mean HbAc1*	Mean no. of visits to GP for IHD	Mean no. of visits to Practice Nurse for IHD
		Systolic (mmHg)	Diastolic (mmHg)	(kg/m <sup>2</sup> )	(mmol/l)			
All patients	Repeat	136.38	76.98	29.64	4.45	7.63	1.80	1.35
	Baseline	137.65	78.97	29.04	4.72	8.06	2.14	1.75
	t	0.506	1.529	-0.628	1.759	0.789	1.708	2.759
	p	0.613	0.127	0.531	0.079	0.432	0.088	0.006
	95%CI	-3.64-6.16	-0.56-4.51	-2.50-1.30	0.11-0.61	-0.65-1.49	-0.05-0.73	0.11-0.69
<b>Ethnicity</b>								
South Asian	Repeat	121.38	74.38	28.99	4.25	6.96	2.20	2.04
	Baseline	134.32	74.89	27.42	4.59	8.27	2.13	1.97
	t	2.829	0.214	-1.122	1.187	1.587	-0.178	-0.243
	p	0.006	0.831	0.267	0.238	0.118	0.859	0.808
	95%CI	3.86-22.03	-4.27-531	-4.37-1.23	-0.23-0.91	-0.35-2.97	-0.94-0.79	-0.67-0.53
White	Repeat	141.85	77.92	29.82	4.54	8.11	1.68	1.14
	Baseline	138.93	80.54	29.61	4.77	7.75	2.15	1.68
	t	-1.021	1.758	-0.181	1.241	-0.519	2.071	3.246
	p	0.308	0.079	0.856	0.216	0.607	0.039	0.001
	95%CI	-8.54-2.71	-0.31-5.53	-2.53-2.11	0.22-0.77	-1.80-1.06	0.02-0.91	0.21-0.85
<b>Sex</b>								
Men	Repeat	133.41	76.40	30.69	4.51	7.10	2.06	1.62
	Baseline	137.75	79.34	28.69	4.66	7.87	2.26	1.77
	t	1.258	1.737	-1.609	0.728	1.214	0.742	0.810
	p	0.209	0.084	0.109	0.467	0.229	0.458	0.418
	95%CI	-2.45-11.12	-0.39-6.26	-3.95-0.41	-0.26-0.56	-0.49-2.04	-0.32-0.71	-0.22-0.52
Women	Repeat	140.28	77.77	28.44	4.35	8.70	1.47	1.02
	Baseline	137.46	78.22	29.87	4.85	8.40	1.93	1.72
	t	-0.821	0.224	0.765	2.051	-0.305	1.473	2.997
	p	0.413	0.823	0.446	0.042	0.763	0.143	0.003
	95%CI	-9.62-3.97	-3.56-4.47	-2.29-5.15	0.02-0.97	-2.28-1.69	-0.15-1.07	0.24-1.16
<b>Age group</b>								
<65 years	Repeat	128.69	76.43	30.35	4.52	7.00	2.04	1.74
	Baseline	135.80	80.41	29.35	4.71	8.03	2.27	1.72
	t	2.008	2.192	-0.495	0.802	1.425	0.691	-0.102
	p	0.045	0.029	0.621	0.423	0.160	0.490	0.919
	95%CI	0.13-14.08	0.40-7.55	-3.39-2.03	-0.27-0.63	-0.42-2.48	-0.43-0.89	-0.47-0.43
≥65 years	Repeat	141.52	77.37	29.23	4.36	8.27	1.63	1.08
	Baseline	142.10	75.49	28.32	4.75	8.11	1.88	1.82
	t	0.156	-0.953	-0.702	1.789	-0.194	1.124	3.974
	p	0.875	0.341	0.485	0.076	0.847	0.262	0.000
	95%CI	-6.80-7.97	-5.78-2.02	-3.49-1.67	-0.04-0.81	-1.83-1.51	-0.18-0.68	0.37-1.11

<sup>1</sup> Clinical measurements and consultations provided within the specified 12-month audit period

\* HbAc1 calculations were conducted upon IHD patients who also had diabetes

p-values refer to the difference between mean values for the dichotomized ethnicity, sex and age group variables

Data is from 16 GP practices located in inner-city Bristol.

### *Clinical measurements and consultation rates*

Table 7 (previous page) shows a summary of differences in mean clinical measurements (blood pressure, BMI, cholesterol and HbAc1) and IHD-related consultation rates (with the GP and practice nurse) between the baseline and repeat audits for all patients and for each of the demographic sub-groupings. Mean systolic and diastolic blood pressure for all IHD patients overall and for each of the sub-groups was similar in both audits, except for statistically significant decreases in mean systolic blood pressure in the repeat audit for South Asians (134.32:121.28,  $p=0.006$ ), and for patients aged below 65 years (135.80:128.69,  $p=0.045$ ). Mean BMI and HbAc1 values (the latter for IHD patients with a co-morbidity of diabetes) showed no meaningful changes between the two clinical audits, for all patients or for any of the subgroups. Mean cholesterol value decreased in the repeat audit for all IHD patients, and within the subgroups – achieving a statistically significant decrease for all women (4.85:4.35,  $p=0.042$ ).

Although the number of IHD-related visits to see the GP and/or practice nurse is not a NSF:CHD criterion, it is nevertheless worthy of examination. Mean number of consultations to the GP and practice nurse for IHD decreased for all patients – achieving statistical significance at the 1% level for mean visits to the practice nurse (2.14:1.80,  $p=0.088$ ; 1.75:1.35,  $p=0.006$  respectively). This systematic decrease was also observed in all demographic subgroups - except for mean visits to the GP and practice nurse by South Asian patients, which showed a slight increase in visits within the repeat clinical audit (see Table 7).

Finally, differences in the proportion of all IHD patients (that had the specified clinical measurement recorded within both the baseline and repeat audits) who were recorded as having high clinical measurements for blood pressure (>150/90 mmHg); BMI (>30 kg/m<sup>2</sup>); cholesterol (>5 mmol/L), and HbAc1 (>7.5) for IHD patients with a co-diagnosis of diabetes, was deemed worthy of investigation (see Table 8 and Figure 3). A decrease in the repeat audit was obtained in the proportion of patients with high BMI values (39.7%:26.5%) and high cholesterol values (32.1%:23.5%). The proportion of all IHD patients with high blood pressures and HbAc1 values showed marginal increases in the repeat audit, though none of the differences observed reached statistically significant levels.

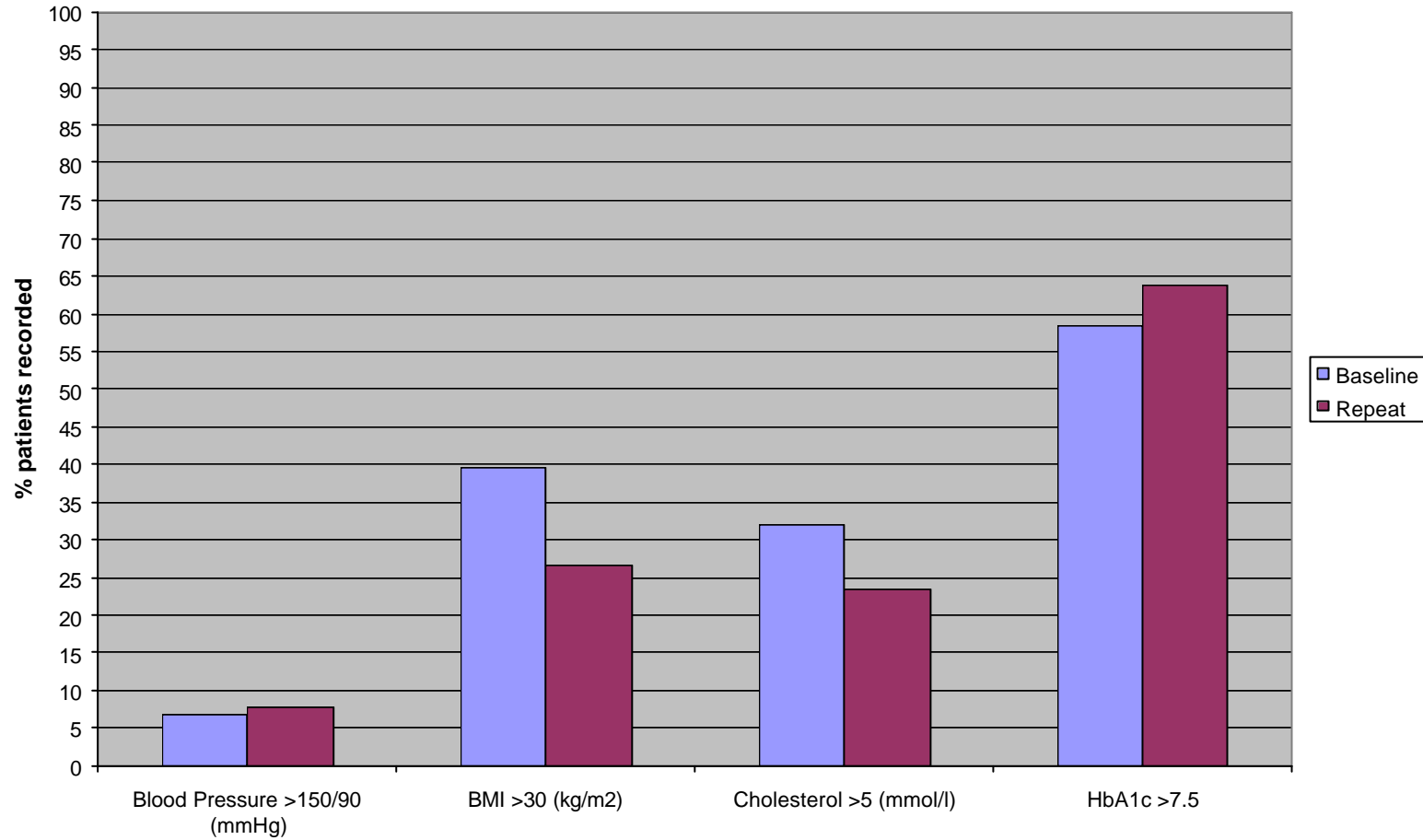
**Table 8. Proportions of all IHD patients\* with 'raised' clinical measurements at the baseline audit (2001-2002) and at the 12-month repeat audit (2002-2003) (%)**

		BP >150/90 (mmHg)	BMI >30 (kg/m <sup>2</sup> )	Cholesterol >5 (mmol/l)	HbAc1** >7.5
All patients	Repeat	15 (7.8)	18 (26.5)	38 (23.5)	23 (63.9)
	Baseline	13 (6.8)	27 (39.7)	52 (32.1)	21 (58.3)
	X <sup>2</sup>	0.15	2.69	3.02	0.23
	p	0.695	0.101	0.083	0.629
	RR	1.15	0.67	0.73	1.09
	95%CI	0.56-2.35	0.41-1.09	0.51-1.04	0.76-1.58

\*Patients who have had a clinical measurement recorded in both the baseline and repeat clinical audits

\*\* HbAc1 calculations were conducted upon IHD patients who also had a diabetes diagnosis

**Figure 3. Baseline (2001-2002) and repeat (2002-2003) clinical audits of secondary prevention of ischaemic heart disease (IHD): % of all patients recorded with high clinical values\***



\* Patients who have had a clinical measurement recorded in both the baseline and repeat clinical audits

## **Discussion**

The baseline and repeat clinical audits examined management of IHD in primary care by secondary prevention for patients identified on CHD registers, sub-divided by race, gender, and age. The practices were selected in inner city Bristol for having sizeable numbers of South Asian patients. All 'new' patients listed onto the CHD registers of these sixteen practices were included in the repeat audit sample. Furthermore, an additional seventeenth GP practice from Bristol was invited to participate – the data of which contributed towards the repeat clinical audit. In an attempt to examine whether the management of IHD patients had improved since the baseline clinical audit, a baseline-repeat audit comparison was conducted. For a statistical comparison, the repeat audit sample consisted of all 'new' patients listed (since March 2002) on the IHD registers of the 16 GP practices that participated in the baseline audit.

### **Repeat clinical audit of primary care IHD patients (2002-2003)**

#### *Medication*

It was pleasing to observe that 87.1% of all IHD patients in the repeat clinical audit had a prescription for or obtained over-the-counter aspirin, and that there were no significant differences by any of the socio-demographic sub-groupings. In contrast to this finding, the Bristol North Coronary Heart Disease (CHD) Audit (2001-2002)<sup>9</sup> conducted upon 30 GP practices observed that only 65.9% of IHD patients were prescribed aspirin; whilst research by Stewart et al upon angina patients in Sandwell, found that 66.5% of eligible patients had been given a prescription to take aspirin.<sup>7</sup> Indeed, the low cost and proven efficacy of aspirin justifies the use of aspirin in every IHD patient without contraindications.

The overall proportion of IHD patients prescribed statin therapy was found to be 78.4%. This being a welcomed observation, particularly in relation to the existence of research that highlights the efficacy of statins in reducing the risk of sudden cardiac events in patients with pre-existing IHD, as well as reducing the risk of cardiac disease in patients with high risk of a cardiac event, but without pre-existing IHD.<sup>11-14</sup> In line with prior studies however, the repeat audit shows that women are prescribed statins less commonly than men.<sup>15,16</sup>

68.9% of MI patients had been prescribed a beta-blocker. In comparison, the Bristol North Baseline CHD Audit reported 74.7% of MI patients as having a prescription for this drug. However, whilst previous research has reported women with IHD as being less likely than men to be given beta-blocker therapy,<sup>17</sup> no such significant association was observed here.

Prescription levels for ACE-Inhibitors amongst patients who had experienced an MI, were lower in comparison to the other drugs examined in the audit. However, in the NSF:CHD, ACE-Inhibitor is targeted towards patients with an MI and left ventricular dysfunction (LVD) and not patients with MI per se. In the current audits, LVD with MI was not always recorded

and all MI was used as the denominator for the prescription of this drug. This adjustment may explain the low levels of the prescribing of this drug overall.

### *Monitoring and lifestyle advice*

Monitoring and recording of height (24.4%), weight (56.7%) and BMI (38.0%) was disappointingly low, as was recording of smoking status (33.5%) and of advice for alcohol (25.9%), exercise (26.5%), diet overall (30.5%), and diet advice for both obese (46.2%), and diabetic IHD patients (37.6%). The recording of blood pressure (80.6%), cholesterol (74.1%), and HbA<sub>1c</sub> checks for diabetic IHD patients (75.9%) were pleasing. The majority of the fluctuations by socio-demographic characteristics occurred by ethnicity. South Asians were more likely than Whites to have a weight, and cholesterol check recording, and more likely to be given general dietary advice as well as dietary advice if diabetic. However, South Asians were less likely to be given smoking and alcohol advice. A number of associations also appeared by sex, men were more likely than women to have a weight check recording, as well as a recording for receiving advice on alcohol.

There is capacity for general practices in the audit to give lifestyle advice to many more patients. Indeed as this audit was looking at the recording of such advice, it may be that such advice is being given to patients but that there are problems in recording it. The less than adequate recording (or provision) of lifestyle advice provided to patients observed here reflects Stewart et al's findings of their audit of primary care angina management in Sandwell.<sup>7</sup> However unlike practices in Stewart et al's audit, a number of practices within this repeat clinical audit were only just beginning to record such advice provision upon electronic templates at the time the audit data was extracted. Yet if we take the figures as they are, then the finding of South Asian patients being less likely to have their smoking status recorded is worrying, especially when we take into account the high levels of smoking prevalence amongst some South Asian groups.

### *Mean clinical measurements*

Mean systolic and diastolic blood pressure values were low for all patients and for each of the socio-demographic sub-groupings. The statistically significant increase in systolic blood pressure and decrease in diastolic blood pressure with increasing age is a pattern that has been well documented elsewhere,<sup>18,19</sup> though it is not certain whether this relationship is due to increasing age per se, or an effect of disease and or pharmacological interventions. Mean BMI level for all patients would be located in the overweight (and close to obesity) category. White patients had a higher mean BMI value than South Asian patients, this being in-line with other larger surveys such as the Health Survey for England: The Health of Minority Ethnic Groups (HSE),<sup>20</sup> and the Fourth National Survey of Ethnic Minorities.<sup>21</sup> Overall, mean

cholesterol values for all groups appear lower than those documented in the in the HSE, this could perhaps be partially explained by the high levels of statin prescribing. Whilst no significant associations were observed between men HbAc1 values and the socio-demographic sub-groupings, the values were generally higher than those documented in the HSE, and above the 7.5 cut-off point highlighted in the NSF:CHD. Indeed this may be the result of a small sample bias within the present audit.

The mean numbers of IHD-related visits to the GP and practice nurse were higher amongst South Asians than White patients, and amongst all men than all women patients, achieving statistically significant levels in both cases. It is not possible to report whether this finding is related to a clinical requirement, say for a diabetic check, or patient-induced visiting. Whilst the association between ethnicity and number of visits to primary care services in general has been well documented,<sup>21</sup> the pattern with sex appears to be the reverse of that found in the General Household Survey (2000-2001).<sup>22</sup> Again, this may well be attributable to the small sample bias of the current audit.

### *Referrals*

The proportions of IHD referrals for each of the interventions examined were small overall and within the socio-demographic groupings. Yet this may be a reflection of under-recording rather than reluctance in referring on part of the health professional. Several studies,<sup>23-26</sup> but not all,<sup>27,28</sup> report less aggressive treatment of South Asian people with coronary disease compared with White people at the secondary healthcare level. However, the results of the current audit suggest that differences in access to medical interventions are not present at the stage of GP referral, and therefore physician bias is unlikely to contribute to ethnic differences in the documented lower use of cardiac procedures. Significant associations were observed between sex and referral to a cardiologist, and recording of cardiac rehabilitation attendance (the latter with wide confidence intervals), with men more likely than women to have a recoding of both interventions. Indeed extensive international literature refers to a gender bias in favour of men with CHD. Research shows that women with angina are less likely to be referred to a specialist<sup>29</sup> or to have revascularization than men.<sup>30</sup> Though the current audit involves a selective patient population, such gender bias makes it unclear whether clinical decisions to provide referral to a cardiologist is made solely on the basis of clinical need.

**Baseline (2001-2002) - Repeat (2002-2003) clinical audit of primary care IHD patients: comparison**

The results of the second audit showed improvement on the first audit, with standards of the NSF:CHD being attained for prescribing of some medications and clinical monitoring, but less so for items of advice and related measurements. These improvements were most marked in the sub-groups of South Asians, men, and those patients aged less than 65 years. However, only a few of these improvements were significant statistically.

Prescription levels for receiving an ACE-Inhibitor amongst all patients who have experienced an MI, were similar in both the clinical audits. Yet, as mentioned above, according to the NSF:CHD, ACE-Inhibitor should be targeted towards patients with an MI and left ventricular dysfunction (LVD), and not to patients with MI per se. In the current audits, LVD with MI was not always recorded and all MI was used as the denominator for the prescription of this drug. This adjustment may explain the fixed levels of the prescribing of this drug for all patients in both audits. Of particular concern is the general decrease over time in prescription levels of all drugs for all women.

Mean clinical measures of blood pressure, cholesterol, and HbAc1 decreased in the repeat audit – the decrease in mean cholesterol to 4.45mmol/l only just missing the 5% level of statistical significance. Similar changes for blood pressure and cholesterol occurred in most of the sub-groups. These changes will represent some regression to the mean, and the influence of medication.

The proportion of patients whose blood pressure exceeded target levels of 150/90 increased between the two audits, though not significant statistically. Likewise a slight increase in the proportion of diabetic patients with IHD and HbAc1 levels greater than 7.5 was observed. Decreases were observed for patients with BMI's greater than 30 kg/m<sup>2</sup>, and for patients with cholesterol levels greater than 5 mmol/l, (the proportions fell by approximately 13% and 9% respectively), although these changes did not attain statistical significance.

Monitoring and recording height, weight, BMI, and smoking status was low in both audits, as was advice on alcohol use, exercise, and diet. The BMI of those patients in whom the index was recorded (<50%) averaged 29 kg/m<sup>2</sup> in both audits, i.e. overweight and close to obesity. Indeed, recent WHO advice is that increased risk for diabetes and IHD in Asian people may begin at BMI's of 23 kg/m<sup>2</sup> with higher risk above 27kg/m<sup>2</sup>.<sup>31</sup> Dietary advice was recorded only for 42.7% of patients in the first audit and exercise advice for only 43.9%. These levels

of advice fell to 30.2% and 28.3% respectively for new patients in the second audit. The changes were statistically significant.

It is possible that only patients who appeared overweight were monitored, giving the high mean value for BMI. Alternatively, recording of monitored patients was incomplete. The improvement in dietary advice to diabetic patients was associated with small, but not statistically significant improvements in HbAc1 levels.

Recorded dietary advice given to new patients with BMI > 30kg/m<sup>2</sup> fell even more dramatically from 59.4% to 25%. This order of change was reflected in all sub-groups, except for South Asians, where recorded advice improved. Only in diabetic patients was dietary advice recorded as increasing overall and in most sub-groups between the two audits.

Whilst the provision of lifestyle advice has been found to be generally low overall, it appears to be particularly low amongst most patients of South Asian origin. Interventions such as the promotion of lifestyle components of secondary prevention have been shown to reduce levels of BMI, serum insulin, serum tryglycerides and raised blood pressure amongst South Asian groups,<sup>32</sup> as well as resulting in fewer total deaths and coronary events.<sup>6</sup> The low levels of lifestyle monitoring and advice provision found here, was also observed in Stewart et al's Sandwell study, and could perhaps be partially explained by communication and cultural barriers between the South Asian patients and their health care professionals. Indeed, prior research has highlighted the notion that attitudes and beliefs of health and illness held by South Asian patients may result in them placing greater value upon pharmacological interventions as opposed to lifestyle and behaviour change advice.<sup>33,34</sup> Though the current audits reflect the imbalance between pharmacological therapy and lifestyle interventions (particularly so for South Asian patients), they also provide the primary care teams with an opportunity to decrease the gap between the two types of measures. In the case of South Asian patients – this may be achieved by considering the potential of training and education to increase cultural competence of the primary health care staff.

Mean number of IHD-related visits to the GP and practice nurse fell in the repeat audit for all patients and in all subgroups (apart from visits made by South Asian patients – which were similar in both audits), with declines in most subgroups achieving statistical significance, particularly so for visits to the practice nurse. The mean number of IHD-related visits to both GP's and practice nurses was more than one but less than three in both audits. The statistically significant decline in such visits as observed in the repeat clinical audit might

reflect a more selective and efficient management of IHD patients within these specific practices.

### **General discussion**

There are calls to study South Asians within their own heterogeneous subgroups rather than pooling them all together as one group.<sup>35,36</sup> However, due to the lack of ethnic monitoring within the majority of the participating practices, it was not possible to ascertain the exact ethnic origin of the patients. In relation to ethnicity, throughout this report a comparison has been made of the IHD management of South Asians with that of Whites. There has been criticism of such an approach because of the implication that the health experience of the White population may in some manner be viewed normative.<sup>15</sup> Yet as Kelaher et al argue, the main reason to use such socially constructed categories in public health context is to examine whether the health of minority ethnic groups is compromised as a result of societal factors.<sup>37</sup> Consequently one can argue that the White group is the appropriate reference group if we assume that ethnic differences in IHD management, if any, may be attributable to the possibility of the healthcare system being designed to meet the needs of the majority population. This report does not imply that the IHD management of the White group is either the 'gold standard' that needs to be met, or is 'normal' (the same argument would apply to the categories of sex and age group).

An additional (17<sup>th</sup>) GP practice was invited to participate and contributed data to the repeat clinical audit. Comparisons of data from this practice with the group data of the remaining sixteen practices showed little difference, suggesting no bias caused by this change. It is also pertinent to highlight that the CHD:NSF targets its standards and milestones upon patients within a specific age-band (35-74-years), and the current audits had no age cut-off point.

Finally, a number of strengths can be associated with the current study. A relatively large number of practices volunteered to participate in both clinical audits. It was possible to collect the same items of data for comparison in the repeat audit as was achieved in the baseline audit. Practices from areas of Bristol with the largest proportions of South Asian residents were well represented. The proportion of single-handed practices and the proportion of practices with the average patient list size per GP in this sample are similar to those found in Bristol as a whole.

The initial audit was undertaken in the first year of the NSF:CHD implementation. Practices in this audit were located in the Primary Care Trust of Bristol North, and like all practices in

this Trust they received advice, support and encouragement to improve IHD management in pursuit of NSF standards. By the second audit all practices had improved towards these standards.

## **Recommendations and conclusions**

This study highlights improved prevention and management of IHD in a selective primary care setting, according to the standards and service models set out by the NSF:CHD. The primary health care teams of the practices involved in the baseline and repeat clinical audits are to be commended for their hard work in achieving these improvements, particularly in relation to the medication management of IHD, and in the achievement of good control of clinical measurements for all IHD patients. The NSF:CHD pledges high quality standardized care for all, and at an early stage of its implementation, the data presented in this report reflects this pledge - highlighting the benefits of the NSF:CHD in aiding the provision of fair and effective care.

The few differences in IHD management between the ethnic, sex, and age groupings, revealed in both audits, were exceptions to the overall similarities in care. However, in addition to meeting NSF:CHD milestones and standards, health care professionals will need to approach their continuing professional development in a systematic way; moving towards team-based learning that involves all members of the primary health care team, and which at its forefront aims to further minimize inequalities in the health of different subgroups of the population. By employing such an approach, it is hoped that GP practices will not only continue to demonstrate achievements in primary care CHD management, but also endeavor to maintain such quality improvements.

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## **APPENDICES**

**Appendix 1 Number (%) of patients with ischaemic heart disease (IHD) diagnoses<sup>1</sup> at the repeat audit (2002-2003)**

			IHD DIAGNOSES <sup>1</sup> (%)			IHD CO-MORBIDITY <sup>1</sup> (%)		
			Myocardial infarction (MI)	Angina	MI & Angina	IHD & Diabetes	IHD & Hypertension <sup>2</sup>	IHD & Obesity <sup>3</sup>
<b>All patients</b>	(n=495)		172 (34.8)	214 (43.2)	109 (22.0)	141 (28.5)	215 (43.4)	65 (13.1)
<b>Ethnicity</b>	(n=138)	South Asian	36 (26.1)	63 (45.7)	39 (28.3)	66 (47.8)	51 (36.9)	12 (8.7)
	(n=357)	White	136 (38.1)	151 (42.3)	70 (19.6)	75 (21.0)	164 (46.3)	53 (14.8)
<b>Sex</b>	(n=319)	Men	126 (39.5)	116 (36.4)	77 (24.1)	97 (30.4)	130 (40.8)	38 (11.9)
	(n=176)	Women	46 (26.1)	98 (55.7)	32 (18.2)	44 (25.0)	85 (48.3)	27 (15.3)
<b>Age group</b>	(n=255)	<65	93 (36.5)	105 (41.2)	57 (22.3)	68 (26.7)	95 (37.3)	39 (15.3)
	(n=240)	≥65	79 (32.9)	109 (45.4)	52 (21.7)	73 (30.4)	120 (50.0)	26 (10.8)

<sup>1</sup> Ever had doctor-diagnosed condition

<sup>2</sup> Hypertension defined as bp ≥140/90 mmHg

<sup>3</sup> Obesity defined as bmi ≥30 kg/m<sup>2</sup>

Data is from an audit of 17 GP practices located in inner-city Bristol

**Appendix 2.1 Number (% of patients with ischaemic heart disease (IHD) diagnoses<sup>1</sup> at the baseline audit (2001-2002) and at the 12-month repeat audit (2002-2003)**

		IHD DIAGNOSES (%)				IHD CO-MORBIDITY (%)		
			Myocardial infarction (MI)	Angina	MI & Angina	IHD & Diabetes	IHD & Hypertension	IHD & BMI $\geq 30$ (kg/m <sup>2</sup> )
All patients	(n=351)	Baseline	47/106 (44.3)	43/106 (40.6)	16/106 (15.1)	19/106 (17.9)	27/76 (35.5)	5/90 (5.6)
	(n=495)	Repeat	128/351 (36.5)	153/351 (43.6)	69/351 (19.7)	99/351 (28.2)	57/161 (35.4)	18/266 (6.8)
<b>Ethnicity</b>								
South Asian	(n=92)	Baseline	10/24 (41.7)	10/24 (41.7)	4/24 (16.7)	7/24 (29.2)	5/18 (27.8)	1/24 (4.2)
	(n=138)	Repeat	31/92 (33.7)	36/92 (39.1)	24/92 (26.1)	53/92 (57.6)	9/42 (21.4)	2/74 (2.7)
White	(n=259)	Baseline	37/82 (45.1)	33/82 (40.2)	12/82 (14.6)	12/82 (14.6)	22/58 (37.9)	4/66 (6.1)
	(n=357)	Repeat	97/259 (37.5)	117/259 (45.2)	45/259 (17.4)	46/259 (17.8)	48/119 (40.3)	16/192 (8.3)
<b>Sex</b>								
Men	(n=228)	Baseline	29/59 (49.2)	20/59 (33.9)	10/59 (16.9)	13/59 (22.0)	19/55 (34.6)	3/51 (5.9)
	(n=319)	Repeat	89/228 (39.0)	88/228 (38.6)	50/228 (22.0)	66/228 (29.0)	38/113 (33.6)	13/177 (7.3)
Women	(n=123)	Baseline	18/47 (38.3)	23/47 (48.9)	6/47 (12.8)	6/47 (12.8)	8/21 (38.1)	2/39 (5.1)
	(n=176)	Repeat	39/123 (31.7)	65/123 (53.0)	19/123 (15.5)	33/123 (26.8)	19/48 (39.6)	5/89 (5.6)
<b>Age group</b>								
<65 years	(n=233)	Baseline	21/43 (48.8)	18/43 (41.9)	4/43 (9.3)	8/43 (18.6)	12/37 (32.4)	3/36 (8.3)
	(n=255)	Repeat	87/233 (37.3)	101/233 (43.3)	44/233 (18.9)	60/233 (25.8)	42/113 (37.2)	12/188 (6.4)
$\geq 65$ years	(n=118)	Baseline	26/63 (41.3)	25/63 (39.7)	12/63 (19.1)	11/63 (17.5)	15/39 (38.5)	2/54 (3.7)
	(n=240)	Repeat	41/118 (34.7)	52/118 (44.1)	25/118 (22.1)	39/118 (33.1)	15/48 (31.3)	6/78 (7.7)

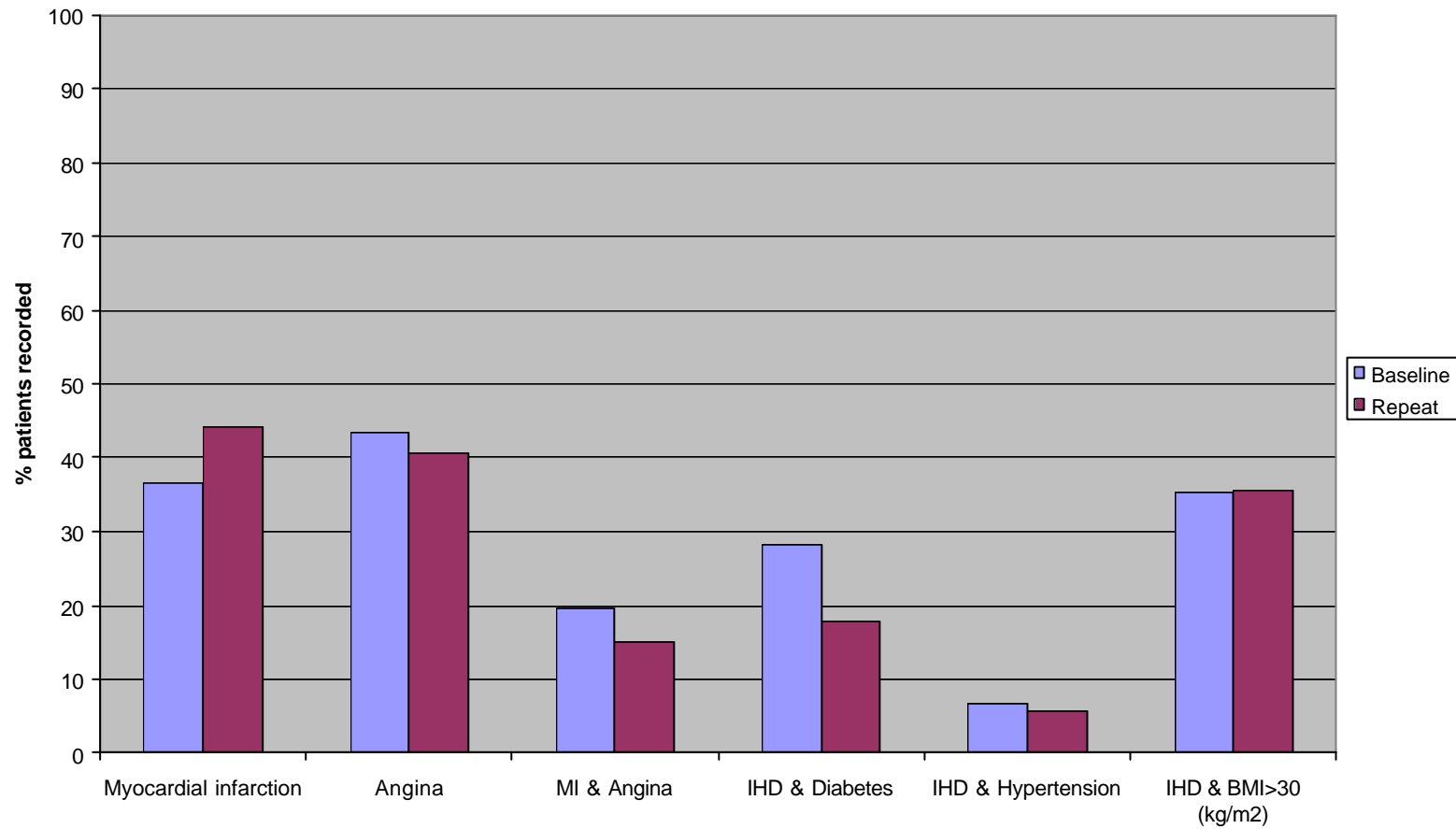
<sup>1</sup> Ever had doctor-diagnosed condition

All patients of South Asian origin were selected from IHD registers by surname

White patients were randomly selected from the same IHD registers, enough patients were selected to fulfill criteria for conducting statistical analyses

Data is from 16 GP practices located in inner-city Bristol.

**Appendix 2.2 Baseline (2001-2002 and repeat (2002-2003) clinical audits of secondary prevention of ischaemic heart disease (IHD): Diagnosis and co-morbidity for all patients**



Data is from 16 GP practices located in inner-city Bristol.