Is choice of general practitioner important for patients having coronary artery investigations?

F Kee, B Gaffney, C Canavan, J Little, W McConnell, A M Telford, J D Watson

Abstract

Objective—To determine whether particular sociodemographic characteristics of patients with stable angina affected their general practitioners' (GPs') decisions to refer them for revascularisation assessment.

Design—Postal questionnaire survey.

Setting—Collaborative survey by the departments of public health medicine in each of the four health boards in Northern Ireland, serving a total population of 1.5 million.

Subjects—All (962) GPs.

Main measures—The relation between GPs' referral decisions and patients' age, sex, employment status, home circumstances, smoking habits, and obesity.

Results—541 GPs replied (response rate 56%). Most were "neutral" towards a patient's sex (428, 79%), weight (331, 61%), smoking habit (302, 56%), employment status (431, 80%), and home circumstances (408, 75%) in making decisions about referral. In assigning priority for surgery most were neutral towards the patient's sex (459, 85%), employment status (378, 70%), and home circumstances (295, 55%). However, most GPs (518, 95%) said that younger patients were more likely to be referred, and a significant minority were less likely to refer patients who smoked (202, 37%) and obese patients (175, 32%) and more likely to refer employed patients (97, 18%) and those with dependants (117, 22%) (compared with patients with otherwise comparable clinical characteristics); these views paralleled the priority which GPs assigned these groups. The stated likelihood of referral of young patients was independent of the GPs' belief in ability to benefit from revascularisation, but propensity to refer and perception of benefit were significantly associated for all other patient characteristics.

Conclusion—GPs' weighting of certain characteristics in reaching decisions about referral for angiography is not uniform and may contribute to unequal access to revascularisation services for certain patient groups.

(*Quality in Health Care* 1994;3:17-22)

Introduction

In October 1992 the chief medical officer for Northern Ireland made several recommendations concerning the provision of cardiac

surgery services in the province,¹ recognising not only the need to increase local capacity but also to rationalise the organisation of the services. Among the issues he raised were the concerns of some doctors about unequal access to treatment for certain groups of patients and the need to establish clear criteria for referral for investigation and revascularisation assessment. Indeed, there is some evidence of apparent inequity in the rates of angiography between different areas of the province² and of disproportionately low rates among women.³ The chief medical officer recognised the pivotal role of the patient's general practitioner (GP) and local hospital specialists but, though he acknowledged the lack of hard data, he suggested there was little consistency among clinicians in the approach to referral. At the same time, some who gave evidence to the chief medical officer considered that the overall rate of angiography (200/100 000 or roughly twice that in many English districts) was excessive.

This paper reports a survey of the views of GPs about their routine management of patients with stable angina; it aimed at determining patient characteristics which GPs felt influenced their decisions to refer for angiography and revascularisation assessment.

Methods

Family practitioner services in Northern Ireland are organised by four health and social services boards, serving a population of 1.5 million. After a pilot study a questionnaire was sent to all 962 GPs providing services in the boards' areas. The covering letter, issued in October 1993, explained that the purpose of the survey was to address some of the issues raised by the chief medical officer's report and to assess the GPs' usual approaches to managing chronic stable angina. The questionnaires were identified by a code number to allow the posting of one reminder letter, and the doctors were assured that their responses would be treated strictly confidentially.

Among the primary issues raised by the questionnaire, the doctors were asked whether demographic or clinical factors (severe symptoms, relatively young patients, male sex, employment, dependants, smoking, obesity) influenced their decision to refer patients with chronic stable angina to a cardiologist for assessment; their belief about the ability of particular groups of patients to benefit from revascularisation; and the priority (on the surgical waiting list) which it was justifiable to

Department of Epidemiology and Public Health, Queen's University of Belfast, Belfast
F Kee, honorary senior lecturer

Eastern Health and Social Services Board
B Gaffney, consultant in public health medicine
J Little, director of public health

Northern Health and Social Services Board
C Canavan, research assistant, department of public health medicine
J D Watson, director of public health

Western Health and Social Services Board
W McConnell, director of public health

Southern Health and Social Services Board
A M Telford, director of public health

Correspondence to:
Dr F Kee, Department of Public Health Medicine, Northern Health and Social Services Board, County Hall, Ballymena BT42 1QB
Accepted for publication 31 March 1994

accord to patients with specific characteristics (compared with patients without the specified features) (box).

- 8 In regard to patients aged 70 or less, do any of the following factors affect the likelihood that you will refer a patient for assessment of suitability for revascularisation *compared with other patients without the specified characteristic?*

(Please indicate by circling the appropriate response, whether the factor would increase, decrease, or not affect your decision to refer)

Severe symptoms	Increase	Decrease	No change
Relatively young patients	Increase	Decrease	No change
Male patients	Increase	Decrease	No change
Employed patients	Increase	Decrease	No change
Patients with dependants	Increase	Decrease	No change
Patients who smoke	Increase	Decrease	No change
Obese patients	Increase	Decrease	No change

- 9 Do you believe that patients of the types shown below have an increased, decreased, or no different chance of benefiting from revascularisation *compared with patients without the specified characteristics?*

Patients with severe symptoms	Increased	Decreased	No different
Relatively young patients	Increased	Decreased	No different
Male patients	Increased	Decreased	No different
Employed patients	Increased	Decreased	No different
Patients with dependants	Increased	Decreased	No different
Patients who smoke	Increased	Decreased	No different
Obese patients	Increased	Decreased	No different

- 10 Cardiac surgeons in the United Kingdom prioritise their waiting lists for bypass operations in several different ways. Other than the degree of anatomical stenosis of the coronary vessels and the ventricular ejection fraction, which of the following factors do you feel it reasonable for the surgeon to take account of in deciding the priority given to patients?

(Please indicate by circling the appropriate response whether the factor would increase, decrease, or not affect the priority of the patient *compared with other patients without the characteristic*

Severe symptoms	Increase	Decrease	No change
Relatively young patients	Increase	Decrease	No change
Male patients	Increase	Decrease	No change
Employed patients	Increase	Decrease	No change
Patients with dependants	Increase	Decrease	No change
Patients who smoke	Increase	Decrease	No change
Obese patients	Increase	Decrease	No change

Relevant parts of questionnaire

Figs 1–4 General practitioners' responses to patients with chronic stable angina with respect to (a) likelihood of referral, (b) ability of patient to benefit from revascularisation, and (c) priority accorded on list

After coding the data were analysed with SPSS for Windows software. The practice size of the responders and non-responders was compared with the *t* test for independent samples. Differences in the proportions of doctors giving particular responses were assessed with the χ^2 statistic for contingency tables. When appropriate, Fisher's exact test was applied.

Results

Of the 962 GPs surveyed, 541 replied, a response rate of 56%; female GPs were slightly under-represented (114, 21% of responders *v* 118, 28% of non-responders; $\chi^2 = 13$, $p = 0.0015$). Response rates were lower in practices with fewer patients living in deprived areas (61% in the lowest tertile and 44% in highest tertile of practices; $\chi^2 = 36$, $p < 0.0001$). There was no significant difference in the average practice size of the responders and non-responders (6103 *v* 6337; $t = 1.19$, $p = 0.23$).

As indicated in the questionnaire the GPs were asked to say whether, for patients with stable angina (with *otherwise comparable clinical characteristics*), certain features increased the likelihood that they would refer particular patients to a cardiologist compared with patients without the specific features (for example, young patients versus old patients, men versus women, obese patients versus non-obese patients, etc).

Figures 1 to 6 summarise the results and also show the numbers of doctors believing that a particular characteristic affected the patient's ability to benefit (from revascularisation) and that the characteristic should affect the patient's priority on the waiting list. Most of these GPs were "neutral" towards a patient's sex (428, 79%), weight (331, 61%), smoking habit (302, 56%), employment status (431, 80%), and home circumstances (408, 75%) in making decisions about referral for revascularisation assessment. In their assignment of priority for surgery most were neutral towards the patient's sex (459, 85%), employment status (378, 70%), and home circumstances (295, 55%). However, most GPs (572, 95%) said that relatively young patients were more likely to be referred than older patients, and a significant minority were less likely to refer smokers (202, 37%) and obese patients (175, 32%) and more likely to refer employed patients (98, 18%) and those with dependants (117, 22%) (compared with patients with otherwise comparable clinical characteristics), views which paralleled the priority which they assigned these groups.

Except for age, there was a significant relation for all of the other patient characteristics between the likelihood of referral and the perception of benefit (table 1). Table 2 shows the association between the perception of the patient's ability to benefit and the priority on the waiting list which the doctors felt it justifiable to accord to particular types of patients. The stated propensity to refer relatively young patients was independent of the perception of benefit for the patient, but

Figure 1 Relatively young patients

Figure 2 Male patients

Figure 3 Employed patients

Figure 4 Patients with dependants

significant associations were evident for the other patient characteristics.

Some differences were apparent in the responses of male and female doctors. A higher proportion of the male GPs indicated a greater propensity to refer employed patients and those with dependants (table 3). Male GPs were also significantly more likely than female GPs to accord a higher priority on the waiting list to employed patients and those with dependants and a lower priority to obese patients (table 4).

Discussion

Our results give some insight into the socio-demographic characteristics of patients with chronic stable angina which GPs consider influence their decisions about referral for revascularisation assessment. With few exceptions, GPs' propensity to refer specific types of patients (and the priority on the waiting list which they accorded them) paralleled their belief about the patient's ability to benefit from bypass surgery. Though this tends to suggest rational decision making, it may not reflect good clinical judgement if the prior beliefs about ability to benefit from revascularisation are suspect. If this were so, it could contribute to inequity of access to these services for certain patient groups.

Most GPs said they were more likely to refer younger patients (though a cut off age was not defined), and most believed that younger patients had a greater chance of benefiting from bypass surgery. This finding bears out a recent study that showed that older subjects present at angiography later in the course of the disease and are receiving more intense treatment.⁴ There is little evidence that older subjects are less likely to benefit than younger subjects,^{5a} and in fact the survival advantage conferred by surgery in the European coronary surgery study was greater in older subjects.^{5b} Although predicting the risk of death or infarction for individuals is difficult on the basis of angiographic results,⁶ the absolute risks of adverse events in older subjects is generally higher. Seldom are patients given the opportunity to weigh the risks and benefits,⁷ and we wonder whether these responses reflect a form of agism.⁸ However, it has been convincingly argued that the chronological age of a patient is an inadequate criterion on which to base decisions regarding medical care.^{9 10} It is possible, nevertheless, that older patients complain less, for there is some evidence that the perception of angina is reduced with age.¹¹

A sizable majority of doctors felt that men and women had equal chances of benefiting from bypass surgery. However, roughly one in five (124, 23%) thought that male patients had a greater chance of benefit, and about the same proportion (98, 18%) said they were more likely to refer men for assessment. Though women are considered to experience higher operative risks,⁷ there is also some evidence of systematic differences between male and female patients in rates of angiography³ and in referral for surgery.¹² Female

Figure 5 Patients who smoke

Figure 6 Obese patients

Figs 5–6 General practitioners' responses to patients with chronic stable angina with respect to (a) likelihood of referral, (b) ability of patient to benefit from revascularisation, and (c) priority accorded on list

patients seem to report angina symptoms less reliably,¹³ and the clinical management of female patients is strongly influenced by the patient's presentation "style."¹⁴ There are also some differences in the clinical presentation and range of disease in the two sexes.^{15–18} Thus we do not know whether our findings reflect bias in a minority of doctors. Certainly male and female doctors in our sample held similar views in this regard.

Although 438 doctors thought that patients who smoked would benefit less from revascularisation, less than half (202) said that the likelihood of their referring such patients was any lower. However 381 (70%) felt it justifiable to accord such patients a lower priority on the surgical waiting list. There is evidence that smoking accelerates graft occlusion^{19–20} and that the benefits of surgery in this group are smaller.²¹ In this context the GPs might have been considered to be utilitarian and fair in their decisions. However, other patient characteristics may reduce the chances of benefit, such as diabetes or elusive genetic factors,²² which seldom feature in the debate on priorities for surgery. A major weakness of the utilitarian approach is that, ultimately, judgements have to be made about the welfare of different types of people⁸ and, arguably, value of life can only sensibly be judged by patients themselves.²³ Though two thirds of doctors said that their referral decisions were

unaffected by a patient's obesity, a third said that they would accord such patients a lower priority on the waiting list. The debate on the appropriateness of such decisions might share much in common with the arguments rehearsed for smoking.

Though most GPs said they were uninfluenced by a patient's employment status or the home circumstances (whether or not there were dependants), roughly one in five admitted that they were more likely to refer employed patients and those with dependants and would accord these patients a higher waiting list priority. This was particularly characteristic of male doctors. Though there is no direct evidence on how these factors affect the outcome of bypass surgery, low levels of social and economic resources identify an important high risk group among medically treated patients with coronary artery disease, independent of medical prognostic factors.²⁴ In one study the number of individuals dependent on the household income was inversely related to survival.²¹ The views of these Northern Ireland GPs parallel those of a group of Canadian surgeons who were strongly influenced by a patient's work status in assigning waiting list priority.²⁵ In fact, the mean shift in priority due to work status was equal to or larger than the mean shift due to clinical factors such as severity of angina.²⁵

In summary, we showed that most of these GPs were fairly "neutral" towards a patient's sex, weight, smoking habit, or home circumstances in making decisions about referral for revascularisation assessment and their assignment of priority. However, most GPs said that younger patients were more likely to be referred and a significant minority were less likely to refer patients who smoked and obese patients and more likely to refer employed patients and those with dependants, views which paralleled the priority which they assigned these groups. Since the timeliness of revascularisation is ultimately dependent on the point of entry of the patient "into the system" (that is, after the initial referral) we believe these findings may have a bearing on equity of access bypass surgery. We qualify our conclusions with three principal caveats, as follows.

Firstly, our response rate was only 56%. However, this is twice the response rate of a recent national survey of GP referrals for angiography²⁶ carried out by the National Heart and Lung Hospital, and we consider it unlikely that non-responders would have been better informed about the benefits offered by surgery for particular types of patients. Secondly, we have not measured the GPs' actual referral rates of patients for revascularisation assessment. Although death rates from heart disease are higher in Northern Ireland than in the rest of the United Kingdom, the prevalence of angina is comparable,²⁷ but the number of angiograms performed in the province in 1991 (3087 for a total population of 1.5 million) was twice that which would be predicted on the basis of a recently devised "population needs" algorithm.²⁸ Despite this generous "capacity" there are still consider-

Table 1 Relation between GPs' propensity to refer and their perception of patients' ability to benefit from revascularisation

	Relatively young patients			Male patients			Employed patients			Patients with dependants			Patients who smoke			Obese patients		
	Doctors stating higher propensity to refer	Others	Total	Doctors stating higher propensity to refer	Others	Total	Doctors stating higher propensity to refer	Others	Total	Doctors stating higher propensity to refer	Others	Total	Doctors stating higher propensity to refer	Others	Total	Doctors stating higher propensity to refer	Others	Total
Doctors perceiving greater capacity to benefit	419	12	431	65	57	122	48	66	114	49	35	84	69	19	88	123	27	150
Others	88	5	93	31	365	396	49	359	408	67	370	437	256	181	437	227	147	374
Total	507	17	524	96	422	518	97	425	522	116	405	521	325	200	525	350	174	524
$\chi^2 = 0.91$; $p = 0.34$ Missing data = 17																		
$\chi^2 = 124.6$; $p < 0.0001$ Missing data = 23																		
$\chi^2 = 51.4$; $p < 0.0001$ Missing data = 19																		
$\chi^2 = 72.8$; $p < 0.0001$ Missing data = 20																		
$\chi^2 = 11.4$; $p = 0.00048$ Missing data = 16																		
$\chi^2 = 21$; $p < 0.0001$ Missing data = 17																		

Table 2 Relation between GPs' perception of patients' ability to benefit from revascularisation and their priority rating on waiting list

	Relatively young patients			Male patients			Employed patients			Patients with dependants			Patients who smoke			Obese patients		
	Doctors stating greater ability to benefit	Others	Total	Doctors stating greater ability to benefit	Others	Total	Doctors stating greater ability to benefit	Others	Total	Doctors stating greater ability to benefit	Others	Total	Doctors stating greater ability to benefit	Others	Total	Doctors stating greater ability to benefit	Others	Total
Doctors giving higher priority	423	79	502	47	12	59	62	81	143	68	158	226	50	86	136	103	117	220
Others	7	12	19	75	381	456	53	324	377	16	277	293	38	342	380	46	256	302
Total	430	91	521	122	393	515	115	405	520	84	435	519	88	428	516	149	373	522
$\chi^2 = 25.4$; $p < 0.0001$ Missing data = 20																		
$\chi^2 = 112$; $p < 0.0001$ Missing data = 26																		
$\chi^2 = 50$; $p < 0.0001$ Missing data = 21																		
$\chi^2 = 55$; $p < 0.0001$ Missing data = 22																		
$\chi^2 = 49$; $p = 0.0001$ Missing data = 15																		
$\chi^2 = 60.7$; $p < 0.0001$ Missing data = 19																		

Table 3 Relation between GPs' sex and their likelihood of referring particular patients. Figures are numbers (percentages)

	Employed patients			Patients with dependants		
	Doctors stating increased likelihood of referral	Other GPs	Total	GPs stating increased likelihood of referral	Other GPs	Total
Male GPs	85(21)	329(79)	414	98(24)	317(76)	415
Female GPs	11(10)	100(90)	111	16(15)	94(85)	110
Total	96	429	525	114	411	525
$\chi^2 = 5.9$, $p = 0.014$ (missing data = 16)						
$\chi^2 = 3.69$, $p = 0.055$ (missing data = 16)						

Table 4 Relation between GPs' sex and their prioritisation criteria for employed patients, patients with dependants, and obese patients. Figures are numbers (percentages)

	Employed patients			Patients with dependants			Obese patients		
	GPs giving higher priority	Other GPs	Total	GPs giving higher priority	Other GPs	Total	GPs giving higher priority	Other GPs	Total
Male GPs	123(30)	287(70)	410	194(47)	217(53)	411	181(44)	229(56)	410
Female GPs	18(16)	93(84)	111	31(28)	79(72)	110	36(32)	74(66)	110
Total	141	380	521	225	296	521	217	303	520
$\chi^2 = 7.7$, $p = 0.0054$ (missing data = 20)									
$\chi^2 = 12$, $p = 0.0005$ (missing data = 20)									
$\chi^2 = 4.2$, $p = 0.04$ (missing data = 21)									

able disparities in angiography rates between different parts of the province. The chief medical officer himself acknowledged that patients with the most vociferous doctors sometimes received their bypass earlier than might have otherwise been the case. We consider it likely therefore that who a patient's doctor is contributes significantly to chances of referral to hospital and ultimately to the timeliness of revascularisation. Thirdly, the scenarios which were drawn from the GPs' appraisal were obviously artificial and required consideration of only the particular characteristic in question. Reality is far more complex. Nevertheless, "paper evaluation" has been shown to distinguish substantial variations in clinical practice in the management of patients with chest pain²⁹ and may circumvent other biases.³⁰

Therefore we hope that this work can form the basis of further inquiry into how doctors weight various sociodemographic patient characteristics in reaching decisions about the need for angiography and revascularisation assessment. The results of this study are being used to inform the discussions of the regional Clinical Resource Efficiency Support Team (CREST)³¹ which will advise on the development of local referral criteria. Though they have their detractors,³² consensus methods for developing practice guidelines have attracted a large amount of published work.³³⁻³⁴ What has become clear, however, is that while coherently gathered published evidence can inform the production of guidelines³⁵⁻³⁶ the utilisation of guidelines may be more contingent on a sense of ownership among the "stake holding" clinicians.³⁷ It must be remembered that waiting lists are now the ultimate responsibility of the purchaser and coronary artery bypass procedures are included in the budget of GP fundholders. GPs, particularly those practising in closely knit or rural communities may be particularly susceptible to pressures from their most vociferous patients. They may know many of them socially, and the difficulty of objectively applying practice guidelines should not be underestimated.

Thus, in the light of our results concerning the effects of demographic characteristics on the perceptions of benefit and priority, it may be time to look closely at which types of patients will reap the benefits of expanding the service.

We thank the following GP advisors at each health board for their advice and help: Drs M Brown (Western), S Gillen (Southern), C Booth (Eastern), M Eakin (Northern). A complete copy of the questionnaire is available from the authors.

- 1 *Review of cardiac surgery in Northern Ireland. A report by the Chief Medical Officer.* Belfast: Department of Health and Social Services, 1992.
- 2 Kee F. Referrals for coronary angiography in a high risk population. *Quality in Health Care* 1993;2:87-90.
- 3 Kee F, Gaffney B, Currie S, O'Reilly D. Access to coronary catheterisation: fair shares for all? *BMJ* 1993;307:1305-7.
- 4 Elder AT, Shaw TRD, Turnbull CM, Starkey IR. Elderly and younger patients selected to undergo coronary angiography. *BMJ* 1991;303:950-3.
- 5a Kirklin JW, Akins CW, Blackstone EH, Booth DC, Califf RM, Cohen LS, et al. ACC/AHA Task Force report. Guidelines and indications for coronary artery bypass graft surgery. *J Am Coll Cardiol* 1991;17:543-89.

- 5b Vornaukas E and the European Coronary Surgery Study Group. Twelve year follow up of survival in the randomised European Coronary Surgery Study. *New Engl J Med* 1988;319:332-7.
- 6 Patterson DLH, Treasure T. The culprit coronary artery lesion. *Lancet* 1991;338:1379-80.
- 7 Weston CFM, Watura R, Reeves P, Fraser AG. Do patients with heart disease sanction medical paternalism? *Br Heart J* 1993;69(suppl): Abstract 237.
- 8 Hope T, Springings D, Crisp R. "Not clinically indicated": patients' interests or resource allocation? *BMJ* 1993;306:379-81.
- 9 Kilner JF. Age criteria in medicine: are the medical justifications ethical? *Arch Intern Med* 1989;149:2243-6.
- 10 Wetle T. Age as a risk factor for inadequate treatment. *JAMA* 1987;258:516.
- 11 Umachandran V, Ranjadayalan K, Ambepityia G, Marchant B, Kopelman PG. Aging, autonomic function and the perception of angina. *Br Heart J* 1991;66:15-8.
- 12 Petticrew M, McKee M, Jones J. Coronary artery surgery: are women discriminated against? *BMJ* 1993;306:1164-6.
- 13 Harris RB, Weissfeld LA. Gender differences in the reliability of reporting of symptoms of angina pectoris. *J Clin Epidemiol* 1991;44:1071-8.
- 14 Birdwell BG, Herbers JE, Kroenke K. Evaluating chest pain. The patient's presentation style alters the physicians' diagnostic approach. *Arch Intern Med* 1993;153:1991-5.
- 15 Lerner DJ, Kannel WB. Patterns of coronary heart disease morbidity and mortality in the sexes: a 26 year follow-up of the Framingham population. *Am Heart J* 1986;111:383-90.
- 16 Feibach NH, Viscoli CM, Horwitz RI. Differences between women and men in survival after myocardial infarction. Biology or methodology? *JAMA* 1990;263:1092-6.
- 17 Orenca A, Bailey K, Yawn B, Kotke T. Effect of gender on long term outcome of angina pectoris and myocardial infarction/sudden unexpected death. *JAMA* 1993;269:2392-7.
- 18 Bickell NA, Pieper KS, Lee KL, Mark DB, Glower DD, Pryor DB, et al. Referral patterns for coronary artery disease treatment: gender bias or good clinical judgement? *Ann Intern Med* 1992;116:791-7.
- 19 Fitzgibbon GM, Leach AJ, Kafka HP. Atherosclerosis of coronary bypass grafts and smoking. *Can Med Assoc J* 1987;136:45-7.
- 20 Nietzel GF, Baboriak JJ, Pintar K, Quershi I. Atherosclerosis in aortocoronary bypass grafts. Morphology study and risk factor analysis 6-12 years after surgery. *Arteriosclerosis* 1986;6:594-600.
- 21 Ramanathan KB, Vander Zwaag R, Maddock V, Kroetz F, Sullivan JM, Mirvis DM. Interactive effects of age and other risk factors in long term survival after coronary artery surgery. *J Am Coll Cardiol* 1990;15:1493-9.
- 22 Bhattacharaya S. Higher complication rates are not confined to smokers. *BMJ* 1993;306:1409.
- 23 Harris J. *The value of life.* London: Routledge, 1985.
- 24 Williams RB, Barefoot JC, Califf RM, Haney TL, Saunders WB, Pryor DB, et al. Prognostic importance of social and economic resources among medically treated patients with angiographically documented coronary artery disease. *JAMA* 1992;267:520-4.
- 25 Naylor CD, Levinton C, Baigrie RS, Goldman BS. Placing patients in the queue for coronary artery surgery: do age and work status alter Canadian specialists decisions? *J Gen Intern Med* 1992;7:492-8.
- 26 Priestly KA, Buller NP. Why so few coronary revascularisation procedures? *Br Heart J* 1993;69(suppl): Abstract 238.
- 27 Evans AE, McCrum EE, Patterson CC. *The change of heart baseline clinical survey. A report to the Health Promotion Agency.* Belfast: Belfast MONICA Project and the Department of Epidemiology and Public Health, Queen's University of Belfast, 1990.
- 28 Faculty of Public Health Medicine and Yorkshire Regional Health Authority. *Implementing "Health of the Nation". An example: ischaemic heart disease.* Yorkshire Regional Health Authority, 1991.
- 29 Hlatky MA, Lee K, Botvinick E, Brundage BH. Diagnostic test use in different practice settings: a controlled comparison. *Arch Intern Med* 1983;143:1886-9.
- 30 Bobbio M, Detrano R, Shandling A, Ellestad M, Clark J, Brezden O, et al. Clinical assessment of the probability of coronary artery disease: judgemental bias from personal knowledge. *Med Decis Making* 1992;12:197-203.
- 31 McClements P. Clinical Resource Efficiency Support Team (CREST). *Health Trends* 1993;25:46.
- 32 Oliver MF. Consensus or non-consensus conferences on coronary heart disease. *Lancet* 1985;i:1087-9.
- 33 Fink A, Kosecoff J, Chassin M, Brook R. Consensus methods: characteristics and guidelines for use. *Am J Public Health* 1984;74:979-83.
- 34 Woolf SH. Practice guidelines, a new reality in medicine. II. Methods of developing guidelines. *Arch Intern Med* 1992;152:946-52.
- 35 Lomas J, Anderson G, Enkin M, Vayda E, Roberts R, Mackinnon B. The role of evidence in the consensus process. Results from a Canadian consensus exercise. *JAMA* 1988;259:3001-5.
- 36 Grimshaw J, Russell I. Achieving health gain through clinical guidelines. I. Developing scientifically valid guidelines. *Quality in Health Care* 1993;2:243-8.
- 37 Buchan H. Clinical guidelines: acceptance and promotion. *Quality in Health Care* 1993;2:213-4.