Accessibility, acceptability, and effectiveness in primary care of routine telephone review of asthma: pragmatic, randomised controlled trial

Hilary Pinnock, Robert Bawden, Stephen Proctor, Stephanie Wolfe, Jane Scullion, David Price, Aziz Sheikh

Abstract

Objective To determine whether routine review by telephone of patients with asthma improves access and is a good alternative to face to face reviews in general practices.
Design Pragmatic, randomised controlled trial.
Setting Four general practices in England.
Participants 278 adults who had not been reviewed in the previous 11 months.
Intervention Participants were randomised to either telephone review or face to face consultation with the asthma nurse.
Main outcome measures Primary outcome measures were the proportion of participants who were reviewed within three months of randomisation and disease specific quality of life, as measured by the Juniper mini asthma quality of life questionnaire. Secondary outcome measures included the validated "short Q" asthma morbidity score, nursing care satisfaction questionnaire score, and length of consultation.
Results Of 137 people randomised to telephone consultation, 101 (74%) were reviewed, compared with 68 reviewed (48%) of the 141 people in the surgery group, a difference of 26% (95% confidence interval 14% to 37%; $P < 0.001$; number needed to treat 3.8). Three months after randomisation the two groups did not differ in the Juniper score (risk difference −0.07 (95% confidence interval −0.40 to 0.27) or in satisfaction with the consultation (risk difference −0.07 (−0.27 to 0.13)). Telephone consultations were on average 10 minutes shorter than reviews held in the surgery (mean difference 10.7 minutes (12.6 to 8.8; $P < 0.001$)).
Conclusions Compared with face to face consultations in the surgery, telephone consultations enable more people with asthma to be reviewed, without clinical disadvantage or loss of satisfaction. A shorter duration means that telephone consultations are likely to be an efficient option in primary care for routine review of asthma.

Introduction

Guidelines on the management of asthma emphasise the importance of regular review, and systematic recall is integral to the UK chronic disease management programme.[1] Regular review of patients taking medication is not only a professional responsibility highlighted by medical defence organisations: when linked with self management education, it reduces asthma morbidity.[2] Despite proactive asthma care in general practice, only about a third of people with asthma attend for annual review.[3 4] Non-attenders, however, may have considerable morbidity.[3 4] It is therefore a good idea to explore innovative, patient centred ways of providing care.[5]

Improving access to health care is an NHS priority.[6] With the development of telephone services such as NHS Direct, a culture is evolving in which telephone consultations are increasingly accepted as alternatives to face to face contacts.[7] Many general practitioners now accept calls from patients, with some doctors reserving specific times of day for such consultations.[8] Telephone consultations are safe alternatives in the triage of requests for same day appointments and out of hours care.[9–11] Patients' satisfaction with telephone consultations is high.[12]

A large US trial that compared normal clinic visits with a mix of face to face consultations and telephone reviews (the recommended interval for clinic visits was doubled and three telephone reviews took place in the intervening period) showed that telephone review has the potential to reduce morbidity, use of medication, and use of the health service in patients with a range of chronic disorders.[13] We are not aware of any study that has addressed the role of telephone consultations in the routine review of chronic disease in primary care in the United Kingdom. We hypothesised that telephone consultations improve access of patients to care and are an acceptable and effective alternative to face to face consultations for the provision of routine care of patients with asthma.

Methods

Recruitment—All four general practices that took part in the study had nurses who were trained and experienced in providing proactive asthma care (table 1). From their computerised asthma registers the practices identified adults (≥18 years) who had asked for a bronchodilator inhaler prescription in the previ-

Department of General Practice and Primary Care, University of Aberdeen, Foresterhill Health Centre, Aberdeen AB25 2AY
Hilary Pinnock *General Practice Airways Group clinical research fellow*
David Price *General Practice Airways Group professor of primary care respiratory medicine*
Botesdale Health Centre, Diss, Norfolk IP22 1DU
Robert Bawden *general practitioner*
Clarendon Medical Centre, Hyde, Cheshire SK14 2AQ
Stephen Proctor *general practitioner*
Thorpewood Surgery, Norwich NR7 9QL
Stephanie Wolfe *respiratory nurse*
Respiratory Unit, Glenfield Hospital, Leicester LE3 9QP
Jane Scullion *nurse consultant*

continued over

bmj.com 2003;326:477

Department of Public Health Sciences, St George's Hospital Medical School, London SW17 0RE
Aziz Sheikh
NHS/PPP Foundation national primary care postdoctoral researcher
Correspondence to: H Pinnock, Whitstable Health Centre, Whitstable, Kent CT5 1BZ
hpinnock@gpiag-asthma.org

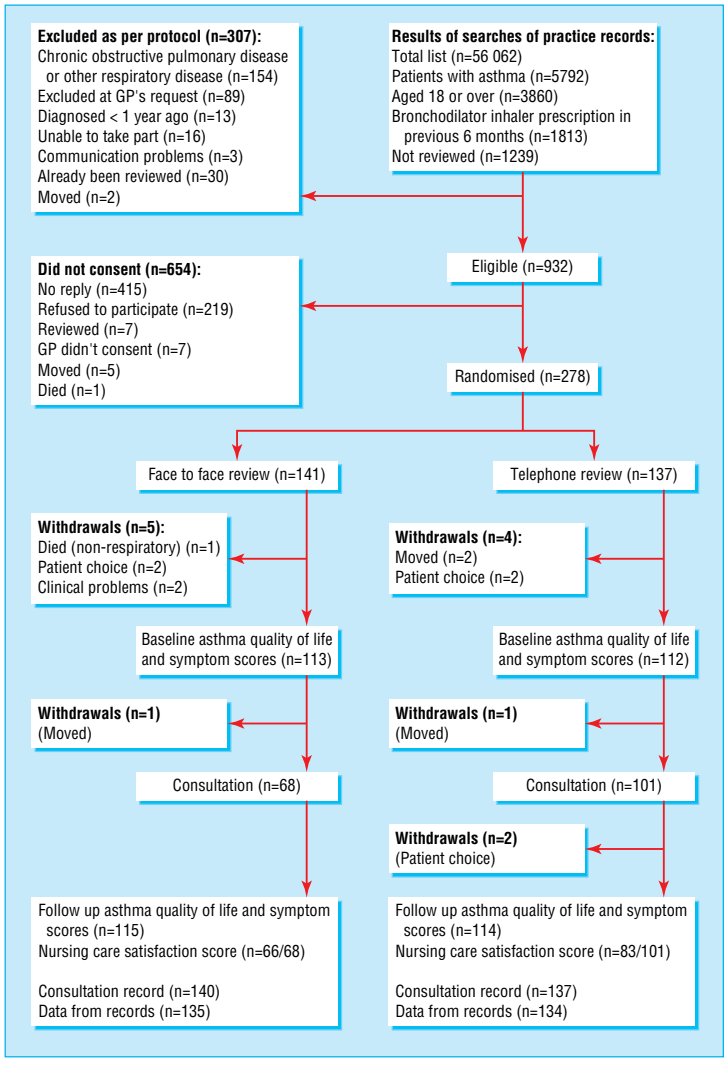
Table 1 Details of the general practices in the study

Place	Type of practice	No of doctors	No of nurses trained in care of asthma patients	No of patients	No (%) of patients on asthma register
Diss, Norfolk	Town practice	5	1	7 515	920 (12.2)
Hyde, Greater Manchester	City practice	4	1	8 067	775 (9.6)
Norwich	City practice	7	1	12 355	1387 (11.2)
Whitstable	Town practice on two sites	13	3	28 125	2710 (9.6)

ous six months but who had not had a routine asthma review in the preceding 11 months. Patients were excluded if the diagnosis of asthma had been made within the previous year, if they had chronic obstructive pulmonary disease, if communication difficulties made a telephone consultation impossible, or (at the general practitioner's request) for major social or medical reasons. We wrote to all eligible patients inviting them to take part in the study.

Randomisation—Patients were centrally randomised in blocks of 10 to ensure that approximately equal numbers of patients were allocated to each arm of the study.

Intervention—Patients randomised to the telephone review group were sent a letter from their practice informing them that they had been allocated to receive a telephone review and that they should expect a call from the asthma nurse within a month. Nurses were told to make up to four attempts to contact the patient by phone. The nurses were given no instructions about the content of the review except that it should reflect their normal practice and be appropriate to each patient's clinical need. Details about the consultation, including failed attempts at phone calls and the duration of the consultation, were recorded immediately after the review on a piloted consultation record. Nurses arranged any follow up consultations (whether in the surgery or by telephone) they deemed clinically necessary. Patients were free to arrange any consultations they wished.



Flow of patients through the trial

Control group—Patients randomised to the face to face consultation arm were sent a written invitation to make an appointment to see the asthma nurse within a month. Clinical care and follow up were the same as for the intervention group but without a telephone option.

Outcome measures—Primary outcome measures were the proportion of patients reviewed within three months of randomisation and change in asthma related quality of life, as measured by the Juniper mini asthma quality of life questionnaire.[14] This validated instrument is widely used in asthma research.[15] It has 15 questions (responses are rated on a scale from 1 (greatest impairment) to 7) and is responsive to change with a minimum important difference of 0.5 for both improvement and deterioration in clinical condition.[14 16]

To measure asthma morbidity we used the "short Q," a validated score incorporating three questions recommended by the Royal College of Physicians as outcome indicators for routine use in asthma care.[17 18] We used the nursing care satisfaction questionnaire to measure satisfaction with the consultations.[19] This questionnaire is validated for nurse consultations and has good discriminant validity, permitting comparison of quality of care.[20] Other secondary outcome measures were the duration of consultation, as recorded by the nurses at the end of the consultation, and use of healthcare resources during the three month study period, obtained by the nurses through a search of electronic and paper general practice records. Baseline questionnaires were sent with the initial letter to the patients. Follow up questionnaires on morbidity and satisfaction with the consultation were sent to the patients at three months.

Training and quality control—We gave the nurses standardised training in the study procedure. One member of the research team (JS), who was blinded to allocation, visited each of the practices and validated a random 20% sample of consultation data and data retrieved from records.

Sample size and statistical methods—An 80% power, at the 5% significance level (two tailed test), of detecting a 20% difference in the proportion of patients reviewed

Table 2 Baseline characteristics of patients

Characteristic	Type of consultation: Face to face (n=141)	Type of consultation: Telephone (n=137)
Number (%) of women	82 (58)	81 (59)
Mean (SD) age (years)	56.4 (17.5)	54.6 (17.5)
Mean (SD) scores on Juniper mini asthma quality of life questionnaire:		
Overall	5.16 (1.17)	5.17 (1.22)
Symptoms	4.96 (1.36)	4.92 (1.34)
Activity limitation	5.61 (1.62)	5.62 (1.39)
Emotional function	5.03 (1.52)	5.01 (1.56)
Environmental stimuli	4.89 (1.43)	4.90 (1.55)
Mean (SD) Short Q asthma morbidity score	1.85 (1.79)	2.09 (2.02)

Table 3 Number of consultations in which aspects of asthma care were discussed

Aspect of asthma care	Type of consultation: Face to face (n=68)	Type of consultation: Telephone (n=101)	P value for difference
Symptoms	63	100	0.06
Medication	66	100	0.77
Change in treatment recommended	20	23	0.33
Devices	63	88	0.15
Peak flows	64	75	<0.001
Self management	39	66	0.35
Written information given	14	9	0.03

from 30% to 50% required 206 patients.[3] A difference of 0.5 in the Juniper scores (SD 0.78) required 180 patients.[14] Equality in terms of quality of life was regarded as less than a 0.5 difference on the Juniper score.[16] To allow for an anticipated 25% of subjects failing to complete questionnaires, we estimated that we needed to recruit 225 patients. We used Student's *t* test to compare normally distributed continuous data and the Mann-Whitney U test to compare non-parametric data. We used the χ^2 test or Fisher's exact text (for small numbers) to analyse categorical data.

Results

Recruitment—From a total of 56 062 patients we identified 3860 adults on the practices' asthma registers, of whom 1813 had requested a bronchodilator in the previous six months. Of the 1239 patients (69%) who were due for an annual review, 307 were excluded (half because they had chronic obstructive pulmonary disease). Of the 932 eligible patients 278 agreed to participate in the study (figure). Participants were older than the overall eligible population (mean age 55.5 versus 48.6 years; $P<0.001$). Baseline characteristics were similar in the two groups (table 2).

Proportion reviewed—On an intention to treat analysis, 101 of the 137 patients (74%) allocated to the telephone arm were reviewed, compared with 68 of the 141 patients (48%) in the face to face consultation arm (risk difference 26% (95% confidence interval 14% to 37%; $P<0.001$; number needed to treat 3.8 (2.7 to 7.1)).

Duration and content of review and patients' satisfaction—Telephone consultations were shorter than surgery consultations (mean durations 11.2 and 21.9 minutes, a difference of 10.7 minutes (8.8 to 12.6; $P<0.001$)). This difference remained even when the 141 abortive telephone calls and five missed appointments were allowed for. Table 3 shows aspects of asthma care addressed during the consultations. The groups were equally satisfied with the consultation (table 4).

Morbidity—Quality of life scores and symptom scores measured three months after randomisation were similar in the two groups (table 5). The number of acute asthma exacerbations and use of healthcare resources did not seem to differ between the groups (table 6), though the trial did not have adequate power to detect differences in these secondary outcome measures.

Discussion

Telephone consultations improve access and are an acceptable alternative to face to face consultations for reviewing patients with symptomatic asthma. Nearly three quarters of the patients allocated to the telephone consultation arm had a routine asthma review, a substantial improvement on the proportion of patients reviewed by traditional means. The shorter duration of telephone consultations makes them an efficient option for primary care.

Limitations of the study

It was not possible to conduct a blinded study, so bias may have been introduced. To minimise the risk of allocation bias we opted for centralised randomisation by an independent company, and to minimise

Table 4 Mean (SD) scores on nursing care satisfaction questionnaire

	Type of consultation: Face to face (n=68)	Type of consultation: Telephone (n=101)	Difference (95% CI)	P value
Overall	3.86 (0.55)	3.80 (0.57)	–0.07 (–0.27 to 0.13)	0.51
Professional care	4.11 (0.63)	4.08 (0.59)	–0.03 (–0.24 to 0.18)	0.76
Relationship depth	3.47 (0.69)	3.44 (0.77)	–0.04 (–0.29 to 0.22)	0.78
Perceived time	3.77 (0.68)	3.66 (0.74)	–0.11 (–0.36 to 0.14)	0.38

Table 5 Mean (SD) morbidity and quality of life scores at three months follow up

Questionnaire	Type of consultation: Face to face (n=141)	Type of consultation: Telephone (n=137)	Difference (95% CI)	P value
Juniper mini asthma quality of life questionnaire:				
Overall	5.22 (1.14)	5.15 (1.28)	–0.07 (–0.40 to 0.27)	0.69
Symptoms	5.14 (1.34)	5.04 (1.35)	–0.10 (–0.46 to 0.26)	0.59
Activity limitation	5.54 (1.44)	5.55 (1.39)	–0.01 (–0.38 to 0.38)	0.99
Emotional function	5.00 (1.51)	5.01 (1.68)	0.09 (–0.41 to 0.43)	0.97
Environmental stimuli	4.91 (1.36)	4.78 (1.46)	–0.13 (–0.50 to 0.25)	0.50
Short Q asthma morbidity score	1.96 (1.96)	2.10 (2.16)	0.41 (–0.41 to 0.68)	0.62

Table 6 Number of asthma or respiratory consultations and acute episodes of asthma

	Patients in face to face consultation group (n=141)		Patients in telephone consultation group (n=137)		P value for difference
	No	Median (range)	No	Median (range)	
GP consultations	34	0 (0 to 3)	27	0 (0 to 5)	0.57
Nurse consultations	20	0 (0 to 2)	22	0 (0 to 2)	0.95
Outpatient consultations	2	0 (0 to 2)	2	0 (0 to 2)	0.97
Accident and emergency consultations	0	0	0	0	1
Acute exacerbations of asthma	5	0 (0 to 1)	7	0 (0 to 2)	0.68
Emergency bronchodilation	1	0 (0 to 1)	1	0 (0 to 1)	0.97
Steroid courses for asthma	3	0 (0 to 1)	5	0 (0 to 2)	0.64
Hospital admissions for asthma	0	0	0	0	1

information bias we gave standardised training on all the study procedures to the nurses. A blinded quality assessment that checked completeness and accuracy of data extracted from records in a random sample of participants from each practice failed to detect any systematic errors in data extraction.

Despite the broad entry criteria, two factors limit the generalisability of our findings. Our practices were all "asthma interested"—they all had specialist nurses with considerable experience of providing asthma care, potentially enhancing their skills to undertake telephone consultations. Also, our participants were slightly older than the total eligible population and may not be wholly representative of all adults with asthma in these practices.

Our study was of short duration and so we can't comment on the long term impact of telephone assessments. The short duration of follow up should, however, have maximised the chance of detecting a change in quality of life, as the impact of a clinical assessment would tend to dissipate over time.

Main strengths of study

Our study aimed to reflect, as far as possible, normal care of patients with asthma in the participating practices. We asked nurses not to change their clinical practice. Consultations were generally incorporated into the normal workload, although nurses observed that the end of the day was often a good time to make phone calls. Using validated instruments we obtained data on several clinical and practice related outcomes.

Interpretation of findings in relation to other studies

Neither telephone reviews nor face to face reviews resulted in improvement in asthma related quality of life or morbidity, and it may be tempting to conclude that routine reviews of asthma patients are ineffective. However, it may be that the educational and supportive role of nurses might be better reflected if a broader range of outcome measures—such as enablement (how well patients understand and cope with their illness and treatment), self efficacy, or knowledge—were evaluated. A second possibility is that in our practices, with their special interest in asthma, many of the patients' asthma may already have been relatively well controlled, leaving limited scope for improvement. This is supported by the observation that treatment was changed in only a quarter of consultations, which compares with a change to 80% of prescriptions in a survey of the effect of introducing an asthma clinic in a practice.[21]

In keeping with other studies, telephone reviews were of shorter duration than the face to face consultations, though the content was similar, apart from practical procedures such as peak flow measurements.[10] The distribution of the timings of the consultations in the two groups suggest that surgery consultations may have been paced to use the available 15, 20, or 30 minute appointments, whereas a telephone review could take as short or as long a time as needed. Time may be saved during a telephone review, as patients do not have to enter or leave the room, and computer templates and medical records can be completed during the course of the consultation. The nurses who undertook the reviews observed that the telephone consultations felt more "focused," which may reflect the recognised tendency for telephone interactions to be more goal oriented, with fewer digressions and achieving shared tasks faster.[22]

Patients' satisfaction was equally high with both modes of consultation. The nursing care satisfaction questionnaire included a domain that reflects "perceived time," and it is reassuring that despite the shorter duration of telephone consultations there was no evidence of dissatisfaction with the time spent. Studies have associated longer duration of consultation with greater satisfaction, but our data do not support this conclusion, suggesting that the dynamics of the two modes of consultation might be different.[23 24]

What is already known on the topic

Regular review of patients with asthma reduces morbidity and is endorsed as good practice by UK and international guidelines, but only about a third of patients attend for their annual review

Most studies of telephone consultation in primary care have focused on consultations requested by patients rather than their use in the routine review of chronic disease

What this study adds

Telephone consultations enable more people with asthma to be reviewed

Telephone consultations are shorter than face to face consultations, without any apparent clinical disadvantage

Patients are satisfied with telephone consultations

Conclusions

Telephone consultations enabled 26% more people with asthma to be reviewed than surgery consultations, without any apparent clinical disadvantage or loss of satisfaction. Because of their shorter duration, telephone consultations could be an efficient option in primary care for the routine review of people with asthma. Future studies exploring the role of telephone consultations for asthma should include a formal cost effectiveness analysis and a qualitative assessment of the perceptions of health service users and providers of care.

This study was originally developed at a General Practice Airways Group research meeting, which was organised by Mark Levy and funded by an educational grant from AstraZeneca. Victoria Madden advised the trial steering group. Aziz Sheikh undertook this work while in the Department of Primary Health Care and General Practice, Imperial College of Science, Technology and Medicine.

Contributors: HP had the idea for the study and led the development of the protocol, securing of funding, study administration, data analysis, interpretation of results, and writing of the paper. RB, SP, and SW contributed to the development of the protocol, collection of data, and interpretation of results. JS contributed to the development of the protocol, quality control of data collection, interpretation, and writing of the paper. DP contributed to the development of the protocol and data analysis plan. AS contributed to the development of the protocol and securing of funding and oversaw data analysis, interpretation of results, and writing of the paper. All authors reviewed the final manuscript. HP and AS are guarantors for the study.

Funding: British Lung Foundation (Grant No P00/9). AS is supported by an NHS R&D national primary care fellowship. The guarantor accepts full responsibility for the conduct of the study, had access to the data, and controlled the decision to publish.

Competing interests: None declared.

Ethical approval: The study was approved by all relevant ethics committees. All participants gave their fully informed consent.

1 British Thoracic Society. The British guidelines on asthma management: 1995 review and position statement. *Thorax* 1997;52(suppl 1):S1-20.
2 Gibson PG, Coughlan J, Wilson AJ, Abramson M, Bauman A, Hensley MJ, et al. Self-management education and regular practitioner review for adults with asthma. *Cochrane Database Syst Rev* 2002;(2):CD001117.
3 Gruffydd-Jones K, Nicholson I, Best L, Connell E. Why don't patients attend the asthma clinic? *Asthma in General Practice* 1999;7:36-8.
4 National Asthma Campaign. Out in the open: a true picture of asthma in the United Kingdom today. *Asthma Journal* 2001;6:3-14.
5 Partridge M. Consultation by telephone and e-mail. *Asthma Journal* 1999;4:103.
6 Department of Health. *The NHS Plan.* London: Stationery Office, 2000.
7 Toon P. Using telephones in primary care [editorial]. *BMJ* 2002;324:1230-1.
8 Hallam L. Organisation of telephone services and patients' access to doctors by telephone in general practice. *BMJ* 1991;302:629-32.
9 Marklund B, Korittz P, Bjorklander E, Bengtsson C. How well do nurse run telephone consultations and consultations in the surgery agree? Experience in Swedish primary health care. *Br J Gen Pract* 1991;41:462-5.
10 McKinstry B, Walker J, Campbell C, Heaney D, Wyke S. Telephone consultations to manage requests for same-day appointments: a randomised controlled trial in two general practices. *Br J Gen Pract* 2002;52:306-10.
11 Lattimer V, George S, Thompson F, Thomas E, Mullee M, Turnbull J, et al. Safety and effectiveness of nurse telephone consultation in out of hours primary care: randomised controlled trial. *BMJ* 1998;317:1054-9.
12 Hallam L. Access to general practice and general practitioners by telephone: the patient's view. *Br J Gen Pract* 1993;43:331-5.
13 Wasson J, Gaudette C, Whaley F, Sauvigne A, Baribeau P, Welch HG. Telephone care as a substitute for routine clinic follow up. *JAMA* 1992;267:1788-93.
14 Juniper EF, Guyatt GH, Cox FM, Ferrie PJ, King DR. Development and validation of the mini asthma quality of life questionnaire. *Eur Respir J* 1999;14:32-8.
15 Garratt A, Schmidt L, Mackintosh A, Fitzpatrick R. Quality of life measurement: bibliographic study of patient assessed health outcome measures. *BMJ* 2002;324:1417-9.
16 Juniper EF, Guyatt GH, Willan A, Griffith LE. Determining a minimal important change in a disease-specific quality of life questionnaire. *J Clin Epidemiol* 1994;47:81-7.
17 Rimmington LD, Aronoffsky L, Mowatt A, Wharburton E, Ryland I, Pearson MG. Use of a simple patient focussed asthma morbidity score [abstract] *Eur Resp J* 1997;10(suppl 25):194S
18 Pearson M, Bucknall C, eds. *Measuring clinical outcomes in asthma: a patient-focused approach.* London: Royal College of Physicians, 1999.
19 Baker R. Development of a questionnaire to assess patients' satisfaction with consultations in general practice. *Br J Gen Pract* 1990;40:487-90.
20 Poulton BC. Use of the consultation satisfaction questionnaire to examine patients' satisfaction with general practitioners and community nurses: reliability, replicability and discriminant validity. *Br J Gen Pract* 1996;46:26-31.
21 Charlton I, Charlton G, Broomfield J, Mullee M. Audit of the effect of a nurse run asthma clinic on workload and patient morbidity in a general practice. *Br J Gen Pract* 1991;41:227-31.
22 Rutter DR. *Communicating by telephone.* Oxford: Pergamon Press, 1987.
23 Freeman GK, Horder JP, Howie JGR, Hungin AP, Hill AP, Shah NC, et al. Evolving general practice consultation in Britain: issues of length and context. *BMJ* 2002;324:880-2.
24 Howie JGR, Heaney DJ, Maxwell M, Walker JJ, Freeman GK, Rai H. Quality at general practice consultations: cross sectional survey. *BMJ* 1999;319:738-43.

(Accepted 17 December 2002)