

# Coordinating and standardizing long-term care: evaluation of the west of Scotland shared-care scheme for hypertension

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## SUMMARY

**Background.** The long-term management of patients with chronic conditions such as hypertension presents problems for the health services. Shared care addresses these by coordinating care and defining responsibilities.

**Aim.** This study set out to investigate the feasibility, acceptability and cost effectiveness of shared general practitioner-hospital care for well-controlled hypertensive patients in an urban area by comparing three matched groups of patients.

**Method.** A total of 554 outpatient clinic attenders, considered suitable for shared care by their consultant, were randomly allocated to shared care or follow up in the outpatient clinic; a third group of 277 patients was selected from a nurse practitioner clinic. Main outcome measures were the proportion of patients in the second year of follow up who had undergone a complete review (blood pressure measurement, serum creatinine level result and electrocardiograph report), acceptability to patients and general practitioners as assessed by questionnaire, and cost per complete review in year two (National Health Service and patient costs).

**Results.** After two years 220 (82%) shared care patients had had a complete review compared with 146 (54%) outpatient clinic attenders and 202 (75%) nurse practitioner clinic attenders. Blood pressure control was similar in each group. Of 297 general practitioners invited, 85% wished to participate in the study; 61% of questionnaire respondents subsequently wanted shared care to continue while 25% were unsure. Half of the patients receiving shared care preferred this method of follow up. The rank order of cost-effectiveness ratios was shared care, nurse practitioner care and conventional outpatient care, relative differences being most marked when only patient costs were considered.

**Conclusion.** Shared care for hypertension is feasible in an urban setting, acceptable to the majority of participants and is a cost-effective method of long-term follow up.

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## Introduction

THE long-term management of patients with chronic conditions, such as hypertension, presents problems for the health service in terms of the numbers involved,<sup>1</sup> the high rate of drop out from follow up<sup>2</sup> and duplication of medical work by general practitioners and specialists.<sup>3</sup>

The west of Scotland shared-care scheme for hypertension was set up in 1986 to coordinate the long-term follow-up care of well-controlled hypertensive patients receiving care from different sources including a specialist outpatient clinic. While shared care for hypertension operates successfully in other centres,<sup>4</sup> it has not previously been assessed in an urban setting. The west of Scotland scheme was evaluated over two years for feasibility, acceptability to patients and general practitioners, and for cost effectiveness when compared with two other methods of long-term follow up, a specialist outpatient clinic and a nurse practitioner clinic. In the nurse practitioner clinic, the routine management of well-controlled patients was undertaken by a nurse but a specialist physician was on call throughout the clinic session and each patient was reviewed by medical staff once a year. Details of the nurse practitioner clinic have been published previously.<sup>5</sup>

## Method

The west of Scotland scheme is based on explicit, shared responsibility for the hypertensive patient's care. The general practitioner, the specialist, the patient and the laboratory services each have a defined role and responsibility, although the general practitioner is in overall control of the patient's care. The scheme is facilitated by a computerized database within the Glasgow Blood Pressure Clinic. The database is used to generate an annually updated, two-page medical record on each patient enrolled in the scheme for the general practitioner, and a patient-held summary record (the personal health booklet) for the patient. Each year, the patient is prompted by a letter from the shared-care registry, to arrange a review with the general practitioner. This includes a clinical examination, serum biochemistry and an electrocardiograph. The general practitioner returns the medical record, amended to contain any further relevant information collected during the year, together with the results of the clinical examination and the personal health booklet to the registry. Results of biochemical investigations are sent direct from the laboratory to the shared-care registry. The general practitioner either arranges an electrocardiograph and sends the tracing to the registry for standardized reporting or asks the registry to arrange an electrocardiograph for the patient at the local hospital. The full set of results are flagged by clerical staff for abnormalities according to a protocol and then scrutinized by a specialist physician. The updated medical record is posted to the general practitioner with a standard letter. Any suggested changes in follow-up plans are made to the general practitioner in this letter and, if required, an appointment at a re-referral clinic is available at short notice.

Subsequent return to the specialist clinic can be arranged via the re-referral clinic.

### *Evaluation*

The study was carried out in two outpatient clinics of the Glasgow Blood Pressure Clinic between 1986 and 1989; these clinics were based at two large teaching hospitals, the Royal and Western Infirmarys. All general practitioners who referred patients to these clinics were invited, by post, to participate. Outpatient attenders with well-controlled blood pressure (as assessed by their consultant) were paired, matching for age to within three years, sex and length of clinic attendance, and randomly assigned to shared care or continuing outpatient follow up. If a patient was assigned to shared care but his or her general practitioner was unwilling to take part, then that patient and the matched control were dropped from the study. A total of 554 patients were successfully matched and randomized over a period of one year. The 277 patients allocated to shared care were cared for by 176 general practitioners. A further group of 277 patients with well-controlled blood pressure was selected from the nurse practitioner clinic at Stobhill Hospital, Glasgow. These patients were matched for age and sex with the shared-care group.

*Effectiveness.* Since the annual review was a stated objective of each method of care, effectiveness was defined as the number of patients with a complete review in their second year of follow up, that is one which included a blood pressure measurement, a serum creatinine result and an electrocardiograph report.

Blood pressure was measured in a standard manner in each site. Recordings were made with the patient seated, after five minutes rest, using a conventional well-calibrated mercury sphygmomanometer. Control was assessed using age and sex specific target blood pressures, derived from a questionnaire administered to clinical members of the British Hypertension Society;<sup>6</sup> control was classified into one of the five grades ranging from very good to poor according to the degree of achievement of the target blood pressure.

Serum biochemistry (electrolytes, urea, creatinine, random blood sugar and cholesterol) measurements were taken from laboratory result forms; the same laboratories were used for the shared-care and hospital patients. Measurement of weight and urinalysis results were taken from the general practitioner record.

*Acceptability.* A questionnaire for patients was based, as far as possible, on existing questionnaires (for example, from Heartbeat Wales<sup>7</sup>) with customized questions as required; the final questionnaire was piloted and tested for reliability. A standard approach to assessment of acceptability was used, with questions on preference and perceived advantages and disadvantages of each method of care the patients experienced. Patients were asked to complete the questionnaire at enrolment in shared care and again, after two years. The same questionnaire was used to collect cost information for the economic evaluation. A further, separate purpose-designed, questionnaire assessed the acceptability of the personal health booklet to the shared-care group. The initial patient questionnaire was given to the patient at the clinic; follow-up questionnaires were posted out and returned by post. Two reminders were sent. Demographic information was obtained from hospital records supplemented by the questionnaires.

In the absence of suitable existing questionnaires, a purpose-designed questionnaire was sent by post to general practitioners at the end of the study to assess their preferences and the perceived advantages and disadvantages of shared care and hos-

pital-based care, plus opinions on whether the shared-care scheme should continue. Two reminders were sent. Published listings were used to obtain demographic information about the general practitioners.

*Costs.* The costs included in the analysis were all direct costs of medical, nursing and secretarial time (staff costs), investigations, administration, patient travel and time as measured in the second year of the scheme. Costs of providing premises were not included because these differed greatly between general practices and between general practice and hospital clinics. Staff costs per outpatient clinic consultation were calculated by observing the time spent on a sample of patients by medical, nursing and clerical staff for both routine and review consultations and using relevant salary scales to provide a cost per consultation. The time spent on each activity in the shared-care registry was also measured over a three-month period and staff costs similarly calculated to give an administration cost per shared-care patient. In a similar fashion, a range of costs was obtained for the nurse practitioner clinic depending on whether 100% or 50% of the medical time on call was included. Medical time costs for a shared-care consultation in general practice were calculated from estimates of the length of a consultation provided by a sample of general practitioners. Sensitivity analyses to test the robustness of the findings to changes in the estimate of length of a general practice consultation were carried out using estimates of five minutes, 10 minutes and 20 minutes per consultation. Practice receptionists provided a record of the number of visits to the general practitioner for shared-care and clinic patients over the year prior to the setting up of shared care and in the two subsequent years. The number of clinic visits for all three groups was obtained from the hospital records. Patient time spent travelling and in the consultation, as estimated by patients, was valued as lost leisure time at £0.03 per minute (Department of Transport estimate). Materials used for the annual review investigations were costed by the laboratories concerned. All analyses were done on an intention-to-treat basis excluding those who had died. Patients who dropped out of follow up were assumed to have no further costs. Although these patients may have continued to attend their general practitioner, they were considered defaulters since their follow up was no longer being monitored as planned. Patients receiving shared care who returned to outpatient clinic care were assumed to have the appropriate clinic costs, but were included in the shared-care group for analysis. A cost per complete review was calculated for each group. Costs have been updated to mid-1993 levels by using the National Health Service inflator for health service costs.

### *Analysis*

Statistical significance was determined by calculation of 95% confidence intervals for the difference between proportions and by using one and two sample *t*-tests for the clinical data, as appropriate.

### **Results**

The only significant difference in demographic characteristics between the groups was that fewer of the patients attending the nurse practitioner clinic lived outside the area served by Greater Glasgow Health Board, compared with the other two groups (95% confidence interval (CI) for the difference between the proportion in shared care and the proportion in the nurse practitioner clinic: 2.0% to 11.8%,  $P < 0.01$ ) (Table 1). Of the 297 general practitioners invited to participate, 251 (84.5%) accepted. The participation rate was similar for practitioners in Greater Glasgow Health Board (84.6% of 247 invited) and for those

**Table 1.** Demographic characteristics of patients in the three groups.

	Shared care (n = 277)	Outpatient care (n = 277)	Nurse practitioner clinic care (n = 277)
Mean age (SD) (years)	58.7 (11.8)	57.6 (11.8)	57.4 (12.4)
% women	52.0	52.0	52.0
% married	71.1	69.0	72.9
% employed fulltime	36.1	33.9	30.0
% live in area served by GGHB	87.0	85.9	93.9

n = total number of patients in group. SD = standard deviation. GGHB = Greater Glasgow Health Board.

practising outside the area (84.0% of 50 invited). Furthermore, the Glasgow practitioners who were invited to participate were similar in important characteristics to those practitioners who were not invited (Table 2). Those general practitioners in Glasgow who agreed to participate were more recently qualified (95% CI for difference 3.5% to 35.3%,  $P < 0.05$ ) and more likely to work from a health centre (95% CI for difference 10.2% to 39.4%,  $P < 0.01$ ) than those who refused to participate or did not reply (Table 2).

Percentages of patients who returned both questionnaires were 81.6% of 267, 73.3% of 270 and 70.4% of 270 for patients in the shared-care, outpatient care, and nurse practitioner clinic care groups, respectively. The response rate for the separate questionnaire on the booklet was 78.3%. Of 176 general practitioners 83.5% returned their questionnaire. There were no differences in demographic characteristics between respondents and non-respondents in any group.

### Effectiveness

The percentages of patients in the three groups who were still in

contact with the scheme or clinic and who had a complete review after two years of follow up are shown in Table 3. The highest percentage of patients receiving a complete review was among those receiving shared care. Seventeen patients visited the shared-care re-referral clinic during the two years and all but two were returned to the shared-care scheme.

There were no significant differences between the three groups in terms of clinical variables, including mean blood pressure levels, at the start of the evaluation. In the shared-care, outpatient care and nurse practitioner clinic care groups 67.8% ( $n = 239$ ), 63.8% ( $n = 188$ ) and 69.9% ( $n = 226$ ) of patients, respectively, either remained in the same grade or moved to a better grade of blood pressure control over two years. These differences were not significant. There was some terminal digit preference in recorded blood pressures with 52.1% of the 240 diastolic readings recorded by general practitioners ending in a zero compared with 21.8% and 13.8% of 188 and 340 readings from the outpatient and nurse practitioner clinics, respectively. The only difference in other monitored variables was an increase in the number of samples with a high serum potassium concentration after two years in the group receiving shared care, probably owing to haemolysis of blood samples in transit to laboratories; up to 18.9% of 175 blood samples were suspected of being slightly haemolysed while 13.1% were definitely haemolysed.

For those reviews carried out the completeness of information on clinical measurements (percentage for whom a result was recorded) for the shared-care group ranged from 79.8% to 97.9% for all variables except urinalysis (60.1%). For the outpatient group the range was 78.2% to 100% although completeness for urinalysis was low (43.1%). The nurse practitioner clinic group results were the most complete at 93.1% to 100% with 81.2% of urinalyses completed.

Of the 243 results of the shared-care clinical examinations in year two 77.8% were received from the general practitioner either on the medical record (51.4%) or in the personal health booklet (26.3%). The remainder of the results were obtained from the general practitioner by letter or by telephone.

**Table 2.** Characteristics of the general practitioners in Greater Glasgow Health Board who were invited to take part in the study and those not invited, those who agreed to participate and those who did not.

	% of GPs			
	Not invited (n = 391)	Invited (n = 247)	Agreed to participate (n = 209)	Did not agree to participate (n = 38)
Women	25.1	19.8	20.6	15.8
Practising from a health centre	43.7	42.1	45.9	21.1
Single handed	9.0	9.7	7.7	21.1
Qualified in last 25 years	-	45.3	48.3	28.9

n = total number of general practitioners in group.

**Table 3.** Effectiveness of follow up at the end of two years.

	% of patients			95% CI for difference	
	Shared care (n = 267)	Outpatient care (n = 270)	Nurse practitioner clinic care (n = 270)	Shared versus outpatient care	Shared versus nurse practitioner clinic care
In contact with clinic or scheme	96.6	85.9	90.7	6.0 to 15.4***	1.8 to 10.0**
Reviewed	91.0	69.6	80.7	14.9 to 27.9***	4.5 to 16.1***
Received complete review	82.4	54.1	74.8	20.8 to 35.8***	0.7 to 14.5*

n = total number of patients in group, excluding those who had died. CI = confidence interval. \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

### Acceptability

Of the 218 respondents to both questionnaires who received shared care 48.2% preferred shared care to outpatient care, 22.0% had no preference and 29.8% preferred outpatient care; the last group had spent longer attending an outpatient clinic prior to shared care than those who preferred shared care or had no preference (mean of 8.2 years versus 5.4 years, 95% CI for difference 0.8 to 4.3 years). The main advantage perceived by patients was greater accessibility to the doctor (78 comments), next was better continuity of care (38 comments), while the need for more than one visit to the general practitioner for annual review investigations was stated to be the main disadvantage (20 comments) and less expertise available was next (five comments). Of 156 personal health booklets returned to the registry for updating, 92.3% had been used. Only 3.8% of questionnaire respondents ( $n = 209$ ) disliked the booklet, while corrections to the demographic and clinical information were made by 14.8% of respondents in the questionnaire.

After two years, 61.2% of the 147 responding general practitioners wanted shared care to continue and 13.6% did not; the career experiences of these two groups were similar. The remaining 25.2% were unsure. One third of general practitioners (32.0%) preferred shared care to conventional primary care, outpatient care or nurse practitioner care for patients with well-controlled hypertension; 63.9% stated a preference for routine general practitioner care with only 2.0% preferring outpatient and 2.0% nurse practitioner clinic care. General practitioners considered the main advantage of shared care to be fewer losses to follow up (15 comments) followed by better communication between doctors (seven comments), while the main disadvantage was difficulty in organizing shared care in the practice (12 comments) followed by increased workload (10 comments). Acceptability of the personal health booklet was high with 85.7% of respondents happy to have it sent direct to patients.

Of the annual review investigations, those considered least necessary by the 147 general practitioners were random blood sugar level (27.9% considered it necessary), electrocardiogram (36.1%) and cholesterol assay (47.6%), while 76.2% considered that electrolytes, urea and creatinine, 95.2% that weight, 91.2% that urinalysis and 100% that blood pressure measurements were necessary.

### Costs

The patients receiving shared care visited their general practitioner a mean of 6.2 times a year compared with 5.3 times a year before registration on shared care, while the mean number of visits by the outpatient group remained at 5.4 times a year. The mean difference of 0.9 visits per shared care patient was included

as a cost of shared care. In the second year of the scheme the outpatient group also visited the outpatient clinic a mean of 2.1 times a year and the nurse practitioner clinic group made a mean of 2.0 visits to the nurse practitioner clinic. The shared care group had a mean of 0.3 clinic visits per patient.

The estimated cost per visit for medical, nursing and clerical time was between £3.30 and £13.18 for a shared care consultation, depending on the estimated time for a general practitioner consultation. A routine consultation for the outpatient group was costed at £8.78 and a review consultation at £13.19, while a routine consultation at the nurse practitioner clinic was costed at £7.59 and a review consultation at between £13.54 and £18.84, depending on the proportion of on-call time included. The mean patient travel costs for a visit were £0.70, £1.89 and £1.64 for the shared-care, outpatient and nurse practitioner clinic groups, respectively and mean patient time costs for a visit were £3.34, £6.69 and £4.68, respectively. Costs of materials for the annual review investigations were estimated as £1.42 per review for each group.

Using the most expensive estimate for staff time for the shared-care group (based on 20-minute appointments with their general practitioner) and the low estimate for the nurse practitioner clinic group (based on 50% of medical time being used in the clinic), the total cost per patient in year two was similar in each group, being £33.67 for the shared-care group, £38.57 for the outpatient group and £32.67 for the nurse practitioner clinic group.

However, each method of care produced a different number of complete reviews, that is, different effectiveness, in year two of the scheme. The cost effectiveness ratio is the cost per complete review and is shown in Table 4. The total cost per complete review for shared care was 57.3% of that in the outpatient clinic and 93.6% of that in the nurse practitioner clinic. Considering only NHS costs, shared care cost 76.4% of the cost of reviewing a patient in the outpatient clinic while for patient costs alone shared care was 36.0% of the outpatient clinic cost per reviewed patient; the equivalent comparisons with the nurse practitioner clinic were 108.6% for NHS costs and 70.4% for patient costs.

### Discussion

This study has demonstrated that the shared-care approach, involving the collection of a uniform set of patient data and its review by both specialist and general practitioner, is feasible for well-controlled hypertensive patients in an urban environment. It is a cost-effective method of long-term care; the benefits of this approach, more complete follow up, continuity of care, standardized follow-up procedures, convenience for the patient and continuing specialist involvement were achieved at less than the

**Table 4.** Costs, and cost per complete review in year two of the scheme.

Cost (£)	Shared care ( $n = 267/220$ )	Outpatient care ( $n = 270/146$ )	Nurse practitioner clinic care ( $n = 270/202$ )
<i>Overall cost</i>			
NHS	6319.19	5486.48	5343.26
Patient	2669.44	4926.45	3478.31
Total	8988.63	10 412.93	8821.57
<i>Cost per complete review</i>			
NHS	28.72	37.58	26.45
Patient	12.13	33.74	17.22
Total	40.86	71.32	43.67

$n$  = total number of patients in group, excluding those who had died/number of patients receiving complete review.

costs of outpatient attendance. The cost advantages are particularly marked for the patient. A direct comparison with routine general practitioner care was not possible in this study but recent evidence that the rule of halves still operates<sup>8</sup> implies that continuing improvements in long-term follow-up care of hypertensive patients are necessary.

This study was concerned principally with comparison of different methods of the process of care. Since blood pressure is susceptible to many confounding influences independent of the process of care, blood pressure control was not a major outcome variable. Comparison of blood pressure measured at different sites is fraught with difficulties. For example, in this study, the analysis of terminal digit preference showed differences in the recording of blood pressure between general practitioners and specialists.

Between 48% and 70% of hypertensive patients, and a similar proportion of their general practitioners, found shared care acceptable in practice and an appreciable number preferred it to alternatives. The personal health booklet was popular with both general practitioners and patients. Its production, from the clinical database used for the management of shared-care patients, was simple and cheap. It functioned as an efficient and convenient method of information exchange between the registry and the general practitioner, with the added benefit that the patient could share and audit the information.

While some general practitioners may not favour the shared-care approach for patients with hypertension, there is clear evidence from this study that many do. The principal disadvantage identified by general practitioners was difficulty in organizing shared care in the practice. The procedures could be varied to suit different working practices and preferences. A mix of methods to suit the type of patient, the level of need and the place of residence could be offered. Direct registration of patients onto the shared-care scheme by general practitioners is now being considered and it is hoped to take advantage of advances in information technology. The care offered will still be based on a standardized but continuously reviewed approach to the monitoring of blood pressure control and the detection of complications.

The shared-care procedure facilitates better auditing and evaluation of care. The long-term care of patients with hypertension often lies at the boundary between primary and secondary care and is thus a legitimate interest of both general practitioners and specialists. Shared-care procedures will enable easier collection of longer-term outcome data.

This shared-care scheme was originated by specialists who formed a steering group including academic general practitioners and public health professionals. Those general practitioners who referred patients to the Glasgow Blood Pressure Clinic were originally contacted by mail; routine contact with new participants is now made through the consultant's letter. Initial feedback from general practitioners was also principally by mail but a general practitioner-specialist liaison group has now been instituted at which shared care is discussed. The review protocols were developed initially from those used in the clinic; the next generation of management plans are being devised in collaboration with general practitioners. Nurses now take the lead role in day-to-day administration of the scheme and the collaboration extends to practice nurses in the participating general practices.

All staff time and material costs of administering shared care in this study were included in the NHS costs. Extrapolating from the 277 patients, it is estimated that up to 2000 patients could be monitored by a half-time person with a well-organized, computer-based system. Additionally, 2000 shared-care patients would require around six hours of specialist time per month for screening of results and five re-referral visits per week. The extra workload for general practitioners would amount to, on average, one

visit per patient per year. From this study, it can be estimated that this would ensure an annual review for approximately 27 more patients in every 100 ((220-146)/277) than would be reviewed through the outpatient clinic.

As yet experience of the effect on shared care of the purchaser-provider split is limited and there are few fundholding general practices in the Glasgow area. However, there are strong clinical and economic arguments for the operation of shared care which should persuade health authorities and boards, as purchasers of care, that contracts should specify such arrangements. Shared care might be included in clinical guidelines. It has already been proven to have benefit in clinical areas such as thyroid disease,<sup>9</sup> and the main features of this approach could be applied to those with other chronic conditions.

In conclusion, there is great potential for improvement in the effectiveness and efficiency of long-term care but the structures for achieving this need to be created. The concept of shared care appears to be sound, but the practice of shared care will require continued dialogue between general practitioners, specialists and health board purchasing teams. Current health promotion and stroke prevention strategies will result in increasing numbers of patients requiring long-term follow up of blood pressure control. Shared care offers the benefits of long-term general practice care with the advantages of continued specialist involvement, a role for the patient and a standardized approach to follow up. The findings presented here suggest that it is an acceptable, cost-effective approach to the coordinated management of the care of hypertensive patients.

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