

PRACTICE OBSERVED

Practice Research

Continuous opportunistic and systematic screening for hypertension with computer help: analysis of non-responders

F DIFFORD, J P TELLING, K R DAVIES, J E FORNEAR, C A READING

Abstract

For two years an office computer was used to identify patients to prompt for opportunistic screening and call for systematic screening. After the two years 92% of patients on the list had had blood pressure readings recorded within the previous five years, of which 34% resulted from special prompts and 22% from screening letters. Those who failed to respond to letters were sent questionnaires, and their records were compared with those of screened patients.

With the help of a microcomputer it is practicable to sustain a continuous screening rate of between 90% and 95%.

Introduction

At least 7% of the population aged between 35 and 65 would benefit from a reduced blood pressure.¹ In 1970 Hart showed that these patients could be identified,² and since then case finding for hypertension has been accepted in principle by most general practitioners. Audits have shown that even in well motivated practices fewer than 65% of patients have been screened in the past

five years, though Hall reported an 80% uptake in a smaller age range of 40-54.³

Microcomputers present an opportunity to improve uptake through their capacity for rapidly reviewing progress and identifying for further action patients who remain unscreened. The prompt for action from a microcomputer can take several forms, varying in technological complexity. A screen and keyboard in the consulting room can highlight the prompt when the patient's details are displayed. A computer generated summary can take the place of a manual one and be updated and reprinted each time information changes appreciably. All the large systems now include an opportunistic screening facility whereby a surgery list can be printed with details of potential cases identified from the patients' computer records.

Though such a facility was available to us, we thought that too many appointments were booked at insufficient notice to produce a printout of the prompts. We therefore obtained lists of patients who had not had their blood pressure entered in the computer record, and ancillary staff confirmed that this was correct by checking the manual record. They entered a prompt in the notes so that it came to the doctor's attention when a patient consulted. It was apparent, however, that some patients would not be reached in this way for several years, so we decided to send for these patients and offer a basic health check. A computer program was devised to carry out these procedures routinely, with minimal initiating action from the practice.

After two years 2354 (92%) of 2546 patients aged 40-64 had had their blood pressure recorded in the previous five years, and we thought that we had reached a watershed in progressing to a higher screening rate. This was an opportune time to examine how the system was working and to look for distinguishing features in the remaining 192 unscreened patients. We report this work to show how computers in general practice can bring about continuous high rates of screening.

The Surgery, Knowle, Bristol BS4 2QJ

F DIFFORD, MB, MRCP, general practitioner and associate adviser in general practice (computing), South Western region

J P TELLING, MB, DOBSTRCOG, general practitioner

K R DAVIES, MB, DOBSTRCOG, general practitioner

J E FORNEAR, MB, DOBSTRCOG, general practitioner

C A READING, MB, MRCP, general practitioner

Correspondence to: Dr F Difford, The Surgery, 326 Wells Road, Knowle, Bristol BS4 2QJ.

Methods

SCREENING SYSTEM

The records of patients on our computer contain the date of the last blood pressure reading and the reading itself, with readings gradually accumulating over several years. Each time the blood pressure is measured a plastic marker is put in the medical record envelope so that it can be recorded on the computer. A program that analyses separately the current state of screening in men and women is run every month. It produces a worksheet for ancillary staff designed to simplify the task of keeping the screening programme up to date. The computer searches the records of patients currently aged 40-64 and lists patients for whom it has been 48, 52, 56, or 60 months since their blood pressure was last recorded. The notes are retrieved and a prompt inserted with red ink on the continuation sheet. We chose intervals of four months so that we had the opportunity to measure the blood pressure before the five year target was reached, and the prompt can be moved down the continuation sheet if it has been missed and lost from sight. If circumstances allow, the doctor responds to the prompt when the patient attends, and, though the actual blood pressure reading is the initiating key, other risk factors may be considered. Prompts are also inserted after four years in the records of the 35-39 age group.

Those patients for whom it has been more than 60 months since their last blood pressure recording are invited for screening. The computer keeps a check of how many times each patient has been written to and the date of the last letter. The worksheet gives a breakdown of these figures, together with the latest screening rates, so that a decision can be made on how many patients might be called. Thus if five men have never been called and three have been called more than 12 months previously eight letters might be sent. The programming suggests this as a default number, the user inputs her selected number, and the rest of the worksheet is printed. The names of those sent for are listed so that their notes can be rubber stamped with the screening protocol. This includes blood pressure, weight and height if relevant, smoking habits, urine examination, peak flow if relevant, alcohol consumption, stress, exercise, family history, retirement plans if relevant, and, in women, breast examination and cervical cytology if appropriate.

The required number of personalised invitations are printed with an emphasised address that can be seen through a window envelope. Patients are screened in an order of priority. Those who have not previously been invited for screening are selected before those who have already had one or more invitations, and so on. Those who have already had one invitation are given priority according to the length of time since their last invitation. Finally, within the other priorities, those with the longest time since their blood pressure was last recorded are selected first (though as the target population gets smaller this has little effect). At any one time about a dozen letters are held back awaiting the arrival of notes or the resolution of an acute problem. Patients are asked to make an appointment with the doctor during ordinary surgery hours.

Both men and women aged 35-64 have had prompts inserted since our screening system was implemented in October 1984. Men were also sent screening letters from the beginning because of their higher morbidity. Women were not called until January 1986.

RESPONSE RATE

Regular feedback on progress in blood pressure screening is obtained from computer printouts that show figures for the total practice population (see table I). We wished, however, to determine separately the contributions of sending letters and inserting prompts. The setting of a maximum time within which a response to a letter is recorded is quite arbitrary when an ongoing service is being provided. Having reassured ourselves that the response rate to a first mailing was at least 50% within one month, it was unrealistic to try to measure it more accurately when patients continued to turn up for several months afterwards. It is not always clear whether the patient is attending in response to the screening letter or because of medical problems, and motives are often mixed. As it would take a disproportionate amount of effort to keep a full record of response times we analysed them retrospectively. The notes of a random sample of 435 patients aged 40-64 were examined to see whether their blood pressure had been taken as a result of calling the patient, inserting a prompt, or routine work (when many would also be examples of case finding).

ANALYSIS OF NON-RESPONDERS

A list of patients whose blood pressure had not been recorded in the previous five years was obtained from the computer. A questionnaire was sent to 168 of these, the remainder being omitted because they were new

patients, were under care for current acute problems, or had not been screened when they attended after invitation. The questionnaire drew attention to their not accepting the invitation and asked for their level of agreement with several statements. Comment was invited, a stamped addressed envelope was enclosed, and the invitation to attend was left open. A sample of 12 patients were contacted by telephone when they did not reply.

The medical records of these patients were also examined for demographic, social, and other factors that might have influenced screening. The results were compared with an age-sex matched screened sample. Data were insufficient to allow social class, occupation, and medical risk factors to be compared.

Results

SCREENING

At the end of 1986 we had 9237 patients on our list (1282 men and 1260 women aged 40-64) and a total turnover of 8% a year. The social class distribution was mainly among classes II to IV. The number of annual registrations in 1986 in the 40-64 year old cohort was 81. In 1988, owing to the "postwar bulge," 157 patients will reach the age of 40 and will enter the cohort, making the turnover of the target cohort 9.4%. In 1983-6 the average numbers of surgery consultations per patient were 2.74, 2.71, 2.67, and 2.68, respectively, and in 1986 the total number of consultations was 24 711.

TABLE I—Analysis of blood pressure readings measured in five years up to 27 February 1987 (list size=9242 patients)

| Age group | No (%) of patients treated in group | No (%) of patients with blood pressure | | | Total No in cohort |
|-----------------------------|-------------------------------------|--|---------------|-----------|--------------------|
| | | ≥160/90 mm Hg | <160/90 mm Hg | Not taken | |
| <i>Men (4413 on list)</i> | | | | | |
| 30-34 | 1 | 15 (4) | 121 (36) | 201 (59) | 338 |
| 35-39 | 4 (1) | 28 (9) | 185 (58) | 103 (32) | 320 |
| 40-44 | 6 (2) | 64 (20) | 220 (68) | 34 (10) | 324 |
| 45-49 | 12 (4) | 47 (16) | 218 (74) | 16 (5) | 293 |
| 50-54 | 16 (7) | 50 (20) | 168 (69) | 11 (4) | 245 |
| 55-59 | 20 (9) | 48 (22) | 135 (63) | 11 (5) | 214 |
| 60-64 | 26 (13) | 55 (27) | 118 (57) | 8 (4) | 207 |
| 65-69 | 22 (11) | 64 (33) | 86 (45) | 21 (11) | 193 |
| 70-74 | 20 (15) | 44 (33) | 33 (25) | 35 (27) | 132 |
| <i>Women (4828 on list)</i> | | | | | |
| 30-34 | 0 | 13 (4) | 170 (54) | 129 (41) | 312 |
| 35-39 | 3 (1) | 22 (6) | 222 (65) | 93 (27) | 340 |
| 40-44 | 1 | 40 (13) | 262 (82) | 16 (5) | 319 |
| 45-49 | 10 (4) | 47 (18) | 183 (71) | 18 (7) | 258 |
| 50-54 | 14 (6) | 64 (26) | 157 (65) | 7 (3) | 242 |
| 55-59 | 14 (6) | 68 (30) | 133 (60) | 8 (4) | 223 |
| 60-64 | 33 (15) | 69 (31) | 110 (49) | 12 (5) | 224 |
| 65-69 | 38 (15) | 77 (30) | 83 (33) | 56 (22) | 254 |
| 70-74 | 39 (16) | 87 (36) | 54 (23) | 60 (25) | 240 |

TABLE II—Analysis of circumstances under which blood pressure was recorded determined from inspection of sample of medical records

| | No (%) of patients | |
|---------------------------------------|--------------------|---------------|
| | Men (n=220) | Women (n=215) |
| Consulted without prompting | 89 (40) | 74 (34) |
| Prompt inserted after computer search | 54 (25) | 92 (43) |
| Called for screening | 60 (27) | 33 (16) |
| Unscreened | 17 (8) | 16 (7) |

Over 26 months 831 letters were sent inviting patients to be screened. The mailing costs were about 15p a patient for ribbon, paper, envelope, and stamp—that is, 0.1% a year of the total practice expenses. The computer system costs roughly £1000 yearly, or 1.6% of yearly expenses, though it is used for several other purposes. Patients attending after a screening invitation accounted for 1.1% of consultations, though further consultations were generated in some cases.

Table I shows the current screening results in men and women. Table II analyses a sample of 435 patients in the target range to determine the circumstances of recording.

RESPONSE RATE

After 11 months 335 letters had been sent to 315 women (20 were mailed twice). About 200 had completed the screening protocol, 99 remained unscreened, and about 16 (screened or not) had left the target cohort, producing a response rate of 67%. Over 26 months 496 letters were sent to 466 men, and about 350 were screened, 93 remained unscreened, and about 23 had left the cohort. The response rate for men who had been sent one or two invitations was therefore estimated at 79%.

ANALYSIS OF NON-RESPONDERS

Table III analyses the 168 patients sent a questionnaire and the age-sex matched controls from their medical records. Only 19 questionnaires were returned by patients who did not come for screening. Seventeen men and 30 women attended, the overall response to the questionnaire mailing being 31% for men and 49% for women. Four men and three women were reported to have moved, and an inspection of the electoral roll for October 1986 showed that all the remaining non-responders were still living at the address recorded by the practice. This was consistent with the accuracy of our practice register.⁴

TABLE III—Differences between screened patients and age-sex matched unscreened controls determined from inspection of medical records. (Values are numbers (percentages) of patients unless otherwise stated)

| | Unscreened patients | | Screened patients | |
|---|---------------------|--------------|-------------------|--------------|
| | Men (n=82) | Women (n=84) | Men (n=82) | Women (n=82) |
| Years on list | 11.3 | 13.2 | 12.3 | 13.7 |
| Distance from surgery: | | | | |
| >1 mile | 19 (23) | 17 (20) | 16 (20) | 16 (20) |
| ½-1 mile | 22 (27) | 24 (29) | 25 (30) | 23 (28) |
| Only person registered at that address | 22* (27) | 10 (12) | 11 (13) | 13 (16) |
| Married | 61 (74) | 71 (85) | 70 (85) | 65 (79) |
| Mean No of consultations in previous five years | 2.3 | 3.2 | 13.8 | 18.5 |
| No of consultations in previous five years: | | | | |
| 0 or 1 | 43 (52) | 35 (42) | | |
| 0-5 | 71 (87) | 66 (79) | 21 (26) | 13 (16) |
| No of items in problem summary | 1.2 | 1.7 | 2.2 | 3.2 |
| Up to date with smear | — | 25 (30) | — | 69 (84) |

*p<0.05.

From such an incomplete response only the following statements can be made. Fourteen patients disagreed with the statement that they were too busy to keep a screening appointment. Eleven did not disagree with their being afraid of finding something out. Nine reported that they were screened elsewhere. Eight did not disagree with the statement that they did not believe health checks were useful. Nine did not disagree that they were worried that they might have to take tablets or face restrictions in their lifestyle. Three did not disagree that they thought that a high blood pressure was not harmful. Two agreed with a statement that their general practitioner was not the right person to do health checks. Patients contacted by telephone mostly said that they would come when less busy (meaning not at all).

Discussion

Many general practitioners favour opportunistic screening exclusively over systematic screening because of the expense of organising and sending for patients. They also think that extra work may be created at a time when the practice is busy meeting service demands. By inserting prompts on the basis of computer printouts our opportunistic screening rate increased by 43% to 77% in women and by 27% to 65% in men. The higher figure in women, even though they remained unscreened for more than five years, is partly explained because we did not start to send for them until a year after the men. Their greater consulting rate must also play a part.

If, however, we wish to extend a preventive medicine service to patients who are less informed, less demanding, or less able to communicate we should be aiming at a higher screening rate to include them. Our results suggest that this is not possible by case finding alone. Though the unscreened group in our practice was at

the extreme end of a range of patients of decreasing accessibility, even in the screened group 26% of men and 16% of women consulted only one to five times in five years. (These figures compare closely with the proportions of patients who were screened through calling.) Consultations often occur in episodes, and though, for example, a patient may have been screened four years ago, it may be three years before he is seen again. It also requires extraordinary vigilance to screen these infrequent attenders.

As a result of our inviting patients for screening 27% of men and 16% of women completed our short screening protocol. The response rate of 67% in women was probably less than the 79% in men because of a smaller, less accessible denominator left after opportunistic screening. The acceptability to patients was high, and we were satisfied with the gains in morbidity detection and health education directed at a high proportion of our patients. Any increase in workload was obscured by the normal variations found in a practice.

Doctors who send for patients tend to form opinions about those who do not come. We had no recollection of most of the unscreened patients and obtained no picture from their often thin medical records. There was no difference between screened and unscreened patients in the number of years that they had been registered with the practice or the distance that they lived from the surgery. The only significant finding was that a greater proportion of unscreened men were the only people in a household registered with the practice, reflecting their single state or a lack of need to identify with the "family" doctor. As expected, screened patients had a much greater consultation rate (six times) and more items in their problem summary (nearly twice as many) than the unscreened. From the unscreened group 78 had had none or only one consultation in the previous five years, and of these, only 30 came after receiving the questionnaire, pointing to 3% who are very reluctant to see their general practitioner and who account for only one in 7000 of our consultations.

The low number of replies to the questionnaire was expected, as all the patients to whom they had been sent had already been selected as non-responders, and many were unfamiliar with their doctor. Most could be regarded as either too busy to analyse their attitude or not wishing to seem negative to their doctor's approach and still planning to attend. We concluded that 99% of our patients had not expressed a reason for us to change our systematic screening method.

The unscreened group included those unable to come because of work and domestic commitments. We could identify a few patients with agoraphobia, a phobia about medical environments, eccentricity, mild paranoia, or a consciousness of their obesity. There was no indication that most of them had less "healthy" lives than the rest—indeed, they must have been more robust. The commonest feature seemed to be a scepticism about the part medicine could play in their lives. There was no reason to think that they suffered more or less from hypertension.⁵

Thus the consistency and accuracy of a computer enabled us to meet an objective suggested by contemporary medical thinking. By seeing patients primarily for prevention we have learnt to include more health advice and screening in consultations requested by patients. We calculate that with continuing case finding the present screening rate can be maintained by sending only a dozen invitations a month. This makes it possible to include another key risk factor—for example, alcohol⁶ or smoking—in the computer program so that the same screening rate can be reached for two problems.

References

- Hart JT. Semicontinuous screening of a whole community for hypertension. *Lancet* 1970;ii:223-6.
- Coope J. Hypertension in general practice: what is to be done? *Br Med J* 1984;288:880-1.
- Hall JA. Audit of screening for hypertension in general practice. *J R Coll Gen Pract* 1985;35:240.
- Difford F, Hook PM, Sledge M. Maintaining the accuracy of a computer practice register: household index. *Br Med J* 1985;290:519-21.
- Silman AJ, Lock CM. Blood pressure distribution in responders and initial non-responders in a population screening study. *J Epidemiol Community Health* 1982;36:230-2.
- Royal College of General Practitioners. *Alcohol—a balanced view*. London: Royal College of General Practitioners, 1986. (Report from General Practice No 24.)

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