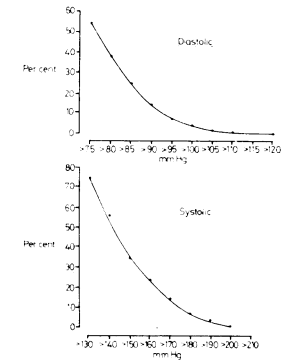
Statistical analysis was done by standard parametric tests. Contingency tables were analysed by the χ^2 test with Yates's correction where appropriate.

INITIAL SCREENING

We used the Vita-Stat blood pressure computer (Electramed, Ireland Ltd),[3] for initial screening, an automatic device that measures the systolic and phase V diastolic pressure in a patient in the seated position. It can accommodate a maximum of 25 patients an hour. It was manned by a technician and was available five days a week between the hours of 10 am and 4 pm. The initial screening of the 2931 patients who attended (55% of the practice population aged 30-65 years) took six weeks to complete (table).

Distribution by age and sex of the attenders and non-attenders at the initial blood pressure screening using the Vita-Stat blood pressure computer

	Age							
	30-34	35-39	40-44	45-49	50-54	55-59	60-65	Total No
Attenders								
Men	225	295	167	169	179	170	219	1326
Women	236	241	198	230	198	267	263	1605
Total	461	439	365	399	377	437	481	2931
Non-attenders								
Men	121	250	164	157	122	139	124	1327
Women	267	183	145	144	107	117	125	1109
Total	388	433	312	301	229	256	247	2436
Total No eligible	1121	872	677	670	606	693	728	5367



Prevalence of blood pressure abnormality in patients aged 30-65 years as measured by the Vita-Stat automatic blood pressure computer

The ultimate diagnosis of hypertension was to be based on the results of three consecutive manual measurements of blood pressure with a mercury sphygmomanometer. But to choose which patients to recall for detailed observations it was necessary to impose an arbitrary dividing line between the readings obtained by the automatic blood pressure machine. The positioning of this division, whether based on systolic pressure or diastolic pressure and at what arbitrary level of pressure, has a profound effect on the workload in manual screening. The figure shows the relation between the blood pressure and the frequency of its abnormality as measured on the Vita-Stat machine and can be used to predict the workload required to set an arbitrary division at different levels of pressure. We had hoped to investigate further all individuals with a diastolic pressure over 90 mm Hg, but such a commitment proved too great. Manageable numbers could be accommodated only by recalling all those with a diastolic blood pressure of ≥93 mm Hg.

MANUAL SCREENING

Two hundred and seventy eight patients (144 men, 134 women; 9·5% of the screened population) were recalled for a manual blood pressure measurement. This was taken with the patient seated, using a Hawksley random zero sphygmomanometer and phase V diastolic pressure was recorded. Comparative studies using a double headed stethoscope showed a coefficient of variation of 1·4% between the readings obtained by the two observers (WPS and DT).

Seventy four patients failed to attend for the first manual reading; 76 had diastolic pressures of less than 90 mm Hg and were excluded from further follow up. Nineteen were already taking medication for hypertension. In four the pressure was so high that to withhold treatment for a longer period of observation was thought to be unethical and treatment was thus started.

The remaining 105 patients (4%) had a diastolic pressure greater than 90 mm Hg on the first manual reading and were all recalled for two further manual readings fortnightly. Eighty eight complied with this follow up, 17 individuals attended for only one further manual reading. Out of the original group of 105 patients, 48 had mean diastolic pressures above 100 mm Hg when all available readings on a single individual were examined. In this group of 18 men and 30 women the mean systolic pressure was 177 mm Hg (range of individual readings 144-226 mm Hg) and the mean diastolic pressure was 106 mm Hg (range of individual readings 95-134 mm Hg).

PATIENTS WITH NEWLY DISCOVERED HYPERTENSION

Fifty two new hypertensive patients were discovered during this study; 48 of these after sequential manual readings and four after a single very high manual reading and a single high automatic reading. Retrospective examination of the practice records showed that during the previous 10 years 17 had had an abnormal blood pressure noted without further action being taken. Thirty seven had consulted their general practitioner at some stage during the previous year for unrelated problems but their blood pressure was not taken. Two had a normal blood pressure recorded during the previous year and in these the development of hypertension seems to have been a new event. Twelve had been seen at a hospital in the previous year. Clearly, some patients fell into two or more of these categories.

One year after the screening procedure had been carried out the practice records were examined to see how the hypertensive patients had fared. Twenty five were taking medication and were being reviewed regularly. Their mean systolic pressure was 156 mm Hg and their mean diastolic pressure was 92 mm Hg. Five were thought not to need medication but were still having their blood pressure reviewed regularly. The remaining 22 had defaulted from follow up. They had never received treatment, had no further blood pressure measurements recorded in their notes, and had never consulted their general practitioner about the importance of the screening procedure.

ANALYSIS OF THE NON-ATTENDERS

Of the 5367 individuals invited to attend the initial screening, 2931 accepted and 2436 declined. The male:female ratio was 0·8:1 in the attenders and 1·2:1 in the non-attenders ($p < 0.001$). There was a uniform age distribution among the attenders, whereas there was a disproportionate number of young individuals among non-attenders ($p < 0.001$). Retrospective examination of the practice records showed that 12·5% of the attenders and 9% of the non-attenders had previously recognised hypertension ($p < 0.05$). If the prevalence of newly discovered hypertension is assumed to be the same in both the attenders and non-attenders then about 45 individuals among the non-attenders would be expected to have had mean diastolic pressures above 100 mm Hg.

Of 278 individuals invited to attend the manual screening, 204 accepted and 74 declined. The male:female ratio and the age distribution were similar among the attenders and non-attenders. The mean

(SD) systolic pressure in the non-attenders 171 (18 mm Hg) was significantly higher than in the attenders (166 (17 mm Hg; $p < 0.05$). Similarly, the mean (SD) diastolic pressure in the non-attenders 102 (8) mm Hg) was significantly higher than in the attenders (99 (6 mm Hg) ($p < 0.02$). If the prevalence of hypertension in the two groups had been the same then about 19 individuals among the non-attenders at the manual screening would be expected to have had mean diastolic pressures above 100 mm Hg.

Discussion

The detection and treatment of unrecognised hypertension are important means of reducing cardiovascular morbidity and mortality. It is generally thought that the prime responsibility for detection of hypertension lies in general practice[4] and broadly two methods are available: firstly, by formally screening the whole practice population and, secondly, by routinely checking the blood pressure during attendance at the surgery. Blood pressure screening programmes in the community are criticised for being expensive and not cost effective.[5] About 80% of the adult population consult their doctors in a three year period[6] and case detection by routine measurement of blood pressure is now the favoured policy.[7]

The prospect of using an automatic device as a cheap and easy solution to the problem is deceptive. The economic and logistic difficulties encountered may be substantial and the decision to embark on a large scale screening programme should not be taken lightly. Practices that have an age-sex register will have an advantage in the preparatory stages, but the time and effort required to check all those patients with higher readings are still considerable. The times that the automatic machine is available may influence the range of patients presenting. In our study the choice of normal weekday working hours ensured that fewer men and fewer young patients were seen. Ultimately, this contributed to the discovery of more women than men with previously unrecognised hypertension. The overall attendance rate of 55% was disappointingly low and challenges the claim that automatic machines have a wide acceptability in the community. The attendance rate of 73% at the manual screening was similar to that reported at other screening programmes, the rates usually varying from 70% to 90%.[8,9]

Invitations to attend were sent to all patients aged 30 to 65 and yet known hypertensive patients were more common among the attenders than among the non-attenders. This supports the view that the public may see an automatic machine to measure blood pressure as a means of checking on their control rather than as a means of detecting new cases of hypertension. Furthermore, the unexpected finding of high blood pressure may frighten some patients and possibly deter them from seeking further help.[9] All those with high readings on the machine were recalled and yet the mean automatically measured blood pressure of the subsequent non-attenders at the manual screening was higher than among the subsequent attenders. This seems to imply that the future attitude of an individual to his or her hypertension is adversely affected by how high the reading is. The automatic machine conveys an alarming figure to the patient with no reassurance at all, whereas the same finding by a doctor would place less emphasis on the individual reading and should provide immediate verbal reassurance plus an invitation to return for another reading.

After the automatic blood pressure measurement three quarters of individuals with high readings reattended for manual screening; thus most patients showed a genuine concern. Even among these highly motivated individuals, however, the long term attitude to newly discovered hypertension was disappointing. One year after the screening programme 42% of the patients with newly discovered hypertension had defaulted from follow up. The desire to know about their blood pressure did not seem to be matched by an insight into the therapeutic implications of the discovery of hypertension. This attitude seems to have changed little over recent years.[7]

The definition of hypertension used in this study (mean diastolic pressure >100 mm Hg) would be widely regarded as a level at which treatment is indicated.[4] It may be calculated that we detected less than half the patients attending the health centre with pressures above this level, indicating the relative inefficiency of screening in the community. The simple expedients of careful scrutiny of old records for high blood pressure measurements and routine measurements at surgery visits would have discovered three quarters of our new hypertensive patients without the need for an elaborate screening programme. Furthermore, a cross sectional study of this kind provides only an instantaneous analysis and would have to be repeated at intervals to detect the development of new cases of hypertension. Miall has attempted to predict the number of individuals whose diastolic pressure rises to over 100 mm Hg over four years.[10] The return achieved from regular screening to detect these new hypertensive patients would be small.

Blood pressure screening discovers a great many patients with "borderline" hypertension, and there is a great dilemma about what to do with this group. Ideally all should be reviewed regularly but this could be an unacceptable burden to some practices. In our study more than 1000 patients had systolic pressures greater than 150 mm Hg, but Vita-Stat readings should be interpreted in the light of evidence suggesting an exaggeration of systolic pressure measurements.[3]

We conclude that automatic devices to measure blood pressure tend to attract patients who are already known to have hypertension and may actively deter some individuals from seeking further help. These devices are not a short cut to efficient blood pressure screening and the better method of detection seems to be routine measurement of blood pressure at surgery visits.

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Continuing Education

No man is an island

ALISTAIR D GRASSIE

What I do not know about continuing education in general practice causes me concern: if it has not already begun to it soon will affect the care of my patients, unless, of course, I choose to do something about it. I am not sitting in a medical library or chewing over the finer points with interested colleagues. I am here alone, acutely aware of being a fully paid up member of a medical minority group. I have spent much of my life as a doctor constantly being vetted and measured by senior colleagues and I am now finding out the hard way how to be my own devil's advocate. It is at once interesting and unique (perhaps not that the *BMJ* should permit someone to ventilate their ignorances in its columns, but I hope you will see that there is a point to be made.

A doctor who takes on an isolated practice off the west coast of Scotland deserves everything that is coming to him in the way of educational deprivation. He casts himself in a mould which will ultimately leave him working in ways that could be described only as idiosyncratic. Do his patients deserve this? Beyond undergraduate training is vocational training and beyond this is the development of the doctor as a general practitioner. On Arran the latter remains haphazard and arbitrary and is left almost entirely to the individual.

My education

I can identify four main aspects where I am being reached by postgraduate education. Firstly, I am being educated by my patients. I think that in the old days this used to be called experience. The 25 year old fledgling still commands a comparable salary to his preretirement senior partner. Seniority payments recognise experience and no more, and general practice has no system of merit awards. My age-sex register is a way in which I am being educated by my patients. Similarly, any feedback from research will provide its own educational stimulus. Foreknowledge of a person's phobia for needles is one fragment of the experience that will influence the course of immunisations for foreign travel.

Secondly, I am being educated by the media. There are journals in my loo, cassettes in my car, and videos on offer if I had the machine to show them. Radio and television concentrate more and more of their resources on health care topics, as it seems that they attract high ratings. I have no doubt that all doctors would judge the media as their main source of topical information. I have a comprehensive reference library, which is so vital on the few occasions when the esoteric condition rears its ugly head or on the more frequent occasions when I am stumped for an answer. My growing experience in practice and the medical media are the two main areas of influence in my continuing education.

Inglewood, Shiskine, Isle of Arran
ALISTAIR D GRASSIE, MB, DRCOG, general practitioner

The third and fourth aspects are personal contacts and medical audit. Surprisingly, there are some slight difficulties in trying to separate these two. Personal contacts mean the usual lively social intercourse among doctors at clinical meetings, courses, and social gatherings. Medical audit, on the other hand, would presumably be the same game played on the home ground with some stealthy changes of the rules to include constructive criticism. *The Future General Practitioner*[1] identifies three component parts of audit: gathering information about the performance of the practice and the quality of patient care that it offers; evaluation of this information; and, where appropriate, making new policies. The "evaluation of this information" is carried out either by the primary care team or by that team with some outside agency. Audit therefore attracts its enthusiasts on the one hand and its sworn enemies on the other.

The formal audit conjures up visions of the grand visitation by appointed members of our peers to pry into our patient services. We are further charged with the fear that if it is not taken up by the profession some public arm of government will do it for us. An external audit would indeed be an attractive prospect for me. But who would do the auditing? In a low income practice like mine finance dictates rigidly every aspect of practice administration. As an inducement payment practitioner and a member of its association, I know that few of us understand the complex financing of these practices. It is a curious anomaly of the history of National Health Service semantics that describes as an "inducement payment practice" one that attracts a lower income for providing more items of service per patient and continuous duty on call. Before beginning on a serious audit of my practice I would need to go on prolonged study leave to the Scottish Home and Health Department to learn the rules governing the arbitrarily applied decision. I am filled with wonder at the Health Department, which has administered the finances of this practice since the beginning of the Health Service, without ever having visited any of the incumbent doctors. Would private industry permit such a thing?

What has this to do with my continuing education? In simple terms my future development will be dictated strongly by NHS financing. Even now, if I were to take a half day off every week and employ a locum I would forfeit all my annual leave. It is becoming clear that we must audit our services accurately to show plainly what a bargain basement office we provide. My predecessor described the inducement payment practice as a salaried service with none of the advantages of being salaried.

Financing the NHS

Only a fellow traveller would appreciate the full implications of my clinical workload. It is a very lonely feeling being in sole charge of a serious clinical problem in a small general practitioner hospital on an island. The buck ends here, and no amount of helpful advice from mainland colleagues over the telephone

will change that. Most doctors would be aghast to learn that my hospital work results in a net financial loss. On a low and fixed income and with increasing costs, this personal financial support to the National Health Service is becoming a burden which I will soon have to shed, causing considerable penalty to my patients and resulting in a much greater cost to the NHS.

Casualties occurring in my practice area are dealt with by me, working from my surgery and local general practitioner hospital. Many casualties are transported to the hospital by me, given an x ray examination if necessary by me, and definitive treatment by me. Often I transport them back home. This arises because there is poor local transport and only one ambulance. It would be grossly inefficient—if I had, say, a patient with an ankle injury—to call the ambulance out from 20 miles away, embark the patient, follow the ambulance in my car, and, having dealt with the patient, ask the driver to make the same double journey in reverse. It may easily be seen that my contribution saves the ambulance 80 miles of travelling since, of course, it must return to its base. The convenience to the patient is naturally the foremost consideration. As I am paid only on the "bed fund" system, I cannot even cover my travelling expenses because I earn an income only if the patient occupies a bed. It may not be quite so easily seen that if I were not contributing time and personal finance to the hospital service it would cost the NHS an extra full time ambulance and driver. Carefully reasoned discussion with hospital administrative staff has so far failed to make them aware of these arithmetical progressions. It is probably time now to surrender the arguments and cut my losses by pulling out of the general practitioner hospital.

What on earth has all this to do with postgraduate education? My one and only contact with colleagues on this island is at the local hospital. Financial considerations are compelling me to relinquish my hospital responsibilities and therefore further isolate me and my patients. The opportunity to discuss problems with my colleagues will be lost and the public coffers will be further depleted.

Having deviated somewhat cynically from the subject of audit, I must return to it once again. Surely all is not so gloomy; there must be a solution somewhere. As I see it, attendance at clinical meetings on the mainland will always be an occasional activity for the island general practitioner, and I sincerely believe that we must try to get the mountain to come to Mohammed. Informal visits by consultants on holiday are always welcome and I eagerly pick their brains. These are not fair pickings, as the poor souls are on holiday to forget about medicine. Students find their way here regularly, and we willingly give them free accommodation at our home. They taste the flavour of remote rural practice and gain an insight into the daily domestic disruption of a doctor's life.

One of our colleagues has embarked on the task of producing a series of talks by visiting "experts" and we are determined to make this work. This "expert" will have to set aside two days of his time in the winter for one evening's talk, and he may well be asked to bring with him any necessary audiovisual aids. I would like to go a step further and suggest some sort of linking with a mainland practice. This might be done with a teaching unit or a university department, and if it was an informal link it might promote a lively academic intercourse between two completely different practices. Short term exchanges might be organised and the experiences gained mulled over afterwards by the whole primary care team. By anyone's definition this would be mutual medical audit. There is absolutely nothing original in this suggestion. Approaches were made about 10 years ago by my predecessor, but there were no takers. In fact, it was suggested that he might be pursuing an avenue for the provision of a steady supply of reliable locums. Locums in an area like mine are really no problem and I have a regular and devoted helper. An exchange of practices is not the same thing as a holiday locum.

The problems facing us here on Arran as regards continuing education must be typical of many remote practices. Our education will remain haphazard and unstructured without outside help. Despite large and comprehensive national organisation of postgraduate medical education, we remain untouched. Becoming a member of a royal college still leaves the ball firmly in our court. How could I be an active member of such an institution when, if I were to take one half day off a week and employ a locum, I would consume all my leave for the entire year?

This type of practice is thoroughly enjoyable and challenging and I have no intentions of leaving it, but when I do I hope some progress will have been made in redressing the balance in the educational aspects.

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Diary of Urban Marks: 1880-1949

And so 1908 rolled on and 1909 dawned with debts hanging over my head to the tune of over £300 which was being paid off in driblets every month as the practice increased and the money came in. Very early after I started practice I started a club for the poorer members of the community who could not afford to pay the regulation fees. The subscription to this club was one shilling per month and for it the patient got advice and medicine. Everything beyond these was extra. Altogether the club brought me in about £100 yearly, but the work of bookkeeping for it was tremendous. At this time I made out my own bills and posted them every month. This took up two nights each month of clerical work in the surgery, but I had plenty of time on my hands. I adopted the idea of sending out the accounts monthly from the very beginning and I have always found this method to pay well. People have no chance to forget they are owing. In chronic cases bills are sent just the same so that the individual has a chance to pay something on account. Later on, as the practice increased, I employed a lady clerk who did all the clerical work for me at so much per hour and after a bill had been sent six times she drew my attention to this fact. Then the bill was put into the hands of a private collector with instructions to report if the patient could pay, and if found to be able to do so he or she was promptly sued for the money. If unable to pay the debt was written off but I found that I made very few bad debts, and moreover the people who were called on by the collector or were sued by him on my behalf came back to me as patients.