

The Marriage of Primary Care and Epidemiology

The Milroy Lecture, 1974

J. TUDOR HART, MB, DCH, FRCGP, General Practitioner, Glyncoirwg Health Centre, Glamorgan. Attached to the MRC/DHSS Epidemiology and Medical Care Unit, Northwick Park Hospital, Harrow.

It is 32 years since a general practitioner, Will Pickles, was the Milroy lecturer (Pickles, 1942). Since then an ideology of primary care as a specialty has been defined, chiefly by the College of General Practitioners, firmly rooted in continuity of personal care (Forman, 1971) and finally rejecting a hybrid specialoid role (Fry, 1969). This continuity depends on the existence of more or less stable defined populations for whose comprehensive primary care the general practitioner is paid an annual sum, unrelated to individual items of service. Within this framework it is possible to develop a fully comprehensive educational, preventive, diagnostic and therapeutic service at primary level, assisted by an attached team of ancillary health workers, controlling access to fully comprehensive hospital services to secondary and even tertiary level, and resuming continuous care on discharge. Possibility is not reality, nor is this the only possibility within this frame; but the social organisation does exist in our comprehensive state medical service, accessible without direct financial barriers to the whole population, if we really want to use it.

All this has greatly enlarged the potential scope of the lectures, established by Gavin Milroy in 1877, on State Medicine and Public Hygiene. We stand now at a point where Public Hygiene must extend rapidly in two superficially opposed directions, if the advances of medical science are to be realised in substantial reductions of sickness, unhappiness and death. On the one hand, primary prevention of the remaining major diseases, chiefly those of accelerated organ and system senescence, will almost certainly depend on very substantial changes in the way that we live. A life designed by market research and foisted upon us by engineered fashion destroys both the body and the spirit; but that is another story. On the other hand, secondary prevention and salvage must depend on a more organised, efficient and humane personal contact between health workers and individuals at risk. This cannot be done without a fusion of the skills of epidemiology and primary care, and the theme of his lecturte will be a first, very tentative and primitive example of such an

experiment, together with some ideas on the new directions in which such a fusion may lead us.

In 1961, after five years in general practice in London, I had the luck to get a year's apprenticeship in epidemiology under Sir Richard Doll and, later, Professor Cochrane. Professor Cochrane's work is well-known, but its full implications are not always appreciated. In his early surveys of tuberculosis and pneumoconiosis he mobilised a whole population to participate both in research and in the improvement of its own health (Cochrane *et al.*, 1952, 1955). His response rates, at or over 90 per cent, set a new world standard in population-based research; they were achieved because of the huge initial goodwill gained by the effective treatment of tuberculosis and access to compensation for pneumoconiosis, and because he used ordinary local people as his recruiting sergeants. The more reluctant volunteers were pursued with the simple vigour possible when a whole community is mobilised for an agreed social objective. It is possible for an ex-miner with progressive massive fibrosis to search out non-respondents in the soap and steam of the pit-head baths, and use what breath he has to lecture them on their moral duty to science and their fellow men; but it is not possible for ambitious young academics to go to the same place in the same way, and explain how very important it is that they should ascend higher on a pile of their own publications. The approach was refreshing; and yet, there was a sad side to the Rhondda Fach surveys. It is an area of gross pathology, with infant mortality rates persistently lagging about 10 years behind the mean for England and Wales, poor clinical traditions and grossly overworked, understaffed and undercapitalised hospital services. The contrast between the conditions of service medicine and of research was so great that it inevitably impeded the effective spin-off of research data for the personal medical care of individuals, and the upward flow of ideas and unexpected data that could have come from involvement in local service medicine.

It seemed to me that it might be possible for a general practitioner with some epidemiological training to fuse research and service functions to the profit of both; so I looked for a place to try. I wanted a well-defined, stable population that one doctor could cope with, surrounded by a wider population, equally well-defined, that might eventually be available for a wider extension involving adjoining practices. I found it in Glyncoerrwg, just over the mountain from the Rhondda. It is an industrial village, a relic of the past, but even more a portent of the future, when we shall have advanced beyond cities to a merging of town and countryside; a compact industrial population, bigger than any rural village, smaller than any town; 2,000 people who all know and acknowledge one another; a single-class community with shared work and

shared leisure, where your place of work is beside or beneath you, not along 60 miles of motorway.

Though all of our pits have been closed, very few of our men have not at some time worked underground, and about a quarter of them still do; of the others, the great majority are manual workers. It is a social setting that permits epidemiological studies with 90 to 100 per cent response, using very simple and primitive forms of organisation and documentation, and with 100 per cent return of the research data for the service care of the population. There is not a child who cannot use a peak flow meter, or a mother who cannot collect a dipslide urine culture for bacteriuria.

However, there is another side to the coin; the burden of illness in the valleys is still so great that anyone attempting to combine service medicine with research is likely to drown in the torrent of immediate clinical and social demand, or sink in the bog of wasteful and ineffective social administration that clogs every mining practice. Compared with 43 other practices taking part in the second year of the National Morbidity Survey of 1970-72, consultation rates for Glyncoerrwg were 50 per cent higher than the mean, although our rates had been slowly falling since 1965; death rates were three and a half times higher than the mean (Royal College of General Practitioners, 1974), and only 31 per cent of these occurred in hospitals or other institutions, compared with a national average of 51 per cent (Cartwright *et al.*, 1973). It was five years before the service work of the practice could be stabilised at a level permitting an added research load.

During this run-up period we seemed to have an unexpectedly high local incidence of ischaemic heart disease which was difficult to explain in terms of known risk factors. From 1962 to 1972 we had 50 deaths from this cause, 23 of them under 64. These were all people I knew, often very well; equally, I knew those without ischaemic heart disease. Comparing these two groups quite subjectively, there seemed no evidence of the alleged coronary-prone personality, aggressive, impatient, and ambitious (Rosenman *et al.*, 1966), the prevalence of which should in any case be reduced by generations of migration. To see whether the apparent excess was real, I turned to the annual reports of the Registrar-General, but these did not present the data in a form from which age-specific rates for the valleys could be calculated. Using the Registrar-General's raw data, male death rates in the Glamorgan valleys from ischaemic heart disease for the years 1963-67 showed an excess over England and Wales rates of 75 per cent at ages 35-44, 32 per cent at 45-54, and 22 per cent at 55-64 (Hart, 1970a). Male mortality from cerebrovascular disease also showed a 55 per cent excess at ages 35-64. I then looked at the evidence on the distribution of known risk factors in South Wales to see if there was anything

to account for this. Morris's exercise hypothesis, at least in a simple form, seemed to offer no explanation at all in a population made up almost entirely of miners and ex-miners doing fairly heavy manual work (Morris *et al.*, 1953). Cochrane's team had already shown that the distributions of serum cholesterol (Higgins *et al.*, 1963) and of blood pressure (Miall and Oldham, 1958; Miall, 1959) in the mining valleys did not differ from those in the rural area of the Vale of Glamorgan, which has a much lower ischaemic heart disease mortality in the same age groups. I surveyed the current smoking habits of all the men in the practice, and found a smaller proportion of smokers in every five-year age-group but one, compared with England and Wales data, and this conformed with the 17 per cent lower lung cancer mortality in the valleys. Nor were our men any fatter; body-weight for height in men is lower in the valleys than in the Vale (Ashcroft *et al.*, 1967). The only known risk factor distributed in the right direction was the hardness of water (Morris and Crawford, 1958), but it seemed insufficient to account for such a large difference; in any case, we drink beer, not water.

Although these regional differences were statistically highly significant, they were based on small numbers. Last year I analysed the 1968-72 mortality data on the same basis, and it is now clear that the Monmouthshire and Glamorgan valleys are best treated as a single socially and geographically homogenous population, as their relative positions have reversed. Merging the mortality data for all the valley populations for both periods produced

TABLE 1. Male deaths under 65 from ischaemic heart disease and cerebrovascular disease: ratio of South Wales valley rates to England and Wales rates

Glamorgan and Monmouthshire valleys	1963-67	1968-72
Ischaemic heart disease:		
age 35-44	1.69	1.57
45-54	1.32	1.24
55-64	1.25	1.41
Cerebrovascular disease:		
age 35-64	1.33	1.38

Table 1. The differences, although in the same direction, are less striking, but still support the idea that there is an excess mortality in the South Wales valleys from stroke and ischaemic heart disease, mainly in younger men, that cannot be fully explained by the distribution of known risk factors. Although the causation of ischaemic heart disease is clearly multifactorial, there is plenty of room for major causes as yet undiscovered, and if such Yetis exist they may well be hiding in the Welsh hills.

Having established that we really did have more than our share of ischaemic heart disease, the question arose of what might be done about it at a primary care level. In 1962 it still looked as though the main hope of preventing ischaemic heart disease would lie in the control of blood pressure—and even now this possibility is by no means disproved, if we start treatment early enough (U.S. Veterans' Administration, 1970; Werkö, 1971)—so I looked at my population from this point of view. Nine men and six women under 65 were already diagnosed and under treatment, and a search of the records showed that of all those aged 20 to 64, only about half had had blood pressures recorded by me during the six years 1962–67. Hypertension is an asymptomatic condition before the stage of irreversible organ damage (Stewart, 1953; Robinson, 1969), and it seemed obvious that more cases would be found if more blood pressures were measured. In spite of this, screening for hypertension was at that time generally held to be unjustified on the available evidence (Holland, 1967): I think this was because of an unwarranted assumption that the new cases found by screening would lie in the diastolic range 90 to 115, which was not then validated for treatment. The argument about screening as a diagnostic technique—clearly the only effective technique in an asymptomatic condition—was confused with the argument about indications for treatment; it ignored the fact that very high pressures, diastolic 150+, are certainly dangerous, certainly need treatment, and are frequently unaccompanied by symptoms.

TABLE 2

Age	Under 40	Over 40
Men	100	105
Women	110	115

In the event (Hart 1970b), screening of the whole population of Glyncorrwg aged 20 to 64 doubled the number of cases on the criteria used, and many of them had diastolic pressures in a range which even at that time could not have been left untreated without negligence. We used the diastolic cutting points suggested by Pickering (1968) (Table 2).

These coincide with a mortality two and a half times the expected rate calculated from Bechgaard's data on untreated hypertension (Bechgaard *et al.*, 1956). Applied to a whole population under 64, they should give us a diagnostic profile consistent with what we know about the rates of hypertension and of its treatment in different age groups. All casual pressures at or above these cutting points were repeated, and, if still at or above these levels, were repeated a third time, on separate days. The results of this procedure are shown in

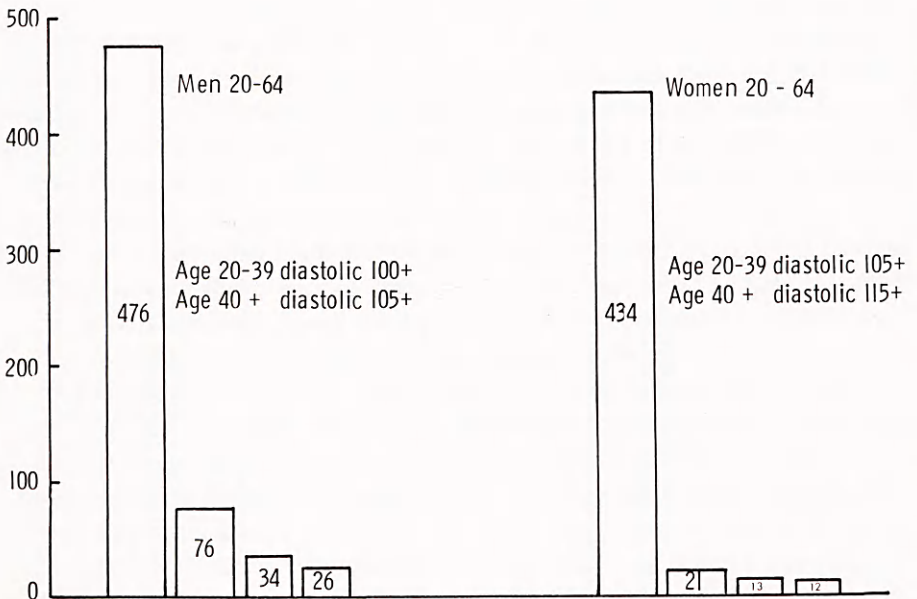


Fig. 1. Persistence through three readings of diastolic pressures warranting treatment. Glynorrwg 1968 screen.

Fig. 1. Note that a fairly stable group seems to be defined by the third reading. This group was investigated and followed up. There was a total of 38, 26 men and 12 women, about 4 per cent of the screened population, a serious logistic burden that was manageable only because the screening process extended over 18 months so that recruitment of cases was spread out over that time. No cases of secondary hypertension were found, though two appeared in the normotensive population during the five-year follow-up. Figure 2 shows the fate of the entire screened cohort over these ensuing five years; no immigrants are included.

Blood pressures fell on follow-up in three men and one woman. Three men under 40 moved away a few months after screening, one having had a myocardial infarct, and were lost to follow-up. Four refused treatment, but have been followed. Two were excluded from treatment because of psychotic illness. Four of the treated cases have died, three from myocardial infarction and one from a cerebral haemorrhage. One transferred to another practice. Fifteen new hypertensives have appeared from the original residual normotensive population, and have been incorporated in the treatment group, which now numbers 32 from the original cohort. Together with those who refused treatment or were not offered it, there is a total residue of 38 defined

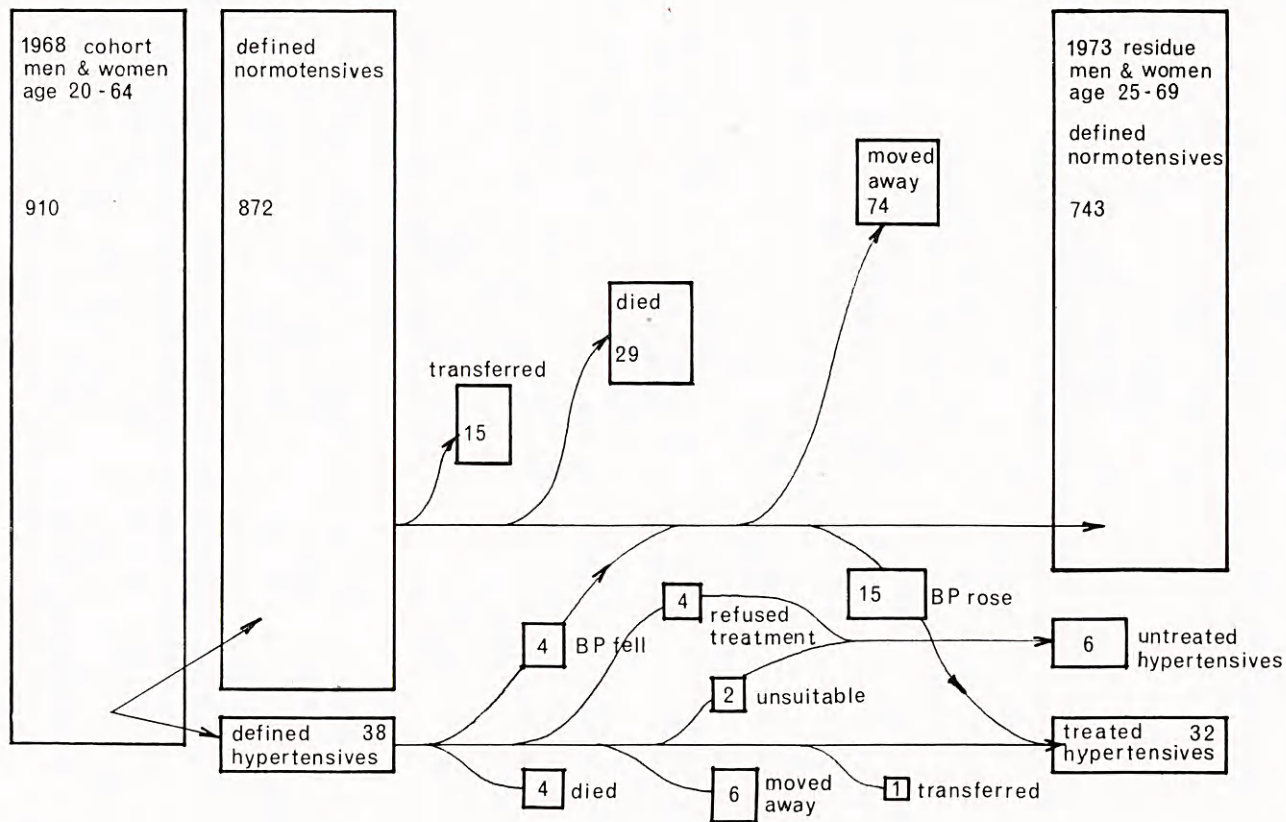


Fig. 2. Progress of a whole population continuously screened for hypertension 1968-73.

hypertensives. Clearly, if mortality in this group remains low it will grow, representing a considerable and increasing workload.

Treatment was effective in reducing blood pressure (Fig. 3). All pre- and post-treatment readings were taken by a single observer using a standard procedure, and post-treatment readings were taken with a random-zero sphygmomanometer to eliminate bias (Wright and Dore, 1970). Twenty-two per cent of the cases showed poor control on Hamilton's criteria (Hamilton *et al.*, 1964), compared with about 10 per cent in the best hospital series (Zacharias, 1972), but we did not exclude anyone from treatment because of anticipated difficulties, other than the two psychotics, and the failures include those unable to cope with any consistent regular medication. We found that co-operation in treatment is not easily predicted in terms of social or psychological stereotypes.

Since our screening began, treatment at these levels has been validated by the Veterans' Administration study (U.S. Veterans' Administration, 1970) for men, and rather less certainly for women, by Hamilton *et al.* (1964). Reduction of pressure in this range reduces mortality, apparently by almost eliminating death from stroke, renal failure and heart failure, while mortality from ischaemic heart disease is hardly affected (Breckenridge *et al.*, 1970; U.S. Veterans' Administration, 1970).

Our screening doubled the number of known hypertensives, the same result as in the population survey in Atlanta, Georgia (Wilber and Barrow, 1969). The proportion of severe cases was indeed less in those diagnosed by screening than in those who had presented with symptoms before screening, simply because the symptoms were those of organ damage—retinopathy, claudication, and cerebrovascular disease. Of course, most of those already known had been detected by the haphazard screening procedures of insurance examinations, pre-employment examination, or routine examination in the course of other illness. However, we picked up one man on the screen, aged 44, blood pressure 260/170, an abnormal ECG, blood urea 88 mg per cent, and no symptoms whatever, who had consulted only for occasional minor ailments during the previous 20 years; had he not been detected by screening he would probably have presented quite soon with organ damage, possibly irreversible. His blood pressure has been very well controlled ever since, and he made a rapid recovery from a small myocardial infarct last year. The proof of the pudding is in the eating, and we have eaten it.

The general practitioner who is called now to a middle-aged patient with a stroke, and has no record of the pre-ictal pressure, will never know whether that stroke could have been prevented, even though he may attend that bed-ridden patient for another ten years. To avoid that situation we have got to

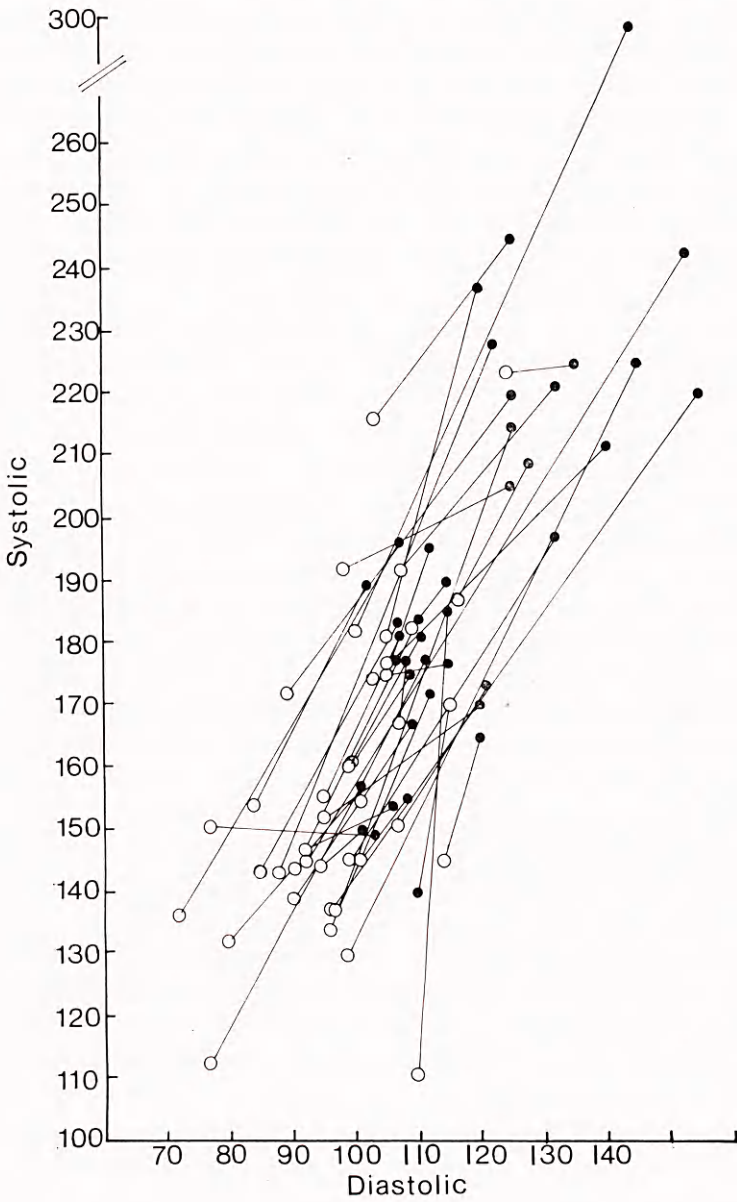


Fig. 3. Means of highest and lowest blood pressure recorded in year preceding treatment ●, and in second year following treatment ○, in 26 male and 14 female hypertensives—1968 screened cohort.

move from individual care to whole-population care, and that requires quite new ways of thinking and organising our work.

I want to look now at what is happening in the absence of such organisation. Illness traditionally presents to the doctor of first contact in the course of a transaction, initiated by a patient who has perceived a problem he thinks appropriate to medical solution, and who has gone to the general practitioner's symptom-relief shop to get it solved. This works very well for strangulated hernia, fairly well for most infections, rather badly for the aged sick (Williamson *et al.*, 1964), and hardly at all for hypertension. Table 3 shows the information available on the sex distribution of hypertension diagnosed by general practitioners, in published personal series and collective surveys. As those who gave their diagnostic criteria all used the same definition for men as for women, I have reworked the Glyncorwg screening data in terms of a definition of diastolic pressure 100+ through two readings. Note the dramatic preponderance of women, despite the massive and consistent evidence of higher risk in men at all ages and all levels of pressure, and of slightly higher prevalence in men than women at pre-menopausal age. Table 4 shows the high proportion of elderly patients, despite the generally poor results and dangers of treatment over 65 (Carter, 1970; Whitfield, 1972).

This transactional profile in diagnosis is carried over into treatment. Table 5 is derived from market research on prescribing, through a random sample of 2,000 general practitioners stratified for year of qualification and area of practice (Intercontinental Medical Statistics, 1973). Note that in this much larger and more representative sample, certainly more typical of average prescribing behaviour than the National Morbidity Surveys, whose data were collected arduously by unpaid volunteers, nearly half those treated are over 65, and nearly twice as many women are treated as men. According to these studies, during the 12 months ending September 1973 there were over 11 million consultations for hypertension, about two-thirds of them by women, and nearly half by patients over 64, of whom three-quarters were women; anti-hypertensive drugs were prescribed at over half these consultations, methyl dopa being prescribed most frequently; the age-sex distribution for prescribing of methyl dopa, guanethidine, debrisoquine, and clorexolone all followed the age and sex distributions of the consultations closely, but the much smaller number treated with propranolol, oxprenolol and clonidine showed almost equal numbers of each sex. This is perhaps some evidence that the sex distribution of treatment is becoming more rational; so is the large difference, in the right direction, between the sex distributions of the first and second National Morbidity Surveys, but these represent the highest quality primary care we have.

This transactional bias toward treatment of women and the elderly even penetrates into most hospital series, shown in Table 6; the female excess still

TABLE 3. Sex distribution of ascertained hypertension: primary care series

Source	Definition DBP	F:M under 65	F:M all ages	Total ascertained
Hopkins, 1958	100+	1.41	2.23	100
Fry, 1966	100+		2.02	390
Hodgkin, 1966	110+		6.00	
Sinclair, 1969	96+	1.27	1.32	651
Logan and Cushion, 1958			3.20	5,412
RCGP, 1974			1.84	15,197
Hart, 1974	100+	0.66	1.20	223

TABLE 4. Age distribution of ascertained hypertension: primary care series

Source	Definition DBP	Per cent 65+	Total ascertained
Hopkins, 1958	100+	59	100
Sinclair, 1969	96+	21	651
Logan and Cushion, 1958		67	5,412
Hart, 1974	100+	18	223

TABLE 5. Distribution of treated hypertension by age and sex in a random sample of 2,000 general practitioners, 1968 and 1973 (Intercontinental Medical Statistics Ltd, 1973)

Year	Number of observations	F:M under 65	F:M all ages	Per cent 65+	Estimated national	
					Consultations	Prescriptions
1968	2,051	1.49	2.13	50	8,760,000	7,014,000
1973	2,766	1.47	1.87	47	11,233,000	9,284,000

TABLE 6. Sex distribution of hypertension in large hospital series

Source	F:M all ages	Number in sample
Bechgaard, 1967	2.19	1,038
Hodge <i>et al.</i> , 1961	1.78	653
Leishman, 1963	1.19	313
Smirk, 1966	1.36	163
Hamilton, 1968	1.35	653
Bulpitt and Dollery, 1973	1.13	448

persists in every series, presumably because all of them are based ultimately on referral from primary care, with transactional selection.

There are two probable reasons for the sex bias. Women consult more than men, nearly twice as much in the 45 to 54 year old age group, though at 55 to 64 it is about equal (Cartwright, 1967), and a small number of hypertensive women will be picked up in the screening procedures of antenatal care. Secondly, and probably much more importantly, women complain more often of symptoms conforming to the mythology of high blood pressure. Whether or not he believes they are causally related to hypertension, the doctor who does not put a cuff on the arm of a stout middle-aged woman complaining of headaches and giddiness is a fool who does not care for the opinion of his patients; those women have their blood pressures measured more frequently, and are therefore over-represented in those diagnosed and treated. The age-bias is less excusable, and one can only assume that it represents the incapacity of a great many of us to leave the transient minor tinnitus, ataxias and other queer spells of old age alone. Both cases are examples of how lay ideas of pathology, derived from the dogmatic assertions of a past generation of doctors, are re-imposed on their professional descendants. Persistent stereotypes still appear to dominate much diagnosis and treatment.

This close and direct connexion between the diagnostic and treatment profiles is disconcerting to those who think doctors' prescribing is based on a training in scientific scepticism, pharmacology, and physiology, and knowledge of the results of controlled trials. We forget that a diagnosis is a plan for action, and that in internal medicine the action that is easiest to take is, in general practice as least, to write a prescription. The role of science in this situation is all too often only to encourage the prescription of something effective, expensive, dangerous, and far less appropriate to the particular peanut we are cracking than the ineffective mixtures of the past. Explanation and education of patients is very time-consuming, and there is no pressure on us to explain seriously or to educate. Medical schools do not evaluate the effect of their teaching on the doctors they produce, but the pharmaceutical industry does. I quote the following from a symposium in Edinburgh on the marketing of pharmaceutical products, a multi-denominational gathering at which most of the big firms were represented:

'Whilst the doctor looks upon his choice of products as being a rational one, and any approach must provide the doctor with sufficient information on which to base a rational choice, at the same time the approach should appeal to those emotional factors which also play a part in his selection . . .

All of us recognise the end purpose of our efforts in the area of physician typology. It is to identify those segments of the physician population which contain our best customer prospects . . . By far the most important criterion is estimated or observed prescribing volume . . . overall prescribing productivity . . . When we compared prescribers and non-prescribers . . . it emerged that non-prescribers thought the patients' condition less severe than the prescribers. It is not inconceivable that one could devise a strategy which questions the doctors' interpretation of these cases.' (European Society for Opinion and Marketing Research, 1970).

The pressure on doctors, in effect if not in intention, is to treat rather than to observe and educate, and to treat symptoms rather than disturbed physiology. The association of virtually every doctor-patient contact with a prescription has deep historical roots that can be torn out only with great difficulty; but the effect of pharmaceutical marketing is to drive them deeper and make them flourish at the expense of cautious and rational care. We are not interested in prescribing productivity, but in the careful and rather infrequent use of a few thoroughly understood weapons aimed at precise targets.

It seems clear that in the case of asymptomatic hypertension the social form of primary care will not accommodate its clinical content. It is for the time being an exceptional case, and premature claims for the effectiveness of, for instance, screening for ischaemic heart disease, could seriously impede progress later on, when we have effective programmes of secondary prevention fully supported by evidence. When the time comes for running in the secondary prevention of ischaemic heart disease it will have been useful to have learned to walk with hypertension. Our generation of doctors is almost certainly going to see the possibility of primary or secondary prevention of most of the chronic killing diseases in middle age, the various kinds of accelerated organ senescence in otherwise healthy bodies. If we can devise an organisational and ideological frame for the secondary prevention of stroke, vascular renal failure, and hypertensive heart failure, and possibly, if we start young enough, of some ischaemic heart disease, by the systematic diagnosis and follow-up of hypertension in whole populations, this will give us and our patients the experience we need to begin to think and work in the new ways we shall need, if the discoveries of medical science are not to remain unapplied to the mass of the population.

This task must be undertaken at primary care level; that is where it naturally belongs, as a part of continuous personal care of defined populations, where it will require the least formal organisation and bureaucracy and can be

most easily integrated with existing forms of work. It may be said that the need for an improvement in the clinical quality of a great deal of primary care is so urgent that this new task cannot be undertaken until we have put an end to perfunctory care by perfunctory men. This view overlooks the reality of how innovation occurs. Primary care is still a public service privately administered, and remains so after the 1974 reorganisation. Each practice is at the mercy of the vigour or indolence that each doctor brings to it. That is a bad situation, but it is the one we have. I am asking those younger doctors who will be the innovators of their generation to do more than excellent transactional care, which they are already doing, and begin to explore this new dimension of anticipatory care of whole populations. If they can solve the organisational and social problems of bringing the form of practice into harmony with its full potential content, they will have solved the main medical problem of our time. The extension of their work to the whole of primary care is a different matter, and depends on much wider social changes outside medicine; but it must have points of origin that actually exist.

These problems of new form and content are chiefly those of reconciling a highly disciplined, structured, and planned organisation with an informal, fraternal style of work; both these objectives must be attained, neither will stand without the other. The real pioneer of screening in general practice has been Van den Dool in Holland (Van den Dool, 1973). After ten years in which three multiphasic screenings had been carried out in his population with very high response rates, using university teams to assist in intensive cross-sectional case-finding drives, he concluded that this was a wrong approach. Instead he advocated a style of anticipatory care in which a profile of agreed variables is measured at intervals for every person at risk, using the ordinary clinical and administrative contacts of general practice as opportunities to secure the data, and only arranging special examinations for the small minority who do not consult over a five-year span. Such a task cannot be carried out efficiently and with full population cover without additional organisation and resources, particularly in ancillary staff who must be trained in new procedures, but this organisation must be genuinely adapted to the community in the true and precious sense of that much abused word. The common assumption that the pastoral and scientific functions of medical care are mutually exclusive and antagonistic (Dornhorst and Hunter, 1967) is harmful and wrong; real progress depends on their fusion.

It is such a fusion that I have called the marriage of primary care and epidemiology, because without marriage we shall beget bastards. The key phrase of the White Paper on National Health Service reorganisation, 'delegation downwards matched by accountability upwards' (White Paper,

1972) sums up an approach to medical care that can only accelerate the depersonalisation already present in the service, particularly if applied to the development of health maintenance and supervision by screening. Why upwards? Why not sideways, and above all downwards? We do not receive our very great authority over other people's lives and bodies by delegation downwards, but upwards from the people we serve; and to them we must be accountable. If we are short of anything it is not management skills, but a real sense of urgency about delivering high standards of care to all of our people as intelligent equals, and more knowledge of the problems of every day living in the bottom 90 per cent of society. If we are to have planned and structured anticipatory care with a human face, we have got to draw thousands of ordinary people into the planning process. Professor Larry Weed has put it perfectly:

'There is no practical way for literally millions of patients to benefit from application of the highest standards except through use of structured information to acquire, and adequate communication techniques to transmit rapidly, the appropriate information. Whether this necessary reminding of the physician involves books, cartoons, an abacus, or a computer is not important. What is important is that the proper care gets to all the people. We should continually remind ourselves that not to think quantitatively about the needs of all the people has qualitative implications for most of the people; and in our efforts we should neither worship nor fear the computer and technology, but rather we should simply use them as long as the benefits outweigh the losses in an honest accounting that does not leave, as many present methods do, thousands of people without care and without even being taken into account and weighed in the balance.'

(Weed, 1971).

Weed is speaking of the situation in the United States, but we have little room for complacency here. The primary physicians of our future will have to acquire the skills and select some of the attitudes of epidemiology, if they are to meet their obligations to the people, and justify their delegated power. A programme of organised anticipatory care, in which doctors accept continuing responsibility for the whole of their defined populations, including responsibility for making available to all of them the discoveries of medical science, will not be possible without simultaneous changes in the whole of society, in the directions of collective equality, freedom, and above all, fraternity. To gain what is new and good, doctors will have to rejoin the human race; and to defend what we have achieved from vulgarisation, greed, and bureaucracy we have to accept that things must change even in order to remain the same.

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