

**PREVENTIVE MEDICINE AND  
PRESYMPTOMATIC DIAGNOSIS**

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**T**HE MAIN aim of any system of medical care is to help the patient, as an individual or community of individuals, to solve or ameliorate their clinical problems. These problems have physical, emotional and socio-economic components. Their solution may or may not involve the formal diagnosis of some disease process (Crombie 1963) and the patient may not even be aware that he has a problem.

**Medical economics**

The aim of all medical care must be to bring the maximum benefit to the patient within limitations set by restricted resources. This is the only absolute value or principle in medical care. All other so-called 'principles' are generalizations appropriate to some more limited problem, whether clinical, social, economic, organizational or ethical. The priorities must be determined by the relative effort expended on the assessment of the problem as compared with the action taken to deal with it. Prevention must be compared with cure, treatment of symptomatic illness compared with presymptomatic illness, the potential benefits to one patient compared with all other patients, and finally the deployment of resources from a centralized hospital must be measured against those of the domiciliary services.

Apart from the simple economic balance sheet based on money, other resources, and human personnel there are ethical considerations. For example, for any given expenditure of medical effort, prevention must always be preferred to cure and presymptomatic to symptomatic diagnosis when presymptomatic diagnosis has some advantage for the patient.

The consideration of the appropriate proportions of medical effort which should be expended on prevention as distinct from cure is made easier by dissociating it from the problem of presymptomatic

as distinct from symptomatic diagnosis.

### Prevention and cure

The term 'preventive medicine' is often loosely used to imply presymptomatic diagnosis when it should probably be restricted to true prophylaxis or the prevention of the occurrence of disease. The term presymptomatic diagnosis should be restricted to the state where there is evidence of disease but where the patient remains unaware of any of its effects.

The cry for more preventive medicine and presymptomatic diagnosis comes most often from those who have no clinical responsibility and who do not appreciate that practically everything which the general practitioner does for his patients contains an element of prevention and presymptomatic diagnosis in the widest sense.

All advice or treatment is preventive in so far as it is used in the hope that it will prevent the patient from getting worse. The only non-preventive medical care is expectant treatment given either in the firm belief that the condition is self limiting and will produce no lasting morbidity if left untreated, or where there is no known treatment which influences the outcome to the benefit of the patient. For example, a formal diagnosis with an implication that the aetiology and pathology is known is seldom made in general practice in patients with respiratory infections (Records Unit Working Party 1958). The general practitioner will treat the patient expectantly if there is a high probability that there is no effective specific or symptomatic treatment for the condition, or that it is self limiting. On the other hand, if the condition progresses or the patient has had recurrent serious infections in the past or has some other debilitating condition which makes complications more likely or more serious should they occur, then he will begin treatment with an appropriate antibiotic even in the absence of any abnormal physical signs. Where the probability is very high he will have left supplies of an appropriate antibiotic with the patient with instructions to start treatment whenever he gets a cold. The numerical values for these probabilities have never been worked out for no general practitioner will now leave untreated these groups of patients.

The indications for carrying out special investigations such as bacterial sensitivity tests which are sometimes essential are not discussed here nor the assessment of the 'appropriateness' of the antibiotics (Crombie 1967). The effectiveness of this approach is shown by the low incidence of mastoid infections, chronically discharging ears, osteomyelitis, lobar pneumonia and, possibly, of rheumatic fever and acute nephritis.

The relative importance of this type of primary preventive medicine in relation to any other is implicit in the relative incidence of

the diseases considered. For example, upper and lower respiratory illnesses together account for some 30 per cent of all the episodes of illness brought to doctors in Great Britain. This is three times greater than the total of all episodes of illnesses treated by all hospitals whether as inpatients or outpatients.

The preventive element is also evident in the way in which the general practitioner uses oral diuretics to reduce if not prevent attacks of acute left-sided heart failure, in his advice to the obese, the heavy smoker and drinker and the patient with a family history of diabetes, in genetic counselling, in the handling of patients with emotional problems, inadequate personalities or with a history of previous psychiatric problems, and in his advice to women who wish to use oral contraceptives. The range of these preventive measures and the opportunities for initiating them stem from the continuity of the relationship between the general practitioner and the majority of his patients and from the fact that the patient traditionally initiates the consultation. Only general practitioners are aware of the volume and importance of the preventive work which they do. Its effects cannot at present be measured numerically; it is integrated into a pattern of medical care evolving gradually over the years and empirically absorbing diagnostic and therapeutic advances. The opportunities which each general practitioner has of clinical contact—on average five times with some 70 per cent of his patients in each year—and the frequency and continuity of such contacts, including especially those which take place in the patient's home, enables the practitioner to identify at the earliest possible moment the emotionally disturbed patient who presents his problem as physical illness. There is an element of assessment in all therapy; and the good general practitioner treats every contact with his patient as an opportunity to anticipate or forestall trouble.

This last section has ignored the more formal, conventional and systematic preventive or prophylactic element in general practice which includes mass immunization and inoculation campaigns and public health measures in general. These need not involve the general practitioner, or other medically qualified personnel in short supply, in much extra work if he has adequate ancillary help. This applies to a lesser extent to antenatal care, possibly the most important systematized preventive component in general practitioner care, and also to well-baby clinics.

Though the approach as outlined here is in its entirety an ideal, it is achieved more often than not by general practitioners in Great Britain despite their formal undergraduate medical education. Medical education, research and academic medicine in general are based on and entirely appropriate to the highly selected clinical material which constitutes the problems of hospital medicine. They

remain cut off from the problems of medical care of the general practitioner, operational as well as clinical. Because of the very efficiency of the general practitioner (and other domiciliary care services) they see only those problems which are inappropriate to his form of care or which slip through his preventive and diagnostic system.

The clinical methods of general practitioners which are only roughly outlined here, are not yet formalized in the way that the clinical methods appropriate to the highly selected clinical problems at hospital level have been systematized and formalized in such excellent books as Hutchinson's *Clinical methods* (1963) and Pye's *Surgical handicraft* (1962). In these books, prevention and assessment are appropriately, indissolubly and economically blended. The beginnings of this systematization of the diagnostic process in general practice have been explicitly dealt with in a study by the Records Unit Working Party of the Royal College of General Practitioners (1963), by Crombie (1963) and Hodgkin (1966). This approach is implicit in various textbooks by Fry (1966), McWhinney (1964), Watts (1966) and Abercrombie and McConaghey (1963). We must beware that these, still largely unsystematized, clinical methods are not distorted or even thrown overboard in a quest for a spurious form of prevention or presymptomatic diagnosis.

### **Symptomatic and presymptomatic diagnosis**

The more restricted question of the appropriateness of symptomatic or presymptomatic diagnosis only arises for those conditions which fulfil the following criteria: there is some therapeutic advantage from early diagnosis; there is some screening procedure which will identify all, or a large majority of, those individuals, and only those individuals needing this preventive treatment in the presymptomatic phase and there is no overwhelming economic bar to implementing this screening, and the screening procedure can be accommodated within the spectrum of good clinical care without distorting it. Wilson and Jungfer (1967) in the most comprehensive review to date define the procedure as "the presumptive identification of unrecognized disease or defect by the application of tests, examinations or other procedures which can be applied rapidly. Screening tests sort out apparently well persons who probably have a disease from those who probably do not. A screening test is not intended to be diagnostic. Persons with positive or suspicious findings must be referred to their physicians for diagnosis and necessary treatment".

The intermediate steps in the diagnostic process between the assessment of the patient's clinical problem and the initiation of appropriate action traditionally include a diagnostic label. This label carries by implication a knowledge of the morphology, path-

ology and aetiology of the morbid processes underlying the clinical problem. However, as Cohen (1943) has said, diagnosis is a signpost to action and the assessment process is concerned with establishing sufficient data to indicate the appropriate action with a probability commensurate with the seriousness of the problem itself, the seriousness of the possible alternatives which must be eliminated and the effectiveness of the treatment.

It is in the field of presymptomatic diagnosis or screening procedures that this simple probabilistic approach has become acceptable. In screening procedures the intermediate phase of establishing a definitive diagnosis, whose main purpose is to increase the probability of indicating appropriate action, is often impossible because of a lack of knowledge about the natural history of the disease process. The general practitioner's assessment of respiratory diseases as described earlier is rational when considered in this broader context.

At a recent symposium on presymptomatic diagnosis (*Proc. roy. Soc. Med.* 1966) some of these problems were discussed. Without going into details it is fair to say that no screening procedure fulfils all these criteria without qualifications. For example, cervical smear campaigns may be detecting the more slow growing, less lethal carcinomata and tending to miss the virulent, rapidly growing and metastasizing tumours. Tonometry in the screening for glaucoma produces a large proportion of false positives and fails to discover a significant proportion of those with the disease.

For some years it has been evident that mass detection-drives for discovering diabetes based on discovery of glycosuria are appropriate only for highly selected at risk groups (Royal College of General Practitioners Working Party 1962, 1963). It has been pointed out (Crombie 1964) that routine detection should be confined to those over 50 in the high risk groups; that is individuals who are or have been obese; women who have borne more than six children or a baby weighing 10 lbs or more at birth; and those who have close relatives who are known diabetics. It was also pointed out that, far more important than this restricted screening was the necessity for the general practitioner to be aware of the possibility of diabetes during his routine contacts with his patients. In this particular example, where the conclusions were based on the mass detection drive carried out by the College Working Party, the numerical evaluation of the results lead us back, not to mass detection drives as such but to current good clinical practice. This consists in testing for glycosuria all patients with certain disabilities such as vague ill health, peripheral vascular disease, or neuropathy particularly associated with ulceration or sepsis of the lower limbs, visual defects, coronary artery or cerebrovascular disease, vulvitis

and balanitis.

Similar conditions seem to apply to detection drives based on blood sugar estimations, for we have insufficient knowledge of the natural history of diabetes and glucose intolerance to know how we should handle people with blood sugar levels between the absolute maximum of normality, say 180 mg per cent of glucose, two hours after a meal and the absolute minimum of abnormality under the same conditions, say 120 mg per cent.

The lack of knowledge about the natural history of many other diseases, including hypertension and ischaemic heart disease as the commonest and most important also precludes them as candidates for any mass screening at present. In the example of ischaemic heart diseases, predisposition can be estimated (Morris 1966), but is not suitable as a means for mass screening.

The lesson from all these examples is that we should be spending such limited resources as we have, not on half-baked screening campaigns but on intensive epidemiological studies of the natural history of these conditions, coupled with therapeutic trials where these are indicated. The use of oral hypoglycaemic agents in the treatment of patients with raised blood sugar levels in the intermediate ranges between normality and undoubted abnormality is an example of such a trial.

Procedures which fulfil the criteria, such as screening for phenylketonuria and for congenital dislocation of the hip exemplify other problems. In the first, the screening can be carried out by non-medically qualified personnel but abnormality is unlikely to exceed one in 10,000 births. The second example is of a commoner disease. However, the requisite examinations can easily become part of normal diagnostic ritual, applied at one of the many opportunities provided by routine contact with babies during the first 12 months of life. Testing for rhesus antibodies routinely during antenatal care is a second similar example though antenatal care as a whole provides other lessons. It exemplifies the relative rapidity with which an appropriate diagnostic and preventive ritual can be formulated when it derives from an academic basis.

### **The future**

The further evaluation of preventive measures in general and screening programmes in particular demands that an interest must be taken by academic medicine not only in analysing, assessing and understanding the current diagnostic systems of general practice but in helping general practice itself to such an analysis and understanding. The evolution of a tradition of good clinical practice which in turn depends on the necessity to teach such traditions must precede scientific systematization. The clinical isolation of the general

practitioner (Crombie 1962) has precluded this in the past. The formation of the Royal College of General Practitioners in 1952 has probably had more to do with breaking down this isolation than any other factor. The College has achieved this by providing a forum or clearing house for the ideas which will form the basis for such systematization. This process is being consolidated by the feed-back which accompanies the attempt to teach others and post-graduate teaching programmes by general practitioners are an increasingly important part of the activities of the College.

Academic medicine can also help in this process by accepting that research into medical care methods and organization is as respectable and rewarding as clinical research. As much research drive and resources should be deployed on evaluating the problems of medical care including the place of prevention and cure and pre-symptomatic and symptomatic diagnosis, as are now deployed on the evaluation and therapeutic trial of drugs and other medical and surgical procedures. This re-allocation of resources would automatically involve the systematization of the clinical methods of domiciliary medicine and the natural history of the common disabling diseases discussed here.

### Summary

Prevention and cure belong to one dimension of medical care while presymptomatic and symptomatic diagnosis belong to a different but overlapping dimension.

Prevention is an integral part of the assessment processes of all general practitioners and is the primary aim in solving all clinical problems. The preventive content of good clinical general practice is underestimated by those who have no first hand knowledge of general practice because it is not systematized.

Presymptomatic diagnosis on the other hand has limited clinical application at present and requires an intensive research effort to establish its true place in clinical practice.

Not only must the effectiveness of screening programmes be proved, but ways of integrating these programmes into the present assessment systems of general practice must be devised. This integration must not distort these systems which are the most complex and efficient preventive and screening programmes in existence.

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**Foot-and-mouth disease in man.** R. ARMSTRONG, M.B., B.S., J. DAVIE, B.S.C., M.R.C.V.S. and R. S. HEDGER, M.R.C.V.S. *Brit. med. J.* 1967. **4**, 529.

A man aged 35, living on a farm but only indirectly in contact with animals, developed a sore throat and blisters on his hands and feet six days after an outbreak of foot-and-mouth disease on the farm. Material from one of the blisters showed type 0 foot-and-mouth virus on culture, and blood antibodies in high titre against this virus were obtained on repeated examinations over the next few months. The patient's clinical progress was complicated by the fact that he was probably also suffering from a skin condition of unknown cause. There is a possibility that this was a factor in lowering his resistance to the virus, especially as his contact with infection was less than that of many people working with infected animals in the area at the time.