General practitioners and open-access pathology services

A review of the literature

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IT is the policy of the Department of Health and Social Security that general practitioners should have free and open access to pathology services provided in hospitals. Use of pathology should be a significant feature of modern general practice. It is not always been the case and initially some pathologists and planners were of the opinion that their departments would be swamped by frivolous and unnecessary requests.[1, 2, 3, 4] This has not happened and the situation has been one of under-use rather than abuse of the services.

It is difficult to see why this argument should have been proposed in the first place since it is quite clear that to use the pathology service leads to more effort on the part of the doctor, the patient or both. For example, the specimen must be collected, conveyed to the laboratory, and probably another consultation arranged after the results have been obtained.

The implementation of the policy of the Department of Health was largely left to the hospitals and it seems that the facilities provided depended on the attitudes and prejudices of the pathologists in charge of the hospital laboratories.[2, 3, 4, 5, 6, 7, 8] Macaulay's [5] study, sponsored by the Nuffield Provincial Hospitals Trust, was the first specific enquiry into open-access facilities for general practitioners. He considered that the service was worst in the cities served by teaching hospitals and the larger voluntary hospitals with a generally satisfactory service in the smaller towns.

The report[9] of the Standing Medical Advisory Committee's Sub-committee on *The Field of Work of the Family Doctor* (Gillie Report, 1963) stated that many general practitioners enjoyed an excellent and comprehensive open-access laboratory service. The report pointed out, though, that there were substantial regional differences and the Department of Health then recommended that at least one laboratory in every hospital group should provide a service for general practitioners. This step was reasonably successful in that by 1968 figures obtained by the General Medical Services Committee[8] indicated that 99 per cent of general practitioners had access to haematology, 95 per cent to biochemistry and 94 per cent to bacteriology. These figures are likely to be underestimates as there were probably doctors who did not know about the services offered and reported the non-existence of the facilities.[7, 10]

Macaulay[5] reported that in 1958 about 5·5 per cent of pathology work was carried out for general practitioners and in 1960 the proportion had grown to 6·25 per cent. In 1962 the proportion was 6·5 per cent and by 1968 it had reached 10·8 per cent[8]. These are average figures obtained nationally and, of course, conceal considerable regional variation.[1] In certain areas where the pathologists had expressed a strong positive attitude towards general practitioners or where the hospitals had retained much of a former general-practitioner tradition far higher proportions have been achieved.

This is shown by the studies of Forbes[10] and Murray[11] in Canterbury and Kingston-upon-Thames, and Fry[12] *et al.* in Bromley. Their figures are summarised in Table 1.

TABLE 1

PERCENTAGE OF GENERAL-PRACTITIONER USE

Area	*Year*	*General-practitioner use as a percentage of demand*
Kingston	1959	*18·0*
Bromley	1962	*20·0*
Canterbury	1964	*18·5*

The advantages of pathology services in general practice

It is not clear whether there has ever been a significant body of medical opinion that laboratory medicine has no place in general practice. Possibly the reluctance or hostility on the part of pathologists, was merely a display of concern that open access by general practitioners would restrict them in their duty of providing laboratory services to hospital patients rather than to the community at large. Whatever the reason, various commentators have found it necessary to attempt to justify the provision of laboratory services for general practitioners and some examples of their arguments are reviewed below.

Following the implementation of open access the total work load on a pathology department should not increase.[1, 4, 9] The argument is that the same patients will be referred to the laboratory but some of these will be referred from general practice rather than from the outpatient department. In fact Wheatley[4] attempted to show that open access reduces the load on the pathology department, however since his analysis is based on the comparative study of only two hospitals, one offering open access and the other not, the evidence is not strong.

This argument was extended to suggest that open access actually reduces the load on hospital beds and outpatient clinics.[1, 2, 5, 7, 9, 11, 13, 14] Levitt[7] quoted results indicating that open access led to a 15 per cent reduction in new medical outpatient attendances and Murray[11] considered that open access reduced the demand for beds to which patients might be admitted for investigation. Darmady[14] suggested that there is an inverse relationship between use of direct-access pathology and outpatient referrals. However, Forbes[10] and Backett[15] found the opposite, a view endorsed by Rose.[16] Forsyth and Logan[17, 18] found no relationship between use of open-access facilities and referrals to outpatient clinics.

The case that open access reduces the load on hospital facilities is thus by no means proven. The studies quoted by Levitt appear to be methodologically sound, based on a survey of general-practitioner referrals to outpatients for diagnosis only. The figure of 15 per cent corresponds with figures given by Fry[2]. However, the correlation approach used by Darmady, Forsyth and Logan, Forbes and Backett cannot be used to prove a causal relationship between use of open access and outpatient referrals.

Why should it be necessary to legitimise the provision of open-access facilities for general practitioners? Laboratory medicine exists to provide information to assist in decision-making. If its use leads a general practitioner to refer fewer patients to outpatient clinics than he would otherwise send, and these decisions are the appropriate decisions, then its provision is vindicated. If its use causes him to refer more patients and these decisions are appropriate, then its provision is also vindicated. Finally, if its use makes no difference at all to his referral pattern but increases his information

and allows him to make better decisions in his practice then its provision is also beneficial. Thus to attempt to justify the provision of open access by these methods is somewhat vacuous.

What is required is a complete cost-effectiveness study of the role of the pathology service in the provision of medical information and its effect on medical decision-making both in the hospital and in the community.

The use of open-access pathology and the quality of general practice

Considering its importance in the British system of medical care, surprisingly little attempt has been made to measure the quality of general practice. In 1950, Collings[19] published a report on his study of 55 British general practitioners. His report caused a sensation in that he suggested that the quality of general practice was bad and was deteriorating. These findings were to some extent discredited because his sample of doctors was not randomly selected and his criteria of assessment were not specified.

Two other studies were set up with the intention of refuting Collings' findings. Hadfield[20], who was assistant secretary to the British Medical Association, studied nearly 200 randomly-selected doctors and succeeded in reaching conclusions opposed to Collings. However once again the criteria of assessment were not specified.

Taylor[21], in 1951, carried out a study observing 94 general practitioners in 30 practices. Again, his sample doctors were not randomly selected, but were chosen as being thought 'good' by other doctors. Presumably Taylor hoped to establish the features of good general practice in order to develop a set of criteria against which other practices could be measured.

From his report it would seem that his criteria of assessment were largely related to the physical circumstances of the practice rather than the standard of investigation, diagnosis and treatment which presumably ought to be involved in the criteria on which medical practice is assessed. Even then he was forced to conclude that a quarter of these supposedly 'good' practitioners were less than satisfactory.

Two more substantial studies have since come from North America—the study by Peterson *et al.*[22] of general practice in North Carolina and by Clute[23] in Ontario and Nova Scotia.

In 1953, Peterson *et al.* studied a randomly-selected sample of 93 doctors and assessed their performance. Each doctor was assigned a mark out of a possible 107 of which, interestingly, 26 could be assigned for skilful use of laboratory aids. The 107 marks were allocated into seven sub-categories; 30 for skill in taking a clinical history; 34 for physical examination; 26 for skill in use of laboratory aids; nine for therapy; six for preventive medicine and two for clinical records. The study and its methodology can be criticised in that the criteria against which the doctors were judged were those prevailing in a medical school and these are almost certainly not appropriate in general practice.

Mechanic[24] has suggested that most doctors, both in hospital and in the community, do not practise in the way in which they are trained. Social pressures force them to adopt strategies which may detract from the quality of care offered to each individual patient but allow them to function more effectively within the context in which they must work. Many people would also argue with the relative weights assigned in the criteria.

Clute essentially took the methodology developed by Peterson and applied it to 86 general practitioners in Ontario and Nova Scotia.

It is clear that what is required to assess the quality of general practice is a more pragmatic methodology based on the outcome of the doctors' decisions. For example, the non-investigation of conditions which clear up should not necessarily be penalised.

It is also clear that to do this is extremely difficult and it is understandable why such a methodology has not been developed.

However, skilful use of laboratory aids to diagnosis has come to be seen as an indicator of the quality of general practice. (In Peterson's study virtually 25 per cent of quality depended on skilful use of laboratory aids.) Since it is often difficult to distinguish skilful from unskilful use, this criterion is usually replaced by use, greater use of the laboratory generally being thought of as better than lesser use. This is reasonable, because, as will be seen, the majority of general practitioners make minimal use of the open-access service.

One of the few unanimous findings of a number of studies[10, 11, 12, 16, 18, 25, 32] of general practitioner use of open-access pathology was the generally low average level of use by general practitioners and a wide variation between different doctors. Often a small group of doctors accounted for the bulk of demand. Many of the investigators attempted to find factors to explain this variability. This will be discussed further later but one of the factors used was a measure of the accessibility of the laboratory to the doctors.

As with most of the factors the effect of accessibility is not clear cut however, intuitively, it remains an appealing explanatory factor and would certainly apply in almost any other sphere of activity. It has been suggested[3, 5, 8, 33, 34] that consideration should be given to improving accessibility, by implementing a collection service to transport specimens from general practitioners to the laboratory and reports in the reverse direction, as a means of increasing and improving the general practitioner's use of diagnostic laboratory facilities and, implicitly, the quality and standards of his practice. An evaluation of such a scheme is currently being carried out for the Department of Health by a team in the Unit for Operational Research in the Health Services, University of Lancaster.

In 1966 Mechanic[35] carried out a postal questionnaire survey of 995 general practitioners in England and Wales. The questionnaire mainly dealt with the doctors' satisfactions and dissatisfactions, the organisation of the practices, attitudes toward various aspects of medical care, work load and views on issues of relevance to the organisation of general practice within the National Health Service. The first part of the questionnaire covered 26 possible problem areas in general practice and one of these was access to diagnostic services and equipment. Of the 26 problem areas this one ranked least as a problem, with 87 per cent of the doctors not referring to it as a problem at all, presumably being satisfied with the service.

It would be wrong to overstress the role of pathology in general practice, but it certainly constitutes an important component of the technical orientation of the general practitioner. In fact, based on his questionnaire, Mechanic in a further paper[36], represents general practice by two components—a technical orientation (measured by reported use of diagnostic aids) and a social orientation (measured by the response to two questions regarding social problems in general practice).

He then divided the two scores at their medians and classified the doctors into four groups:

(a) high diagnostic use—high social orientation
(b) high diagnostic use—low social orientation
(c) low diagnostic use—high social orientation
(d) low diagnostic use—low social orientation.

He labelled these categories as moderns, technicians, counsellors and withdrawers respectively, the implication being that moderns are superior doctors to withdrawers, with technicians and counsellors coming somewhere between but not establishing their position relative to each other, thus mirroring a current controversy.

In the medical world there are two opposing schools of thought; one deploring the increasing scientific, laboratory orientation and the other condemning the old-fashioned, empirical approach. However, it would appear that the two are not irreconcilable, and Mechanic has shown that a technical orientation does not preclude a social orientation and clearly integration of the two is an ideal to be sought.

The potential growth in demand

Many of the studies have shown that general practitioners, when they do use the pathology service, tend to make relatively unsophisticated use of it in terms of the investigations requested. Rose *et al.*[16] found that of a total of about 200 investigations offered, requests for 13 of these constituted 83 per cent of the total requests. Haemoglobin estimation was the test requested most often. In general, routine haematology requests account for over half of the total with straightforward bacteriology investigations and pregnancy testing making up most of the remainder. Requests for biochemical investigations have generally constituted a very small proportion of the total.

This is a pattern which appears to have been the case in the hospital, but by now has significantly altered. Hitchens and Lowe[30] publish some data on the demand by the hospital in each of the branches of pathology for the years 1955–1964. Initially there was a similarity with the demand pattern in general practice but by 1964 this had dramatically altered—biochemistry now had the largest demand, followed by haematology then bacteriology.

Hitchens and Lowe also developed the basis of an interesting method for estimating the potential growth in demand for pathology in general practice. In their study of the 5,758 request forms submitted by 134 general practitioners in Cardiff in 1964, they noted the provisional diagnosis and reason for each request, and classified these into diagnostic groups representative of commoner conditions for which in hospital, laboratory investigation would almost certainly be considered helpful. From Logan and Cushion's[37] survey of morbidity in general practice they found it possible to estimate the likely number of times their population of doctors would have been consulted about these conditions during the year. Their figures are shown in Table 2.

TABLE 2

LABORATORY REQUESTS RELATED TO DIAGNOSTIC CATEGORIES

Diagnostic category	*Estimated number of patient-consultations*	*Number of laboratory requests*
Food poisoning	14,200	633
Pyelitis, pyelonephritis and cystitis	4,000	181
Pharyngitis and tonsillitis	19,000	152
Coronary disease	2,200	80
Skin sepsis	15,000	22
Peptic ulcer, gastritis and duodenitis	13,500	21
Diabetes mellitus	2,200	14

They noted that while it is difficult to reach an acceptable estimate of what would be a reasonable investigation rate for any given condition in general practice, the actual investigation rates shown in Table 2 were extremely low and they considered that this indicates a large potential expansion in use as "clinical standards in domiciliary practice begin to approach those in hospital". Once again there is a tendency rightly or wrongly to measure general practice against the standards of practice in the hospital.

It is often suggested that the role of pathology is fundamentally different in general practice from that in hospital. Whether this is true or not, or ought to be true or not, is not clear but its investigation seems warranted.

In both spheres pathology has two basic facets, diagnosis (including (a) definitive diagnosis of a particular condition (b) exclusion of particular conditions (c) confirmation of a suspected particular condition) and control of therapy. Control of therapy is logically similar in each sphere but different in content since for obvious reasons, the therapies undertaken in each type of practice are very different.

It has been suggested though that from a diagnosis viewpoint, pathology in the hospital is largely concerned with establishing a definitive diagnosis whereas in general practice it is concerned with excluding serious disorders whose manner of presentation may be similar to less serious disorders, or to exclude organic disease when a disease of psychological origin is suspected. There is not much logical difference in these uses of pathology. The difference would appear to be in the expectation of the doctor at the time of requesting an investigation. Darmady[14] wrote "The type of investigation requested by the general practitioner differs considerably from that of the consultant due to the fact that a large number of patients consult their practitioners for psychological reasons and his first concern is to exclude organic disease. Therefore, the requests for investigations submitted from him are likely to be aimed at excluding disease rather than proving it. This provides an entirely different and perhaps more difficult challenge on the laboratory than the investigations asked for by the hospital staff". Whether there ought to be a difference between hospital and general practice, or whether this is a rationalisation for a difference which actually does exist is not clear, but should be investigated.

One of the often quoted advantages of the British system of medical care is that the general practitioner/personal physician/family doctor is enabled to practise preventive medicine and diagnose disorders early in their course, either clinically or, possibly presymptomatically, by screening. This is an ideal rarely achieved in fact as attested to by the existence of the ' clinical iceberg' in general practice first discussed by Last[38] and which has been a recurring theme in literature on general practice. There has been some evidence [39, 40] that, whatever the opinion of experts on medical care systems, the majority of general practitioners have not seen their role as including preventive medicine and certainly not surveillance. This may now be changing as evidenced by the growing demand for cervical cytology in general practice. Thus a screening role for general practitioners as a source of increased demand on open-access pathology is likely in the future. As a development and adjunct to conventional general medical practice this role is logically attractive.

Studies of general-practitioner demand

There have been several studies of general-practitioner demand on open-access pathology [10–12, 14, 16–18, 25–32]. These have sometimes been specifically concerned with this feature but some have had a wider context. Perhaps the first study was that of Forsyth and Logan [17] carried out in Barrow-in-Furness and this, with the paper by Morrison and Riley,[29] has set the fashion for most of the others.

In general terms, most investigators proceeded by measuring the use of a laboratory by each doctor practising within the assumed catchment area of the laboratory and, noticing a wide variation in the usage rates, attempted to find factors to explain this variation.

The factors used can be classified as:

(a) individual characteristics of the doctors
(b) characteristics of the practices and
(c) accessibility of the laboratory.

Table 3 summarises the studies in terms of the factors used and whether use was standardised according to list size. Most of the authors considered that usage rate related to work load was a more appropriate measure than crude usage rate and attempted to approximate this by expressing pathology usage as "tests/requests/specimens/patients referred per unit time per 1,000 patients on the list". In the case of partnerships they have generally considered each doctor's work load to be more accurately represented by the average list size for that practice rather than by the nominal recorded list of each doctor. Morrison and Riley[29] validated this procedure by assessing each doctor's prescribing over a period, finding that this was fairly well correlated with average list size. Fry *et al.*[12] circumvented this problem, in their shorter study, by counting the number of consultations for each doctor during the week of the study. The study periods varied between one week and one year.

TABLE 3

REVIEW OF DATA

Variable \ *Study*	Forsyth & Logan (17)	Forsyth & Logan (25)	Forsyth & Logan (26) (27)	Forsyth & Logan (18)	Morrison & Riley (29)	Fry *et al.* (12)	Darmady (14)	Hitchens & Lowe (30)	Scott & Gilmore (31)	Chamberlain (32)	Forbes (10)	Rose *et al.* (16)
Year of qualification of doctor		√	√	√	√	√		√	√	√	√	√
Postgraduate qualifications			√	√	√			√		√		√
Single-handed or partnership	√		√	√	√			√	√	√		√
List size			√	√	√			√	√			
Trainee					√				√			
Hospital appointment and/or beds			√	√	√							√
Urban or rural	√											
Distance to laboratory			√		√						√	√
Social class or area							√					
Standardised usage	√	√ (a)	√	√	√			√	√	(b)		

(a) for non-routine tests only
(b) the executive council concerned would not give information on list size so Chamberlain could not standardise

After establishing a usage rate corrected for work load for each doctor or practice in this way most of the studies proceeded in a similar way methodologically, as far as can be judged from the papers. Forsyth and Logan give little detail on their analyses, presumably because of the statistically inconclusive results.

However, conclusions are reached by comparing the mean usage rates of groups of doctors differentiated according to the factors listed in Table 3. For example, the mean usage rate of doctors qualified before 1940 is compared with the mean usage rate of those qualified after, or the mean usage rate of single-handed doctors is compared with that of doctors in partnership practice. Further the conclusion is generally made by visual examination and comparison of the means without considering the statistical significance of the difference. Morrison and Riley[29] are an exception here. They do base their conclusions on statistical tests.

Both Morrison and Riley as well as Hitchens and Lowe[30] made attempts to counter the deficiencies of this 'one variable at a time' approach. Morrison and Riley found such a significant correlation of usage rate with age that they carried out all subsequent analyses within age groups. Hitchens and Lowe also attempted to control for age in their analysis of the effect of postgraduate qualifications and considered an interaction between list size and number of doctors in the practice.

It is surprising though, that none of the authors attempted a multivariate analysis which is more suitable for handling interactions among factors underlying use of pathology as in some studies the number of doctors involved was certainly large enough to make this feasible and would almost certainly have been more revealing than the approaches used. The potential explanatory factors seem clearly related to each other. For example urban/rural location is related to solo/group practice, solo/group practice is related to age, and type of postgraduate qualification is related to age.

Taking the studies together, the picture which emerges of the typical high pathology user is that he is likely to be young, in partnership practice, in a predominantly middle-class area and in reasonable proximity to the laboratory. Less important he may also have a postgraduate qualification and a connection with a local hospital either through holding a clinical assistantship or having access to beds.

These findings are by no means conclusive except perhaps for age (or more precisely 'year of qualification') which emerges as a significant factor in most of the studies. Murray's[11] study, where usage for 1949 was compared with usage for 1959, seems to indicate that this is likely to be due to prevailing practice at the time of qualification rather than due to 'ageing'.

Accessibility was dealt with in several different ways in the studies, ranging from 'urban/rural' dichotomy to the 'distance from the laboratory' classification of Rose[16]. Clearly 'accessibility' is an abstract multidimensional concept[41] and depends not only on the relative locations of a doctor's practice and the laboratory (or specimen pick-up point) but also the presence or absence of major traffic divisions or other physical barriers, and possibly, since a doctor sends specimens via his patients, it may also depend on the accessibility of the laboratory to the patients. This in turn may depend on the social class of the practice (car ownership) and the proximity of the laboratory to convenient public transport routes. Darmady[14] accounts for the latter aspects of accessibility in his classification of doctors according to relative locations of practice and laboratory and social class of area.

Taking these deficiences in defining accessibility with the other deficiencies of the studies it is perhaps not surprising that a relationship between pathology usage rate and an accessibility surrogate has not been conclusively shown. However, it still remains an attractive explanatory factor but requiring a suitable operational form before its value can be demonstrated.

Alternatives to open access

This review has centred around open access to hospital pathology laboratories as the appropriate method of providing diagnostic services for general practitioners. However, other methods have been discussed in the literature and should be mentioned.

In the past, general practitioners carried out some laboratory work for themselves. This is a practice which appears to have died out. In 1954 Taylor[21] noted that the majority of practices did not even possess a microscope and Eimerl[1] confirmed this in 1962. The 'amateur' laboratory worker is presumably of dubious accuracy and Godber[13] considered the decline of laboratory work *in situ* should be encouraged.

The health centre concept of providing community medical services is gaining ground both as a theoretical model and in practice and there is some opinion[8] that

health centres should provide a small laboratory for the doctors practising from it. However, it would be difficult to justify these laboratories economically and open access would still be necessary for the more complex (and less common) investigations. There is also some evidence that small laboratories are not as inaccurate as larger ones.[14, 42, 43, 44]

In fact, the current policy* of the Department of Health and Social Security in the provision of laboratory services is towards further centralisation of these facilities in area laboratories[45]. This includes closing down the smaller hospital laboratories and so it is difficult to reconcile the potential provision of laboratory facilities in health centres with this objective.

Other means of providing laboratory services for general practitioners have been proposed and tried. Scott[46] has described an experimental family-doctor diagnostic centre which was a joint enterprise of the Nuffield Provincial Hospitals Trust and the Scottish Home and Health Department. Among other facilities this centre was endowed with "a large and well-equipped laboratory". In fact urinalysis, full-range haematology, limited bacteriology and some biochemistry were provided by one laboratory technician, more complicated procedures being carried out via open access to the laboratory at the Royal Infirmary. The centre was open to all 280 general practitioners in Edinburgh and during a period of three years 79 doctors took 2,650 patients to the centre. The laboratory carried out: 2,180 investigations in haematology; 827 investigations in bacteriology; 3,104 investigations in biochemistry; and 53 other tests, as well as 3,016 radiological investigations and 1,027 electrocardiograms.

There are similar units to this in Corby, Northamptonshire and Peckham[47]. They are obviously intermediate between conventional general practice and health-centre practice in that whilst the practices are decentralised themselves certain facilities, including a laboratory, are provided centrally for a large number of practices. However, these laboratories must be small and subject to similar pressures and limitations as small hospital laboratories, as discussed earlier, and open access to larger laboratories for the more complex investigations would be required.

Rose *et al.*[16] describe a machine, under development and expected to cost approximately £200 with operating costs of 20–60p per test, which performs most of the 14 tests which comprise the basic repertoire of the general practitioner. She considers this machine could very effectively decentralise pathology for general practitioners although once again open access would be required for other investigations.

* Quoting from H.M.(70)50 "The policy of the Department is that, as far as possible all laboratory investigations of disease should be concentrated in area laboratories attached to particular hospitals with only a minimum number of satellite laboratories in individual hospitals . . . .

'The chief functions of the laboratory services are:—Generally, to provide a service of laboratory medicine for a community, to meet hospital, local health authority and general-practitioner needs . . .'"

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