Costs of Tests

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The ready, indeed almost unlimited, availability of radiological and pathological tests has considerable cost implications for the Health Service. The workload in these fields has been rising. In radiology there has been an increase of about 6 per cent annually over the last 10 years with a concomitant and dramatic increase in the quantity of film used and in its cost, which has risen from £4.4 m in 1967 to £16.9 m in 1977 (Fig. 1). It is, of course, claimed that the character of radiological work is changing and that there has been a disproportionate increase in the complex type of investigations. However the fall in the proportion of Class I (simpler) examinations and the slight rise in Class III (more complex) examinations are far from striking. Neither is there any evidence that the 'open access' facilities and Accident and Emergency departments are making disproportionately increased demands on radiological services (Fig. 2); the only marked change is a tendency for more of the work to arise from in-patient than out-patient referrals. In 1967 the proportions were 38 per cent out-patient and 32 per cent in-patient; in 1977 this proportion had approximately reversed. The picture in pathology is broadly similar. The total number of requests—and of course, each request may be asking for more, often many more, than one laboratory test—was just over 58 million in 1977. The approximate growth rate of requests over the last 10 years has again been 6 per cent annually. Thus, over this 10-year period the total workload in both radiology and pathology has increased by at least 80 per cent.

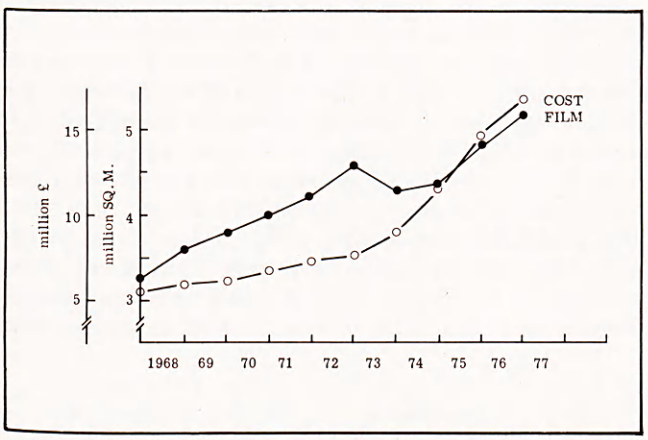
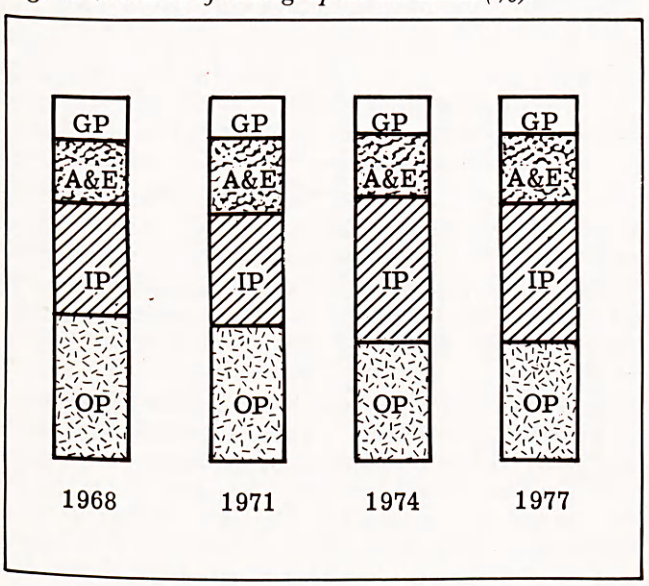


Figure 1. *Consumption of radiographic film, NHS, Great Britain.*

Figure 2. *Source of radiographic workload (%).*



To put these figures into a patient workload context, it is valuable to consider a relatively crude measure: the various patient flows to hospital. First, total discharges and deaths have fluctuated at around 5 million a year, in England, during the last 10 years, while out-patient attendances, which rose to a peak of 8 million new patients in 1971-73 are now running at around $7\frac{1}{2}$ million (Table 1). Thus, the progressive increase in the use of radiological and pathological investigations has not been matched by a corresponding growth in patient flow, although of course the type of patient admitted may well have changed.

The increase in revenue costs for pathology and radiology departments has been equally marked. Table 2 shows the actual expenditure for the years 1974/75—1977/78. Capital costs have increased similarly. All these tests are performed by people in the clinical investigation

Table 1. Patient flows: England: millions.

	1976	Ten year range 1966-1976
Deaths & discharges	5.3	5.0-5.3
Out-patients		
New patients	7.5	6.9-7.9
Total attendances	32.4	30.9-33.3

Table 2. Revenue Expenditure in England (£millions).

	1974/75	1975/76	1976/77	1977/78
Pathology	61.1	82.5	94.8	108.5
Radiology	36.2	48.6	56.1	63.0

Table 3. Staff in pathology and radiology, England. (Whole time equivalents).

	1968	1977	Annual growth rate
Radiology consultants	519	672	3%
Radiographers	3,777	5,404	4%
Pathology consultants	864	1,886	8%
Biochemists	447	879	7%
Medical laboratory technicians	8,312	12,937	4%

departments, which have had concomitant increases in staffing. Table 3 shows the large increase in numbers of consultants, biochemists, medical laboratory technicians (now called medical laboratory scientific officers) and radiographers. However, these figures do not reveal the true extent of the workforce required to cope with the demand as, in radiology and many of the pathology specialties, the number of consultant posts needed far outstrips the numbers in training. The escalating demand for tests has produced a resource consequence—staffing—that is as yet unmet, despite all the efforts being made to increase recruitment to these specialties. There is, however, a more general point arising from these figures which it is vital to consider. Will workload in fact continue to increase at its present rate or will some plateau of demand be reached in the foreseeable future? All the evidence we have points to continued exponential growth and thus the plateau, if it is not a mirage, appears to be some way off.

There are three possible solutions to this problem; more resources, enforced limitation of services, or a reduction in demand for services.

As to resources, recent events have demonstrated what inflation means in terms of money. Any more rapid rate of growth, both of revenue and capital, clearly depends on an improvement in the general economic situation. However, although we all hope for this, I must stress that money is not the sole restraint. I have already mentioned that departments that undertake these investigations have problems in recruiting staff of the right calibre, and many funded posts in these specialties are vacant for lack of applicants.

No one would wish to enforce limitation of services except in the most extreme circumstances. Thus, reduction in the demand for services is left as the one area where there is most scope for action. Naturally, such a reduction can only happen with a widespread and perhaps painful educational process. But there are enormous possibilities for rationalising the use of investigations. The work of Ashley *et al.* (1972), dramatically illustrates the problem (Table 4). This study showed that the amount of radiological investigation undertaken in different hospitals for the same complaint varied by factors of between 4 and 24. Surely such huge variations cannot be accounted for by differences in clinical outcome, in utility to the patient. Is it not likely that such variations arise from quite other factors? Such as our failure until recently to study scientifically the true role of tests in clinical decision-making and especially which tests are the most economic and beneficial in a particular clinical situation. It is important also to bear in mind that in hospital most tests are likely to be ordered by junior staff—while it is often said that it is the senior and experienced staff who require the fewest tests. When ordering a test we should all keep in mind the following thought on costs. With a fixed investigation department budget, multiplication of requests will lead sooner or later to delay in reporting the result of the test and an increased probability of an inaccurate result. Either of these may lead to iatrogenic disease, or to the most expensive investigations of all: prolongation of in-patient stay or repeated out-patient visits. This will cost all of us, the tax payers, a packet.

Table 4. The use of radiology by diagnosis (1966) (from Ashley *et al.*, 1972).

Diagnosis	Number of hospitals in sample	Total cases examined from all hospitals	Radiographic units (1966) used: Mean	Radiographic units (1966) used: Range of means between hospitals
Cerebrovascular accident	6	126	2.8	0.8-9.5
Coronary thrombosis	5	97	1.5	0.8-3.2
Peptic ulcer	8	182	7.1	4.0-9.5
Hernia	6	148	0.8	0.1-2.4
Hyperplasia of prostate	6	111	5.2	2.4-8.2
Fractured femur	5	104	7.2	2.8-10.0

This article is based on a paper read at the Conference on Clinical Decision-Making: Picking the Best Test, held at the Royal College of Physicians in June 1979.

Reference

Ashley, J. S. A., Pasker, P. and Beresford, J. C. (1972) *Lancet*, 1, 890.