CASPE
RESEARCH

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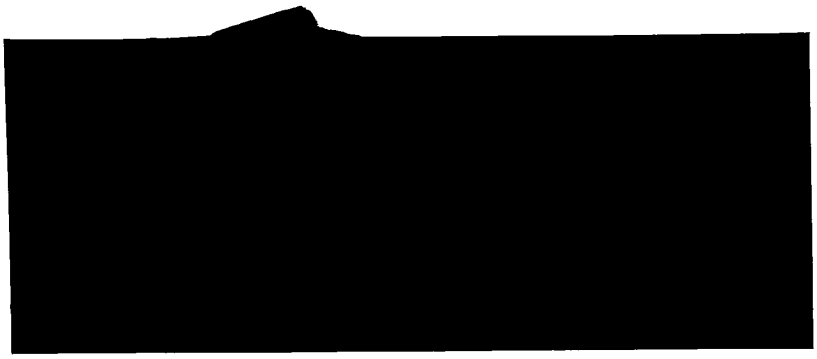
REDUCING THE COSTS OF PATHOLOGY SERVICES

oring Clinical Accountability, Service Planning and Evaluation in the N.H.S.



CASPE RESEARCH PROJECT

King's Fund College

REDUCING THE COSTS OF PATHOLOGY SERVICES

A Report of a Day Seminar held at the

King's Fund College on 9 July 1980

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INTRODUCTION

A Day Seminar on 'Reducing the Cost of Pathology Services', designed to give all participants an opportunity to contribute from their own experience, ideas or knowledge, was organised by the CASPE Research Project based at the King Edward Hospital Fund College. It was held on 9th July, 1980.

Mr. Pat Torrie, Director, King's Fund College, welcomed the participants to the seminar.

The Conference Chairman, Dr. Iden Wickings, Project Co-ordinator, CASPE Research, briefly explained that the CASPE Project was DHSS funded and that its terms of reference included the setting up of interest groups on various health topics to encourage the exchange of ideas and information. It was envisaged that the seminar would provide a forum for exploring problem areas and thus help CASPE Project members in their design of information systems.

Dr. Wickings said that the diagnostic services accounted for approximately 10% of the total expenditure on patients services in hospitals in the NHS, and that costs for drugs were very similar. He suggested that whilst most people seemed agreed on the necessity to control or reduce drug costs, very little concern was expressed about the increasing radiology and pathology costs, with the possible exception of the radiologists and pathologists themselves. He was hoping that during the course of the seminar it would be possible to consider whether pathology services should continue to be funded at the present rate or whether it was desirable for their costs to be reduced, and if so, to identify the actions and possible problems that may result. It would also be of particular interest to the CASPE Project to be advised of the sort of information that pathologists would find most relevant to help in the reduction, control or management of expenditure on pathology services.

LIST OF PARTICIPANTS

D.L. Barnes Esq	Principal Medical Laboratory Scientific Officer East Birmingham Health District
J.M. Coles Esq	Operational Research Scientist CASPE Research
Dr. J.E. Davies	Consultant Haematologist Oldham & District General Hospital
J.M. Dunning Esq	Secretariat, Steering Group on Health Services Information
Dr. P. Evans	Consultant Microbiologist Oldham & District General Hospital
Dr. P. Frost	Consultant Chemical Pathologist Brent Health District
D. Gilburt Esq	Assistant District Finance Officer Southend Health District
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Dr. M.W. McEvoy	Consultant Haematologist Harrogate General Hospital
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Mrs. G. Potts	Research Team Leader East Birmingham Health District

Dr. M.G. Rinsler	Consultant Chemical Pathologist Northwick Park Hospital
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Dr. G. Slavin	Consultant Histopathologist Northwick Park Hospital
Dr. M. Spencely	Specialist in Community Medicine Merton, Sutton and Wandsworth AHA
R. Stern Esq	Research Team Leader Southend Health District
Dr. D.E.H. Tee	Director, Immunology Department King's Health District(Teaching)
Dr. D. Walford	Principal Medical Officer, DHSS
Dr. M.W.P. Ward	Consultant Radiologist Harrogate District Hospital
Dr. H.I. Wickings	Project Coordinator CASPE Research
D. Worsfold Esq	Representative Institute of Medical Laboratory Sciences Gazette
Dr. J. Zilva	Reader and Consultant in Chemical Pathology Westminster Medical School and Hospital

THE CURRENT DHSS STEERING GROUP ON HEALTH SERVICES INFORMATION

Mr. Mike Dunning explained that he was participating in the seminar in his capacity as a member of the Secretariat for the DHSS Steering Group on Health Services Information.

Steering Group

The DHSS Steering Group on Health Services Information was established in February 1980 with a membership primarily comprising NHS staff plus four representatives from the Department of Health. The Chairman of the Group is Mrs. E. Körner, Vice-Chairman South Western RHA. The Group was set up following a lengthy investigation into the information systems currently operating in the NHS and from which it was concluded that the relevance and quality of some systems required considerable improvement. The primary objective of the Group was to study the existing information systems and put forward recommendations as to how they might be made more relevant to the NHS. In particular to ensure that information collected by the DHSS for national purposes was derived from information relevant to the needs of local managers. The various aspects of this objective can be summarised as follows:

(i) to determine a strategy for the development of health service information, and the criteria upon which the relevance of such systems can be judged;

(ii) to consider proposals the DHSS wish to introduce to ensure that they provide information useful to NHS operational managers;

(iii) to identify problem areas and subsequently initiate action to develop or improve systems.

Mr. Dunning explained that the Steering Group decided that it should initially concentrate upon reviewing the information currently recorded about hospital activity, and in March set up the following Working Groups to undertake this task:

Working Group (A): to look at information concerned with facilities, such as beds, allocated to consultants for patient treatment, etc;

Working Group (B): to look at information concerned with diagnostic services and the use of consumables;

Working Group (C): to look at information about para-medical services.

All the groups' initial task was to identify information required for operational management.

Working Group (B)

Mr. Dunning who acts as Secretary to this Group, said that its membership was entirely NHS staff including Dr. Wickings, Mr. Guest and Dr. Ward, who were present at the seminar, and that it was chaired by Mr. Michael Fairey, Regional Administrator for the North East Thames RHA. This Working Group had only just started to meet and had concentrated on information required by managers of departments supplying diagnostic services. An interim report to be considered at the next meeting of the Steering Group outlined a broad model of the types of information that was considered relevant for this purpose:

(i) information about patients;

(ii) information about demand (such as the source and nature of referrals);

(iii) information about processes (including the physical organisation of a department, its equipment and staff);

(iv) information about output quality (for quality control purposes).

It was planned to consider each of these categories in detail. The Group will also be considering how this information could be linked with other information about health service activity. It was hoped that the outcome of this review would be to have defined a minimum data base which would provide local heads of departments with the information to help them in the management of their services and provide a base from which to meet other NHS management and DHSS needs.

Mr. Dunning emphasised that the Working Group was in the very early stages of its work and would welcome any comments or suggestions as to the type of information that would prove useful to local managers.

ESTABLISHING THE TRENDS

Dr. Diana Walford, Principal Medical Officer, DHSS, explained that she was not a specialist in pathology costing but would endeavour to introduce the seminar by describing some studies that had been or are being, undertaken on this and related topics.

Trends in Costs and Workload

She drew attention to the statistics available for pathology workload and revenue costs during the period 1974-1978, and it could be seen that both had risen dramatically (Fig 1). Only in post mortem histology had there been a fall in workload (Fig 2). Dr. Walford explained that although the number of requests was continuing to increase, the rate of increase during the last few years had shown a distinct deceleration (Fig 3). She did not know whether the trend would be maintained, nor indeed why it should have occurred. She said that it was difficult to believe that it was the result of the DHSS attempts to make pathologists more aware of cost effectiveness, but that she thought that research sponsored by the Department into methods of pathology costing and the measurement of pathology workload had played an important role in stimulating debate and in encouraging other research in this field.

Figure 1.

PATHOLOGY REVENUE COSTS v WORK LOAD
England 1974-78

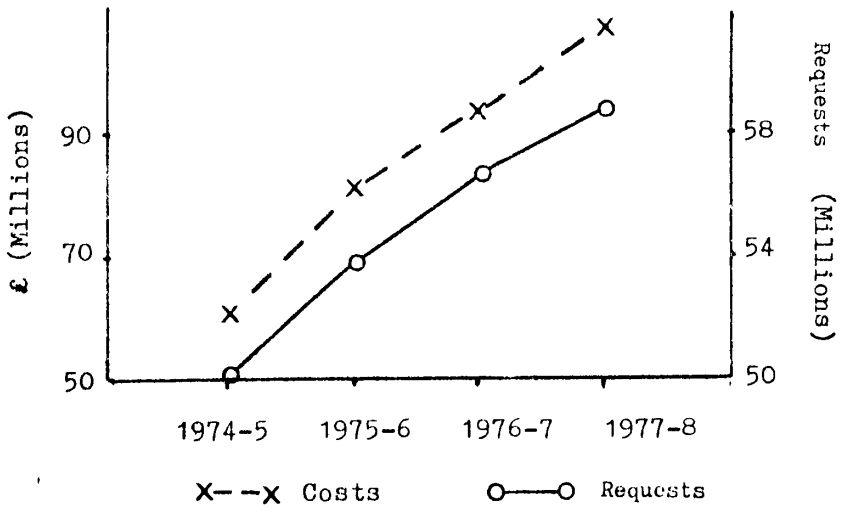


Figure 2.

REQUEST NUMBERS: PERCENTAGE CHANGE 1972-78

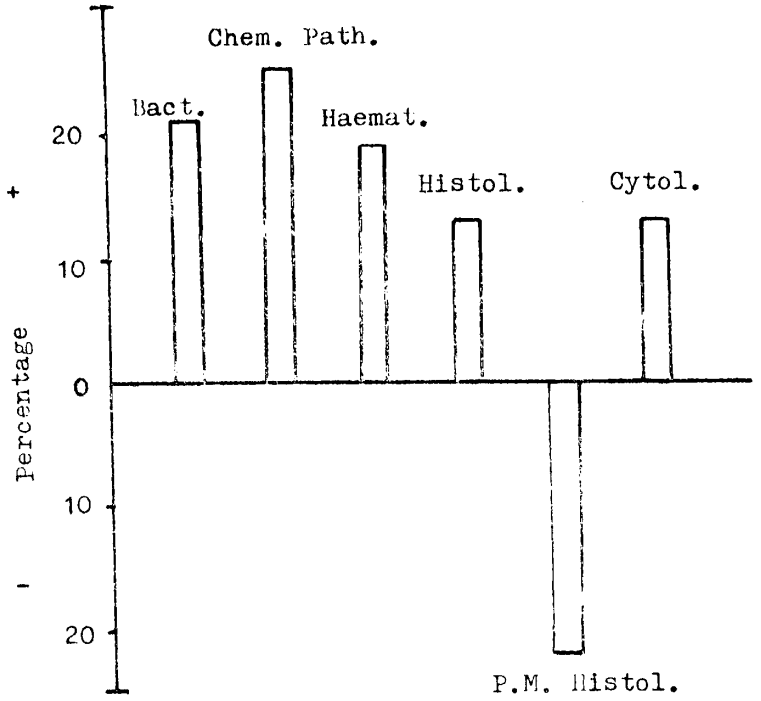
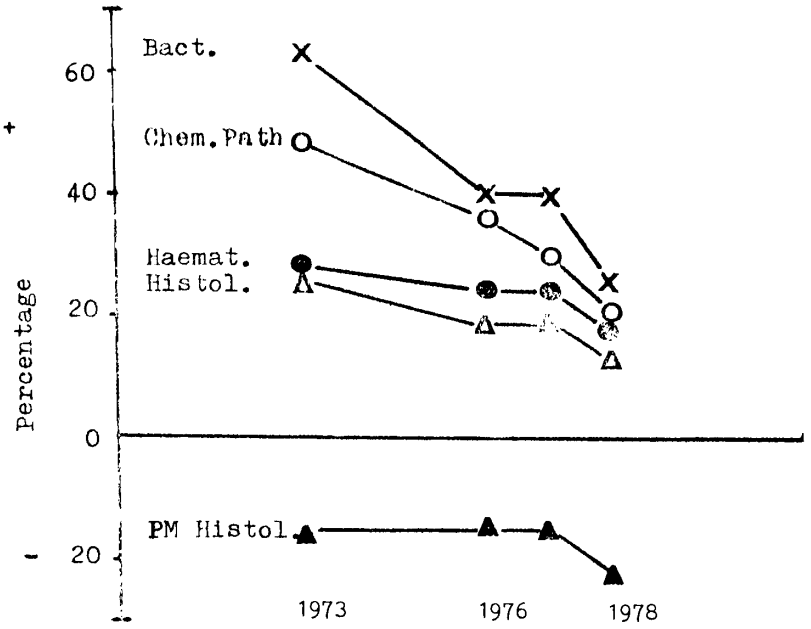


Figure 3.

REQUESTS:
PERCENTAGE CHANGE OVER PREVIOUS 5 YEARS



Costing Studies undertaken in the UK

Dr. Walford stated that an essential tool for cost benefit analysis was the ability to measure the pathology workload in a reliable and uniform way. She had gained the impression, having researched into the various costing studies undertaken, that progress was being made towards finding a simplified and more realistic method of pathology costing. It should, however, never be forgotten that funds are required to implement and operate a costing system.

Dr. Walford went on to describe a basic system of costing pathology workloads developed by Coopers and Lybrand and designed to help laboratory heads of departments to manage their resources more efficiently. Under this system, to arrive at a cost per specimen it was necessary to undertake timed observations of the procedures carried out in a laboratory over a five day measurement period. This provided information on machine time and technician time. Machine cost and technician cost per specimen were subsequently derived and indirect costs relating, for example, to clerical staff, could be added. The final cost per specimen did not include general costs, such as electricity, or the medical staff's salaries.

Dr. Walford said that this method was far from ideal as it involved a complicated exercise and had the inherent disadvantage that the calculated costs would always be different from actual costs. The system was being used by the DHSS in their cost evaluation of new equipment, where it had proved successful possibly due to the fact that it was largely concerned with direct costs. It had also been introduced in a few laboratories to identify costs for some basic tests. However, the results so far indicated that there was an enormous variability in costs calculated by this method and that, even within the same laboratory, cost variations occurred when the same tests were carried out at different times. Dr. Walford understood that some observers believed it possible that the system could be applied without the complicated timing exercise described above, but a full analysis of the deficiencies of the costing procedure, which was being undertaken for the Department by Mr. Peter Broughton of the Wolfson Research Institute, was awaited.

Dr. Walford said that another study by Mr. John Stilwell of the Health Services Research Centre in Birmingham, had been undertaken in a Biochemistry Department to attempt to measure technician involvement rather than machine running time. This method would have the advantages that workstudy officers need not be involved; the laboratory's work need not be disrupted; there would be no complicated time sheets to complete, and it could prove to be much cheaper than adopting the Coopers and Lybrand procedure.

Dr. Walford reminded the participants that since 1965 pathology workload statistics had been based on weighting factors. The validity of such weighting factors had become, over the years, discredited and in 1974 the DHSS decided to set up an enquiry into the possibility of using the Canadian Unit Value System which was reputed to be more realistic. The basis of this system involves looking at the whole activity in a laboratory and breaking it down into identifiable procedures, to each of which a unit value is attributed. The weightings are based on the average time required to complete a test procedure and include costs related to both technical and clerical staff. Field trials had been set up to see whether such a system was applicable to the NHS or whether it would prove too cumbersome and costly. It was found that laboratories accustomed to maintaining detailed records had little difficulty in adopting the Canadian system and that for those who were not so accustomed, the possibility of a sampling system might prove practical.

It had been found that the unit values given in the Canadian Schedule correlated very well with the UK-derived values for the common automated tests but the Canadian values were vastly inflated for manual tests. It had therefore been recommended that a new schedule of unit values should be developed for use in the UK. The national cost of introducing this system was estimated at 1978 prices to be £65,000 in the first year and £17,000 p.a. thereafter.

Dr. Walford said that this looked as though it would be a reliable and cost effective system but despite the DHSS recommendation that a pilot study should be set up in three Regions, no action had been taken.

Reducing the Workload

Dr. Walford stated that the results of costing studies themselves would probably have little impact on clinicians who needed to be encouraged to reduce the number of tests requested. She suggested that the type of study required to achieve this objective would need to relate the usage of tests to patient management and outcome but that unfortunately all such studies were riddled with pitfalls because so many other factors affected the management of a patient.

The participants noted that the DHSS had commissioned a further study to be undertaken by Mr. John Stilwell to evaluate the clinical value of biochemical tests. Dr. Walford gave the following brief description of this study:

> The sample of admissions used in the investigation comprised 174 randomly selected patients brought into general medical wards as acute medical emergencies. The houseman was asked to complete a detailed questionnaire for every test requested for this group of patients.
>
> At the time of making the request the following details were recorded:
>
> (a) the name of the test
>
> (b) the category to which it related, i.e.
>
> (i) non-discretionary: routine
>
> (ii) diagnostic
>
> (iii) monitoring
>
> (iv) checking
>
> (c) the result expected by the houseman

Two weeks after admission, or just before discharge, if that occurred sooner, a further questionnaire was completed recording the test result and any clinical management action which had been taken as a consequence of receiving the test result. Subsequently in those cases where action had been indicated a consultant physician checked the patient's notes to confirm the action had been taken and to assess the importance of that action in relation to the patient's outcome, and what would have happened if the management action had not been taken.

Dr. Walford explained that the results of this investigation would be published in the near future but Mr. Stilwell had kindly given her permission to quote from his findings concerning biochemistry tests. It appeared that

(1) tests requested for diagnostic purposes showed a considerably greater "value for money" in terms of their effect on patient management than the tests ordered in the routine category.

(2) of the non-discretionary tests, the biochemistry profile had the greatest effect on patient management.

(3) at 1977 costs the approximate average cost of a test which produced a clinicially significant management benefit was

£10 : Diagnostic
£20 : Non-discretionary
£23 : Monitoring

(4) £53 was spent on biochemistry tests for every test the result of which uniquely enabled some very serious management action to be taken.

Dr. Walford said that this study also showed that many unnecessary tests had been requested, since it had been found that in a number of cases when the results of tests which had been requested for diagnostic purposes had proved to be the opposite of the expected results, no action had been taken.

New Developments

Dr. Walford briefly referred to the possible introduction of bedside laboratory analysis. She referred to an article by Dr. D. Watson which had been published in the BMJ (July 1980) in which it had been suggested that, with the introduction of such new techniques, even the most complicated of investigations might be within the grasp of any responsible member of the health care team. Dr. Walford suggested that the implications of introducing this new technology included the possibility of decentralisation and, with the exception of out-of-hours testing, this might mean an increase in costs.

The DHSS regarded research into the implications for the pathology service of the introduction of automated testing at the point of use, as a priority area.

Discussion

1. One participant said that the DHSS was mistaken if it believed that its own activities had contributed towards the downward trend of the rate of increase in pathology requests. Dr. Walford agreed that the DHSS did not take this view.

2. It was noted that it was difficult to agree upon the appropriate criteria to determine whether a test is necessary or unnecessary. It was also an essential element of junior medical staff training to learn by experience, and recently qualified doctors, who were obviously less confident diagnostically, tended to rely more upon test results than their senior colleagues. It was considered important that requests falling into this category should not be regarded as a wasteful use of resources.

3. Attention was drawn to the possible danger that some necessary tests would be omitted if too much pressure was put onto clinicians to reduce the number of "unnecessary" tests.

4. It was pointed out that studies which had tried to identify a wasteful use of laboratory resources had concentrated on patients admitted to a hospital bed. It was suggested that a study of general practice and out patient test requesting might produce findings which indicated that insufficient tests are carried out. For example, was adequate care being given to the diabetic outpatient if he is only tested for blood sugar twice a year?

5. Reference was made to the study undertaken by Mr. John Stilwell and Dr. Walford was asked how the physician concerned could be certain whether the correct outcome had been achieved if he was not personally responsible for the patient's care. She explained the emphasis had been on whether the test result had altered the management care of the patient rather than whether the outcome had proved correct.

DOES SCALE MAKE A DIFFERENCE?

Dr. Joan Zilva, Reader and Consultant in Chemical Pathology, Westminster Medical School and Hospital, reminded the participants that the Westminster Medical School was currently fighting to maintain its existence on the premise that "small is beautiful" and she had for many years argued that, to a certain extent, this principle also applied to pathology laboratories. She said she would not be producing statistics as evidence to support her belief as it was based more upon "gut feeling" and her experience. She believed that the collection of comparable and meaningful statistics was almost impossible, and that disaster had occurred when "faulty" statistics had dictated policy.

What is economical?

Dr. Zilva commented that the budgetary system encouraged pathologists to balance the budget but doubted whether it encouraged consideration to be given to the possibility that what appeared economical within the Pathology Department need not necessarily be economical to the community as a whole. She suggested that it may prove necessary to accept that the most useful action is that which will contribute to the quickest treatment decisions and, hopefully, to the return of a patient to the community.

Dr. Zilva said that she did not know the answer to Dr. Wickings' question "Do we want to reduce costs?", but she was confident that Pathologists should ensure that whatever funds were made available for pathology services should be used to the best possible advantage.

What difference does scale make?

Dr. Zilva said that within a very short time of taking over responsibility for running a laboratory, it had become apparent to her that scale did make a difference. She suggested that the likelihood of poor staff relations increased with the size of the laboratory. Small laboratories encouraged team work, and the problems or conflicts between groups of staff, which can cause delays and inefficiency, are more likely to be noticed and resolved at an early stage by the head of a small department. There was also the benefit that colleagues using the department could know the staff providing them with a service and this facilitated good communications.

The Effects of Automation

It was noticeable that Chemical Pathology was most often quoted when talking about pathology costs. Dr. Zilva suggested that this was probably due to the fact that Chemical Pathology was the first laboratory discipline to be automated on any scale, and that, whilst it appeared more obvious that a consultant opinion was required in, say, Histopathology, the need was not quite so apparent in Chemical

Pathology. However, she did not share the view that the demand for Chemical Pathology could be most quickly and efficiently met by a combination of good MLSO's and a large autoanalyser. She believed that a consultant opinion is always required because of the needs to educate junior medical staff, to assess the clinical significance of the laboratory results being produced, and to be able to help clinical colleagues select the most valuable investigations from the total available.

Dr. Zilva contrasted the promises of improved efficiency that had accompanied the introduction of automation with her experience of it in practice:-

	Efficiency promised by automation		Results of automation
1.	the unit cost of a test could be reduced	1.	the unit cost of a test is reduced
2.	the need for staff would be reduced	2.	the need for staff is not reduced, and is sometimes increased
3.	a more rapid turnover of tests will be achieved	3.	it is doubtful if increased turnover is achieved, and there is a tendency to wait until there are sufficient specimens to justify the operation of the machine
4.	productivity would be increased	4.	in terms of quantity of output, productivity of the individual staff member is increased, but is such productivity desirable?

She said that in her experience the workload increased simply because a department has a machine with the capacity to undertake that greater workload; eventually it becomes easier to do all the tests that a machine can carry out rather than argue about which tests provide information that is of most use to the clinician. Furthermore, the unit cost can only be reduced by carrying out a large workload.

Dr. Zilva believed that it had seemed that there were only two ways to ensure that such machines ran "efficiently" - if that were taken to mean at the lowest unit cost:

(1) investigate every patient within your own Hospital 3/4 times per day, or

(2) centralise laboratory facilities so that specimens from more than one Hospital or District are sent to one large laboratory.

Because of such measures to use autoanalysers "efficiently" the introduction of automation had resulted in the necessity of having large-scale laboratories to gain maximum efficiency. However, Dr. Zilva pointed out that it was not appropriate for efficiency in medicine to be defined as "the output of the largest number of results at the least unit cost in the shortest time". She quoted the dictionary definition

of "efficiency":

"the maximum output of useful work for any given input of energy"

and suggested that the emphasis in relation to laboratory tests should be on "useful work". Dr. Zilva stated that it was important that junior medical staff were advised on the need to assess the usefulness of the information provided by a test before it is requested, and to appreciate the costs incurred by their failure to do so. The information given below was used to illustrate her point:-

Unit cost of electrolyte estimation (minimum)	40p (excluding overheads, clerical work, Portering etc.etc.)
Waste if each of 30 staff asks for ONLY TWO unnecessary electrolytes per day	£24 per day
	= £8,500 p.a.

Dr. Zilva suggested that it would be more responsible to accept a high unit cost which might arise from undertaking "necessary" tests only but which would at least reduce total costs. The obvious difficulty arose in defining a "necessary" test but she felt most pathologists would know roughly the proportion of a service which is unnecessary. Her personal criterion for deciding whether a test should be undertaken, regardless of how expensive or cheap, was: will it help to get the patient back into the community, or alternatively, will it confirm that it is not possible to improve the patient's health? Dr. Zilva did not consider it appropriate to provide junior staff with a list of tests with their associated costs as this might encourage them to increase requests for a test simply because it was cheap, and discourage them from requesting another, but more useful test, because it was expensive. The true cost was relative to the value of the result produced.

Dr. Zilva was not convinced of the view expressed earlier that biochemical profiling on admission provided useful information and said that it had been shown many times to produce a very low yield of such information. She believed that profiles contributed to the proportion of tests which came within the "unnecessary" category.

Advantages of Small Laboratories

Dr. Zilva said that small laboratories could never totally eliminate the wasteful use of resources, but they could minimise this possibility. She believed that they were best able to achieve the prime functions of a hospital laboratory which were to work with clinicians towards

(a) the efficient and speedy diagnosis and treatment of patients;
(b) the use of and continued reassessment of the clinical value of established techniques
(c) the development and assessment of new techniques.

It was necessary to have a consultant opinion available in the laboratory and near the wards to achieve these aims. For example, the Consultant Pathologist had specialist knowledge which enabled him to advise his colleagues when more useful investigations should be undertaken. He was also likely to see the results of more investigations for a particular condition than any clinician ever would. Dr. Zilva stressed the importance of the consultant's educational role and said that clinical staff were still failing to ask themselves the questions put forward by Richard Asher in 1954:

- Why do I order this test?
- What do I look for in the result?
- If I find it, will it affect my diagnosis?
- How will it affect my management of the case?
- Will this ultimately benefit the patient?

The training of staff within the pathology department and the medical staff who initiated the requests was an important responsibility of the Consultant Pathologist who needed to

(a) continually reassess the clinical value of established techniques;

(b) introduce new techniques and test their clinical value before introducing them into routine use;

(c) stress the importance of quality control in relation to the clinical side, and make clinicians aware of the analytical and interpretive problems;

(d) encourage the search for new knowledge of scientific mechanisms.

Dr. Zilva assured participants that she believed that laboratories could be too small, and that automation was not all bad! National quality control schemes had shown that the average precision and accuracy of laboratories with a workload of less than 50,000 tests per annum was less good than that of larger ones. This was partly because automated equipment tended to improve analytical performance, and because a small workload did not justify the cost of such equipment. Nor was it usually economic for small laboratories to carry out a full range of tests, and staff morale and training were adversely affected if the laboratory was reduced to performing only "bread and butter" tests and had to act as a post office, packaging specimens to be sent elsewhere. Such referrals had often been shown to delay results reaching the wards. She felt that there was no easy answer to all problems.

Dr. Zilva briefly referred to the development of equipment for bedside investigations. She had reservations about such developments if they were to be

introduced on anything other than a limited scale.

Conclusion

Despite the many years over which she had advanced the "small is beautiful" theme, whilst all around were expounding the virtues of large scale automation, Dr. Zilva said she now found that the theme had become fashionable. She had noted current Departmental advocacy of small hospitals and had reservations about laboratory services being on too small a scale! Taking her earlier lower limit of 50,000 requests a year as the baseline, she now thought that "slightly larger is beautiful"!

Discussion

The main points of the discussion following Dr. Zilva's presentation are given below:

1. It was suggested that centralisation provided an important advantage in that the large scale facilities enabled routine tests to be carried out more frequently but at the same time it was possible to undertake the more esoteric investigations even if only performed once a week.

2. Dr. Zilva said that it should not be forgotten that centralisation can reduce the quality of the work undertaken, for example, it was only human nature that pathologists are liable to take less interest in specimens received from outside the hospital than in specimens from patients with whom they are familiar.

3. The view was expressed that in small laboratories the laboratory design and the way staff and apparatus was used had to be fitted into a more discriminatory approach to laboratory investigations for the patient, and the fact remained that most of the equipment currently available was not designed to be very discriminatory in the common tests.

NECESSARY AND UNNECESSARY WORK

Dr Mary Spencely, Consultant Specialist in Community Medicine, Merton, Sutton and Wandsworth AHA, said that she would be describing one of a series of studies in which she had participated from 1974 onwards, and which had been prompted by the concern expressed at the rapid and increasing number of laboratory tests undertaken. The number of bacteriology tests have followed the same general pattern and since 1959 have represented about a quarter of the total.

NUMBERS OF PATHOLOGY INVESTIGATIONS
(ENGLAND 1000's)

	TOTAL PATHOLOGY	TOTAL BACTERIOLOGY
1949	11,029	Not available
1959	16,428	4,931
1969	36,596	9,285
1970	39,422	10,061
1971	42,047	10,643
1972	44,900	11,523
1973	48,355	12,340
1974	48,732	12,437
1975	51,384	13,095
1976	55,752	14,164
1977	58,266	14,713

Concern had arisen not simply from the manpower and cost implication but because of the suspicion that not all investigations made a positive contribution to care.

The Clinical Value of Microbiological Laboratory Investigations

The study had been designed to look at the following questions:-

(1) What were the reasons for clinicians requesting tests?

(2) What were clinicians' expectations of the results, and how did these compare with the results obtained?

(3) To what extent did the result contribute to patient care?

Dr Spencely explained that as part of the information required for her project had to be obtained before the result was returned to the clinician, the study had to be limited to hospital requests for investigations. The information was obtained by interview as staff could not be persuaded to complete yet another form!
The study was based on five microbiology laboratories:-

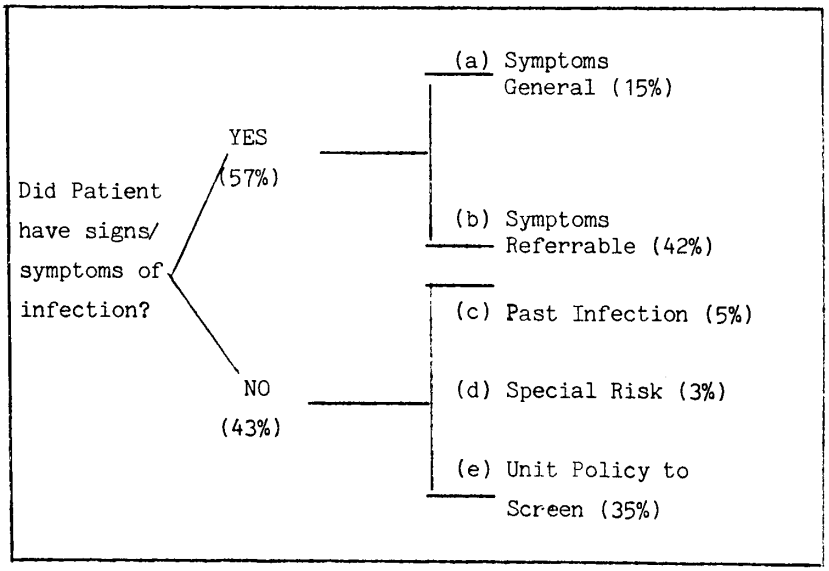
Middlesex Hospital Medical School
Central Middlesex Hospital PHLS
Devon & Exeter Hospital PHLS
Norwich PHLS
Withington Hospital, Manchester

and a sample of 1608 requests. The following table illustrates the range of requests by specimen type and specialty. Dr. Spencely drew attention to the fact that the majority related to urine and sputum.

REQUESTS : SPECIMEN TYPE & SPECIALTY

	MEDICAL	SURGICAL	OBSTETRICS	GYNAECOLOGY	PAEDIATRICS	S.C.U AND ISOLATION	GERIATRICS	TOTAL
BLOOD	62	19	-	2	12	9	14	118
URINE	185	212	63	68	36	78	97	739
FAECES	5	5	4	2	8	8	5	37
SPUTUM	121	50	1	1	-	54	12	239
CSF	12	3	-	-	8	6	1	30
PLEURAL ASP.	10	-	-	-	-	1	-	11
ABDOMINAL FL.	-	12	-	-	-	9	-	21
JOINT ASP.	1	2	-	-	1	-	-	4
EYE	-	1	17	-	1	7	1	27
EAR	2	4	-	-	-	15	-	21
U. RESP.	17	22	2	1	27	57	4	130
GENITAL	2	9	10	34	-	-	1	56
LESION/WOUND	16	90	3	11	3	41	11	175
TOTAL	433	429	100	119	96	285	146	1608

Dr. Spencely said that the fieldworker had spent three weeks with teams in each of the major specialties. The first interview was carried out when the test was ordered, usually with house staff as they were responsible for the greater proportion of tests requested. Their reasons for requesting the test were described in detail by Dr Spencely and a brief outline of the data thus obtained is given below:-



She drew particular attention to the 35% of tests undertaken as a result of a policy to routinely screen patients despite the fact that they did not display symptoms of infection. It was noted that more than 50% of the urine specimens came into this category and that the majority of routine tests were undertaken on the day of admission or the day following. Dr. Spencely raised the question of why was it necessary to undertake a routine test "on admission?" If it was to safeguard the patient, or other patients, then it should always be done as soon after admission as possible. If it was simply that advantage was being taken of the patient being in hospital to do routine screening then timing was of less relevance. It had also been noticeable that although the unit policy dictated that certain tests were to be requested daily, these tests were invariably not requested at weekends.

When staff were asked what results they expected from the tests requested the following information was obtained:

REASON FOR TEST	EXPECTED RESULT		
	POTENTIAL PATHOGEN %	NO POTENTIAL PATHOGEN %	DON'T KNOW %
(a) Symptoms General	30	54	16
(b) Symptoms Referrable	61	28	12
(c) Past Infection	13	70	17
(d) Special Risk	8	79	13
(e) Unit Policy to Screen	5	83	12

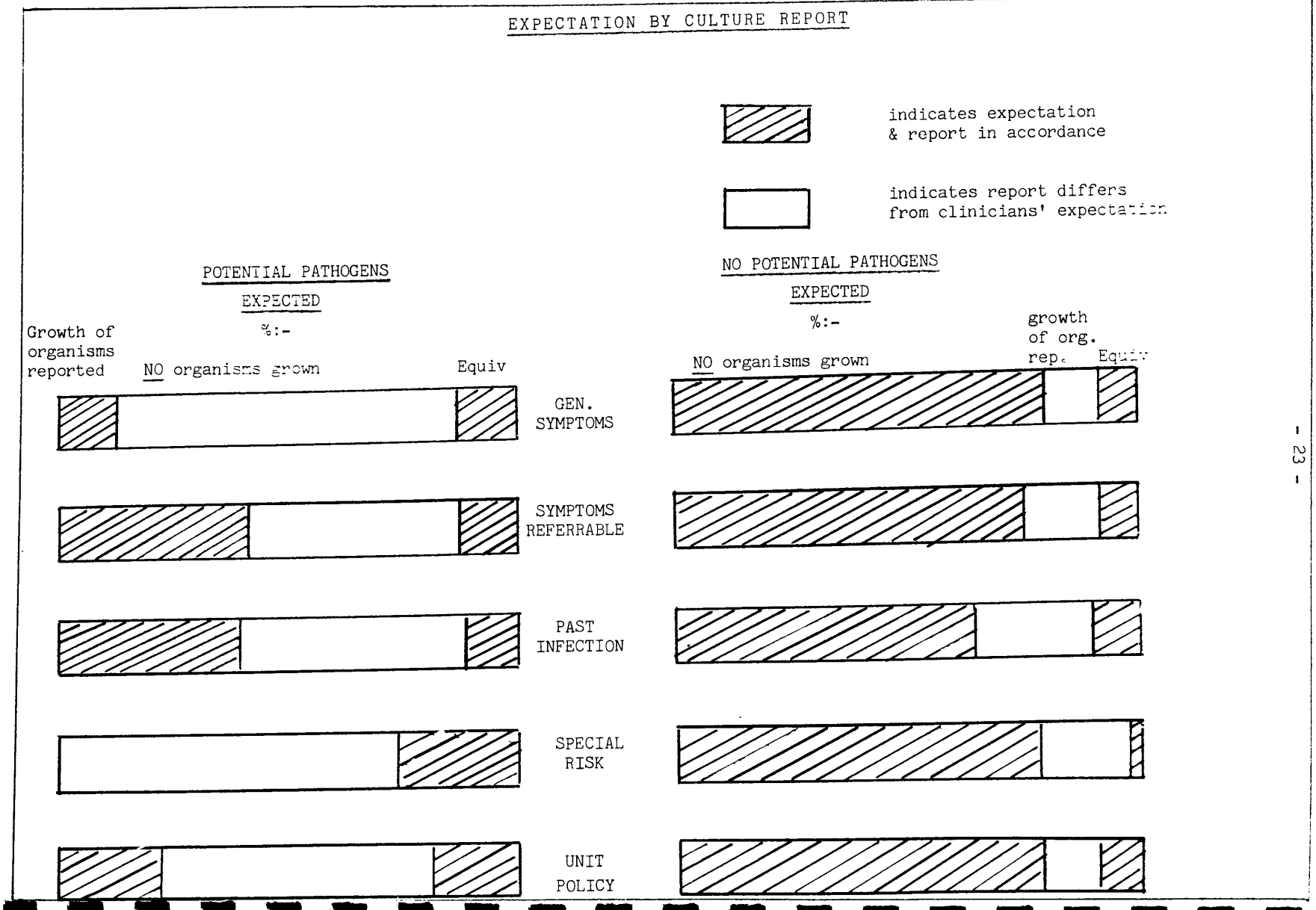
Dr Spencely drew attention to the fact that two thirds of the clinicians giving the reason of "Symptoms Referrable" expected a positive pathogen but more than half refused to commit themselves by identifying which organism they expected to grow.

When the culture reports were returned they were categorised as follows:

Named organism = "positive" result
No growth/no pathogens grown = "negative" result
Positive/Negative on same report = "others"

In trying to relate the clinicians expectations with what actually happened, it could be seen that a much higher proportion of junior staff were expecting positive organisms than was achieved by the results. The following diagram was used to illustrate this discrepancy:

EXPECTATION BY CULTURE REPORT



Following receipt of the results the clinicians were asked if they wished to repeat the test. 59% said they would not. The remainder gave the following reasons for requesting a repeat of the test:-

(i) development of new symptoms : 14%
(ii) laboratory recommendation : 3%
(iii) unit policy to screen : 25%

Of the 25% identified in (iii) above, **two thirds had** asked for a test to be repeated having received negative results initially. The remainder had shown positive results. Dr Spencely queried the usefulness of a test being repeated when the initial result had been positive.

In Dr. Spencely's research the interview concerning the contribution made by the test results to patient management was carried out with Registrars or Senior Registrars and was based on the following questions:-

(1) Did the test result confirm diagnosis?

(2) Did it contribute towards decisions about treatment?

(3) Did it contribute towards decisions about management (e.g. special nursing techniques, etc)?

(4) Did it help in any other way?

A summary of the information thus obtained is given below:

	% CONTRIBUTING			
	3 WAYS	2 WAYS	1 WAY	NOT AT ALL
(a) SYMPTOMS GENERAL	1.8	38.5	44.8	14.0
(b) SYMPTOMS REFERRABLE	6.4	36.3	44.7	11.8
(c) PAST INFECTION	2.7	27.0	56.8	12.2
(d) SPECIAL RISK	6.0	22.0	54.0	18.0
(e) UNIT POLICY TO SCREEN	0.5	16.5	51.3	31.3

Dr Spencely gave more detailed information concerning the contribution made by results in each category. She drew particular attention to the answers received to question (1) whereby categories (a) - (d) indicated that only 28% of the results failed to contribute towards diagnosis, whereas this percentage had risen to 46% in relation to tests requested as a result of the unit policy. The failure of these tests to contribute towards treatment ranged between 40-70% and even less contribution to the management of care was noted. Dr Spencely referred to the group who had replied "no" to all four questions and explained that over one third of the "Unit policy" tests were included in this category.

Conclusion

The conclusion drawn from this study was that one in five tests was considered to make no contribution at all to patient diagnosis, treatment, management or in any other way,and that these tests could be omitted without any adverse effects on patient care. A reduction of 20% of bacteriological tests annually would represent considerable savings.

Dr Spencely said that the study might have underestimated the educational value to junior medical staff of learning when tests were necessary. However, she would be more persuaded by this argument if in fact such staff were continually being asked about the necessity of tests they were requesting, and in her experience this was not happening. Nevertheless she accepted the possibility that the results of the study took insufficient account of the clinician's need to minimise the risk of infection and the reassurance value of excluding diagnoses.

Dr Spencely said that if studies of the kind she had described were to be continued, it would be of interest to concentrate upon what happens to the results. For example, do clinicians treat the many patients for whom a positive result was identified but who have been discharged before the clinician receives the result?

Finally, she suggested that the routine screening of patients needed to be subjected to further scrutiny. Furthermore an assessment made as to whether the tests currently undertaken in laboratories were appropriate if the clinician's objective in requesting such tests is simply to exclude the possibility of certain organisms.

Discussion

The main points arising during the discussion that followed Dr. Spencely's presentation are summarised below:-

1. It was pointed out that a problem frequently experienced by Microbiology Laboratories concerned the fact that up to 50% of requests are not relevant to the information the clinician is seeking to obtain. It was perhaps unfortunate that the Microbiologists concerned in the study had not been directly asked to comment on the usefulness of the tests requested.

2. It was suggested that it was extremely difficult to be precise as to the meaning of the the terms "positive" and "negative" in Microbiology. For example the so called "negative" result can be of vital importance to the management of a patient's care in relation to suspected malignancy or an infection. Dr Spencely agreed that the use of these terms was an example of the difficulties encountered as a result of the variation of reporting practices adopted in the different laboratories. For example some laboratories simply reported whatever organism was identified and left it to the clinicians to interpret the information in relation to the symptoms of the patient. In other laboratories a different practice was adopted.

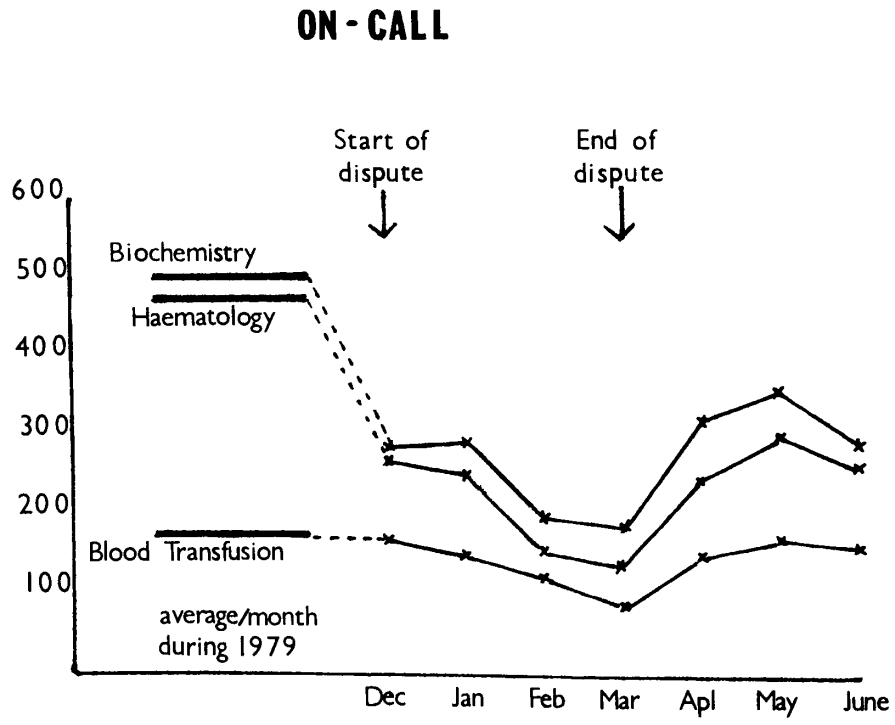
3. In answer to a question, Dr Spencely confirmed that urine specimens featured largely in the study and would have thus weighted the findings. She agreed that the urine specimens were predominantly from the Obstetric Department but pointed out that a high rate of such specimens also originated in medicine and surgery.

CONTAINING THE COST OF HISTOPATHOLOGY

Dr. Albert Hunt, Consultant Pathologist, Greenbank Hospital, Plymouth, and Chairman, Association of Clinical Pathologists' Council, explained that he would begin by briefly describing Plymouth's experience in circulating details of the usage of all emergency Pathology and subsequently talk on the subject of containing the cost of Histopathology.

1. Emergency Pathology

Dr. Hunt explained that the Plymouth District serves a population of 500,000 and has a very heavy on-call commitment. An agreement had been reached with the medical Laboratory Scientific Officers that they would be paid for on-call work per test rather than per request and that in return the clinicians would try to monitor their input. Therefore an analysis was prepared every month showing how many on-call tests had been requested by each consultant using the laboratory and a copy was circulated to each consultant. Clinicans had welcomed this information being circulated. Dr. Hunt was unable to say whether the resulting reduction in on-call requests for laboratory services could be directly attributed to the circulation of the information, but there certainly had been some change in user habit which would probably be worthy of further investigation and comparison with other Districts.



2. Cost of Histopathology

Dr. Hunt said that he was sure that all those present would agree with him that Histopathology was very different from other branches of Pathology and yet, he noted, it had been following the same general increased pattern of workload. It was almost impossible to limit the number of requests; in fact refusal to undertake requests from clinicians could in certain circumstances have legal implications. He explained that during his time with the Association of Clinical Pathologists he had been approached on several occasions by clinicians who complained that their Pathologists had refused to carry out a request. The medical Defence Unions had advised that in such circumstances the pathologist, and not the requesting clinician, would be held legally responsible in any proceedings that might occur. Dr. Hunt noted, however, that Histopathologists had more freedom than other pathologists in deciding to what extent an individual specimen should be examined. Despite this, excessive workloads posed problems in many laboratories.

2.1 The Canadian Weighting System

Dr. Hunt said that many laboratories in his Region had experimented in the use of the Canadian Weighting System for recording workloads. This had required some additional effort, but had produced useful data and he was sorry that it was not more widely adopted. Without such a system, comparisons between laboratories were made very difficult indeed.

2.2 Experience in Plymouth

Dr. Hunt said that he was always hearing it claimed that people worked much harder twenty years ago. He had endeavoured to look into this in histopathology. It was difficult to compare one laboratory with another but a study of his own department had produced the following information:-

	1960	1980
No. of requests	4200	11,500 (x 2.8)
No. of blocks cut	5100	19,200 (x 3.2)
No. of slides produced	6500	36,000 (x 5.6)
No. of technicians (MSLO) employed	2 (44 hr. week)	6 (x3) (37 hr week)
No. of doctors employed	2 + 1 junior	$2\frac{1}{2}$ + 1 junior (x 1.25)

It could be seen that the workload had trebled and Dr. Hunt commented that the number of technicians employed had failed to keep pace with the workload increase, particularly over the last four to five years. This was even more true of the doctors. The reasons for the increase in the Histopathology workload could be summarised as follows:-

1. More patient attendances
   (a) GPs able to do less
   (b) More patients seek medical help
2. Better trained consultants sought more information.
3. Peripheralisation of specialties meant that districts now tackled much more varied and complex work.
4. The changing patterns in medicine and surgery generally.
5. New techniques were continually being developed.

Dr. Hunt pointed out that, although the total number of requests had increased, the percentage distribution of the main requests remained fairly constant and the pattern of work in Histopathology had therefore not changed very much.

SPECIMEN LEAGUE TABLE

1960 (4200)		1980 (11,500)	
Uterine Currettings	882	Miscellaneous Small	2,760
Miscellaneous Small	798	Skin Biopsies	1,725
Appendices	504	Uterine Currettings	920
Other Gynae.	462	Appendices	690
Skin Biopsies	420	Prostates	680
Uteri	336	Uteri	575
	3,402		7,350
		NEW TEAMS	
		Endoscopy	550
		Contraception	500
		Cone Biopsy	100
		Renal Biopsy	50

2.3 Costs and Benefits

Dr. Hunt continued by suggesting that some consideration should be given to how much change had occurred since 1960 in relation to costs. It was clear that a laboratory could be run at very much less expenditure in £ sterling in 1960 when the salaries of technicians and doctors were compared with those currently earned. The most substantial increase in real costs, however, related to the equipment required. The same item of equipment costing £148 in 1960 would in comparative value cost £1,500 in 1980. A considerable proportion of the money spent on laboratory apparatus related to new techniques which required equipment such as fluorescence microscopes. It was estimated that 60% of the total cost of pathology laboratory equipment was devoted to the provision of occasionally used and special techniques, without which the majority of patients would be provided with exactly the same service as existed in 1960.

Dr. Hunt referred to a study undertaken concerning the early detection of malignancy which had shown that there had been only a little change in the accuracy of such detection between 1960 and 1980. Nevertheless he believed it was important to retain the use of facilities which provided this advance even though it only benefited a small number of patients.

2.4 Reducing the Costs

Dr. Hunt said that the only way to try and reduce costs of Histopathology, on the assumption that such a reduction was desirable, was to restrict laboratories to a small size. A laboratory which could only undertake 4,000 specimens per annum could not justify the expense of an electron microscope. He suggested, however, that any action taken along these lines must take into account a laboratory clinician's own job satisfaction, his need to improve the service provided and the requirement to train junior staff.

In conclusion, and referring back to Dr. Zilva's presentation, Dr. Hunt suggested that:

"Small is beautiful
Small is cheaper
but
Small is not quite/so good
Small is not so statusfying".

DETAILS OF SOME OTHER STUDIES

Dr. Iden Wickings, Project Coordinator, CASPE Research, briefly described some studies undertaken concerning the control of costs in pathology services. He emphasised that there were many efforts which had been made but he had selected studies which had tried different approaches and would also report on his own work to date:

1. Hammersmith Hospital

Some years ago an attempt had been made, based on the issuing of tokens to clinical firms, to reduce demand on the Chemical Pathology Laboratory. The idea had been welcomed by staff but did not prove practical over the longer term in limiting the consumption of resources.

2. St. Thomas Hospital

More recently the Finance Department, when setting up a new clinical budgetary system, had been particularly concerned to establish why there were large variations in pathology consumption for apparently similar firms. They had not been successful in this particular objective, but had become aware of the fact that many junior doctors were ignorent of the process undertaken in laboratories. As a consequence, if the result of a test could not be returned in less than 4/5 days, many junior doctors would send in another specimen each day until the report was received, and the demand upon the laboratory concerned was thus inflated.

3. Peter Bent Brigham Hospital

Peter Bent Brigham Hospital in Boston, USA, had undertaken a study funded by Blue Cross, in which the junior medical staff were divided into three groups:

(A) the first group was given material incentives, such as new text books, if their demands in laboratory services were reduced;

(B) the second group had their use of laboratory services reviewed regularly by the investigators, in an analysis of their patients' case notes;

(C) a third group was used as a control and simply observed.

After an initial 4 month general observation period all three groups reduced their demands to some extent in the next 4-months period. However, the groups A & C shared the same, limited, reduction, while the case note review group

showed a significant decrease, described by the investigators as 'quite dramatic'. At the end of the intervention, however, there was a drift upwards of demands again, although it did not reach earlier levels in the period being observed.

4. Johns Hopkins

The Johns Hopkins Hospital, U.S.A. changed its managerial system so that financial control became the responsiblity of the clinical heads of medical and surgical departments. The cost of services provided by radiology and laboratory services was charged to these clinical departments' budgets. In Johns Hopkins Hospital, between 15-20% of the total patient care expenditure is related to the pathology and X-ray services and until two years ago the volume was rising at about 14% per annum. Following the introduction of reporting laboratory usage (to the level of hospital ward by service and to individual clinicians), the growth rate has been reduced to 7-9% per annum. In other hospitals, the growth rate was said to have continued unchecked.

5. Westminster Hospital

Dr. Wickings described two projects he had undertaken at Westminster Hospital in response to increasing pressure to reduce expenditure on diagnostic and other services. The initial study in 1969/70 was based on the belief that if clinicians were made aware of the costs of services they would choose cheaper alternatives, and particular attention was drawn to those laboratory tests which gave comparable information at less cost. This attempt failed to achieve any statistically significant response at all.

Westminster Hospital had next participated in a project which included the incentive of giving budgets to an experimental group of clinical teams on the wards. Four of the experimental teams had reduced their bacteriology costs by amounts ranging from 13% to 55% and a further team elected to reduce its cost for immunological investigations by 67%. There had been a number of other changes not involving laboratory work.

6. Brent Health District

In a sequel to the above research in Westminster Hospital, a project was being undertaken currently in the Brent Health District. This study hoped to find out whether similar results to those at Westminster could be achieved without budgetary incentives, but as a result solely of providing clinicians with information about the comparative costs of services they and their juniors prescribed. So far it appeared that,without the budgetary incentives, the results were disappointing.

7. Planning Agreements with Clinical Teams (PACTs)

Dr. Wickings described his current research, taking place in East Birmingham, Oldham and Southend. It was intended that clinical teams would agree with the DMT a planned usage of services such as pathology, in relation to a planned workload. In some circumstances there would be budgetary incentives, and in others not. However the results of this study would not be available for some years.

8. General

Dr. Wickings said that the usefulness of much of the information provided by laboratory tests had been frequently questioned, and drew attention to an observation by Professor Vincent Marks who in his presidential address to the Biochemical Section at the British Association in 1975, said that "80% of the biochemical tests requested by clinicians provided information that is largely useless. The 'top 20' tests should more appropriately be called the 'silly 20'."

Dr. Wickings concluded by suggesting that at a time when the NHS was faced with endless demands and limited resources it was difficult for administrators to ignore the whole question revealed, for instance by Eva Lester in her article "The Machines are taking over":-

> "of 2000 inpatients who had an admission profile of 16 biochemical tests, 36% had at least one unexplained abnormal result for a test which had not been requested.
>
> ..... However, five years later, follow up of 200 of this group of patients revealed that only 3 had results indicative of presymptomatic disease, and the authors doubted the prognostic significance of early diagnosis even in these."

Dr. Wickings noted that J.S.A. Ashley had found a great range of radiological investigations for similar conditions across hospitals and he suggested that the same was true for pathology. However, Ashley had found no significant correlation between the use of pathology services and length of hospital stay and, similarly, M.H.B. Carmalt and T.P. Whitehead had found that the use of biochemical profiles had no detectable effect on length of stay. If much of the current levels of demand were unjustified, the further efforts to find ways that would encourage the selection of only useful investigations was an important priority.

GENERAL DISCUSSION AND CONCLUDING REMARKS

In opening the concluding discussion Iden Wickings said that it appeared to be the general opinion of participants that some control of pathology costs was required. It was, however, unsatisfactory to look at costs for laboratory work in isolation; for instance, the questions whether or not changes in the pattern of pathology investigation affected patient throughput or health care outcomes needed to be considered. It was also important to recognise that, although evidence indicated that a large proportion of certain types of tests was undertaken unnecessarily, it was also likely that inadequate investigation was undertaken in some other areas.

The main points of the discussion that followed are summarised below:-

1. Containing demand might be more practicable than reducing total costs.

   Some problems were identified which influenced the behaviour of laboratory staffs. For instance, the number of tests performed directly influenced the possibility of obtaining new equipment and augmenting the technicians. Technical staff numbers, in turn, affected the grading and promotion prospects of MLSOs. It was also important that the level of workload was sufficiently high to maintain staff interest, allow some specialisation, train junior technicians and also medical staff and seek for new knowledge. It was thought that, in common with other heads of departments, pathologists would be reluctant to relinquish staff or equipment even if there was a reduced clinical demand. There was usually the possibility of developing the service in some way if resources permitted. There was, therefore, little incentive for the pathologists to take positive action to achieve a reduction in demand, but more support might be gained for attempts to contain it initially at the existing level.

2. Must demands always be met?

   Varying opinions were expressed concerning a consultant pathologist's responsibility to refuse to undertake tests which he regarded as unnecessary. Dr. Hunt reaffirmed his statement that it was difficult for histopathologists to refuse such requests, but accepted that

it may be easier for other disciplines to do so. Dr. McSwiggan said that he regarded requests as a "consultation" and that it was, therefore, one of his responsibilities as a consultant to inform clinicians if he considered a test unnecessary. Other participants suggested that it should not be difficult to justify such refusals if it was known that carrying out the test would divert resources from another, more deserving, use. It was generally agreed that some small reduction in demand could be achieved by discussion and agreement with the consultants concerned and that educating clinicians and particularly junior doctors about their requests was a continual part of all pathologists' duties.

3. Growth had partly resulted from increasing specialisation

When considering how to reduce the growth rate of clinical demand it should be remembered that much of the increasing cost has resulted from the expansion in the number of clinical specialties. There had developed a comparable policy of replacing general pathologists with specialist pathologists, producing an overall growth in the numbers of non-medical graduates and senior technical staff as departments became fragmented and increased in size.

4. Budgets can be constructive and promote cost effectiveness

Dr. Brenda Slavin referred to the way budget constraints could at times prove constructive. For example, in her own laboratory the staff knew that any savings achieved could be used by the laboratory and that additional resources were unlikely to materialise. As a result they were actively seeking ways to bring about economies. She thought it essential that pathologists should retain responsibility for the budgets of their own departments.

Dr. Wickings asked whether participants felt free to manage their budget or whether they felt hindered by restrictions on the way funds allocated to a laboratory could be spent. It was noted that some pathologists did have difficulties, for example, as a result of not knowing how their budgets were compiled, or the value of their laboratory equipment.

5. The utility and dangers of standard cost statements

It was agreed that standard pathology cost statements were useful for disseminating information and making broad comparisons, such as workloads with staffing. It was noted, however, that difficulties did arise from the fact that costs did not always include the same components, for example clerical time was included in some costs and not others, at the local finance department's discretion.

6. The results of employing phlebotomists

Dr. Gerald Slavin suggested that it was too easy for clinicians to request laboratory tests and asked whether participants knew of any statistics relating the growth of tests to the employment of phlebotomists. He thought it likely that if doctors had to take blood samples the number of specimens would be reduced. However, it was reported that this had not been the experience in East Birmingham where the phlebotomists'service had been withdrawn. Initially there had been reduction in the number of specimens, but within three to six months the number had returned to its previous level.

7. Lost report forms are a major factor in wastage

It was noted that it had been found that as many as 20% of pathology reports were not reunited with the patients' case notes. It was generally agreed that pathologists should be taking some responsibility to see that either completion of request forms improved, or that tests were not carried out if the form contained insufficient detail to ensure that the result could be returned reliably to the requesting clinician.

8. Doubts about the role of the regions

Participants agreed that the method by which many regional authorities allocated capital for equipment severely disrupted the economical management of laboratories. It was felt that regions had little idea of local requirements and were unable to assess prorities for purchasing equipment. However, pathologists could not afford to bite the hand that fed them. It would be more appropriate for the entire cost of providing a pathology service, that is including the purchase of equipment, to be decided at district level. This would permit the pattern of staffing, workload and equipment provision to be adjusted locally and thus encourage a realistic planning of such a service. Despite the loss of possible economies due to standardisation

or bulk purchases, many of those present believed that such a change would overall produce better value for money, but not all concurred.

9. Features of successful attempts to control demands and expenditure

A representative from King's Health District said that he thought that the day's proceedings had not brought forth any clear solutions about how workloads might be reduced. He suggested that whilst cash limits might dictate a cutback in the staff employed, they would not control the workload.

Dr. Wickings said that it had appeared that demand could be curtailed effectively only by clinicians. In this area successes had been demonstrated by Dr. Hunt, and the studies at Westminster Hospital and Johns Hopkins Hospital, and during industrial action in several districts. It appeared, however, that such reduction of demand depended, firstly, upon a mechanism for reporting their use of laboratory services to clinicians and, secondly, upon some incentives or sanctions being involved. These could be simply the good or bad opinions formed by colleagues, or they could have financial features. Dr. Wickings said that he had gained a general impression that those present thought it was impossible to reduce the expenditure on pathology services and that authorities would be lucky if they simply managed to control it.

It was generally agreed that pathologists wanted to restrict the workload but believed that any action they could take could only result in a very small reduction within the total annual growth rate. All present concurred that the consequence was that clinicians should be made responsible for any rationing system to be introduced. Perhaps this could only be achieved by negotiating a prior agreement with each senior clinician as to his firm's consumption of pathology resources.

Conclusion

In conclusion Dr. Wickings said that general agreement had emerged that it was desirable that the decision concerning the amount of resources required for pathology services should be taken locally, in the light of demands and other pressures.

It was essential that the differences between unit costs and overall expenditure were understood because the latter was the important matter locally. Cross district comparisons of costs were sometimes useful. However, they needed to be interpreted with caution, due to variations in the methods of computation.

It had appeared that controlling rather than cutting demand must be the first aim and that, in the end, this could only be achieved by the clinicians. This, in turn, implied an information system which demonstrated to the clinicians their own levels of demand, because this allowed action to be taken and workload levels to be discussed and monitored. The only successful attempts to contain or reduce demand which had been quoted had all had these features:-

(i) feedback to clinicians showing their level of demand;

(ii) the sharing of this information with others;

(iii) a climate which encouraged self-monitoring by clinicians;

(iv) the existence of some incentives for clinicians or peer group sanctions, albeit of a modest nature.

Dr. Wickings thanked all those present for their constructive approach and the seminar ended. The CASPE representatives undertook to circulate a full report in due course.