The Pathology Services

A Management Review

The Audit Commission for Local Authorities and the National Health Service in England and Wales

NHS 33
The Pathology Services

A Management Review

LONDON: HMSO
The Audit Commission assumed responsibility for overseeing the external audit of the National Health Service (NHS) on 1 October 1990. In addition to conducting regularity audit work, the Commission is also charged with reviewing the value-for-money provided by the NHS, and to discharge this responsibility will be undertaking studies of selected health service topics each year.

The Commission has undertaken a review of the pathology services as one of its first studies. Pressures on pathology have grown steadily over the years with increasing numbers of requests for investigations, and an increasing range of investigations available. The practice of pathology has been advancing at a remarkable pace and staff within pathology departments can justly be proud of their scientific skill and competence. However, in many situations there is evidence that the application of management techniques has lagged behind the science with the result that the full benefits of the skills available are not realised. Within a cash-limited NHS, it is vital to ensure that the significant resources available to pathology are used to best effect.

This study has involved visits to laboratories in ten health authorities chosen to provide a cross-section of the NHS (north, south, teaching, non-teaching, urban, rural). All were helpful and co-operative as were all of the staff who provided advice and comment throughout the study. Discussions have been held with the Royal College of Pathologists, the Association of Clinical Pathologists, the Association of Clinical Biochemists, the British Society of Haematology, the Institute of Medical Laboratory Sciences, and other leading bodies. The review involved David Browning, Paul Durham, Freda Andrews, Penelope Eames, Brian Pereira of the Commission, and John Stilwell from Warwick University.

In parallel with the publication of this report local auditors will review each local pathology laboratory service, starting in the autumn of 1990, and will make recommendations for the way forward in each case. The Commission intends to publish a further paper, when this more comprehensive review has been completed, which will look in greater detail at the opportunities for improved performance.
# Table of Contents

**PREFACE**  
1

**TABLE OF CONTENTS**  
3

**SUMMARY**  
5

**INTRODUCTION**  
9  
— Scope of the study  
9  
— Background  
12

1. **MANAGEMENT PROBLEMS**  
15  
— Controlling demand  
16  
— Controlling resources  
20  
  Reception: workflow, timeliness and priorities  
20  
  Processing the Investigations: controlling costs  
21  
  Confused budgets  
22  
  Incremental budgeting  
23  
  Poor financial control systems  
23  
  Staff productivities  
29  
  Near-patient testing  
31  
— Staffing  
31  
  Recruitment and retention  
31  
  On call cover overnight  
32  
  Training & development  
32  
— Controlling quality  
32  
— Structuring management responsibilities  
34

2. **OPTIONS AND SOLUTIONS**  
39  
— Managing demand  
39  
  Use of aggregate data  
40  
  Protocols  
40  
  The role of the pathologist  
41  
— Using resources more effectively  
43  
  Improving workflow  
43  
  Improving control of costs  
43  
  Promoting cooperation  
44  
  An illustrative example  
44
Results
- Near-patient testing
- Tackling staffing difficulties
- Promoting quality
- Improving management structures
- Conclusion

3. IMPLEMENTING THE CHANGES
- Checklist for a pathology plan
  - Policies and strategies
  - Resource implications
  - Action points
  - Development schedule and monitoring
- Involvement of others
  - Unit general managers
  - District general managers
  - Regions
- Conclusion

REFERENCES

APPENDIX
Pathology is a clinical service which investigates and advises on the diagnosis, management and treatment of disease. It is concerned with advances in the study of disease and has a role in the maintenance of standards of care in the health service generally. It encompasses research and development, screening, epidemiology, infection monitoring, antibiotic policy, post mortems, medical audit, and education. Within this wider context, a key role is played by the pathology laboratory services which carry out investigations and tests as part of the general practice of pathology. They cost in total around a third of a billion pounds per annum, or 3% of the hospital and community services budget.

The service is facing major challenges. The number of requests for investigations has been growing steadily, and the range of diagnostic tests has been increasing. The NHS and Community Care Act (1990) will take the service into unknown territory. Within a cash limited service, all of these changes must be co-ordinated within the finance available. There are five main areas of concern:

- controlling demand
- controlling resources
- staffing
- controlling quality
- structuring management responsibilities

These problems are mostly well recognised by practitioners and there are initiatives underway to address them in some areas. But the 1990 Act provides an additional impetus for change, and a framework within which this change must occur, so that a new approach is now appropriate.

The demand for pathology investigations is complex and is affected by types of clinical specialties served, numbers of clinicians, and different clinical practice. However, there is evidence that different doctors, presented with similar patients, make different demands on pathology services. Some may be underexploiting the potential of the service; others are almost certainly using resources wastefully.

It is generally accepted that pathologists should play a role in monitoring demand, advising clinicians on ways of using the service more effectively, either by curtailing inappropriate demand or increasing inadequate demand. However, except in a few departments, pathologists do not have sufficient information to fulfil this role effectively. They need to develop robust ways of monitoring demand, and feeding the results back to other clinicians. Guidelines or protocols could also help the discharge of these responsibilities, and the Commission plans to work with the Royal College of Pathologists to assist with the development of such an approach.
Once a clinician decides an investigation is necessary, a written request together with a specimen is sent to the laboratory, processed, and a report of the result with appropriate interpretation and advice is returned to the requester. Often transport arrangements delay this process, and distort workflow planning within the laboratory, creating inefficient peaks and troughs with an impact on productivity.

Within the laboratory itself it is important to make best use of resources. However, the tools for controlling resources need improving. At present there is no single budget, with capital and medical pay being controlled separately (although this situation will be resolved with the introduction of the new Act in April 1991). Moreover funds may come from separate sources (universities, the Public Health Laboratory Service). Accounting systems monitor resources used (staff, telephone, etc) but do not ascribe these resources to patterns of use (investigations or other pathology activities such as teaching).

Evidence collected for the study, using a costing model developed by the Commission, suggests that there are very significant variations in productivity and costs per test from one laboratory to another. Economies of scale, especially for the less common investigations, are clearly available. There are, therefore, opportunities for significant savings through improved productivity, increased co-operation between laboratories and rationalisation of laboratory capacity.

Staffing difficulties must also be addressed – particularly where there are recruitment and retention problems. Recent Whitley Council initiatives give greater flexibility. It is now up to management to make appropriate use of the local discretion available.

The overall emphasis must be on the maintenance of quality. Quality can often be too narrowly defined and equated with accuracy. There are effective schemes in place to monitor accuracy, but the concept of quality must be widened. It should encompass demand management, resource utilisation, speed of response and the interpretation, as well as the presentation, of results.

Producing this synthesis is the challenge confronting pathology management – but too often management structures are confused, with a lack of clarity about who is responsible for managing the service. There must be clear lines of accountability to ensure that the management challenges can be met.

The best way forward for managers will be to develop a pathology plan, by reviewing user needs and current arrangements for meeting them and then setting out policies and strategies, calculating resource implications, and determining a schedule for change. In this way the challenges can be addressed in a systematic fashion.
THE SCOPE OF PATHOLOGY

Pathology is a clinical service which encompasses a wide range of activities, with a central role played by laboratories.

THE LABORATORY

Requests from users are investigated and a consultative report prepared.

Users
- Clinicians
- GPs
- Others

Investigations
- Work Stations
- RECEPTION
- REPORTING

Users
- Clinicians
- GPs
- Others
SCOPE OF THE STUDY

1. Pathology is a clinical service which carries out investigations on specimens from patients as an aid to the diagnosis, management and treatment of disease, and provides specialist interpretation and advice. Pathologists are also involved in population screening for disease. Pathology staff contribute to advances in the study of disease and its diagnosis and have a role in the maintenance of standards of care in the health service generally. The service encompasses a wide range of related activities including research and development, epidemiology, infection control, post mortems, medical audit and education, blood transfusion and the direct clinical care of patients in certain circumstances.

2. Within this wider context, a key role is played by the pathology laboratory services (Exhibit 1). They carry out a wide range of investigations including the examination of cervical smears and biopsies for cancer, blood grouping and cross-matching for transfusions, investigation of patients infected with bacteria such as listeria or salmonella and viruses such as the HIV and biochemical tests for the diagnosis of a host of different conditions. The service is at the heart of the development of modern scientific medicine (ref 1).

3. The practice of pathology has become steadily more diverse and complex. Currently there are four major departments in most laboratories, with a number of subspecialties (Exhibit 2 overleaf). The four main specialties are described in Box 1 (overleaf). Many of the services provided by pathology such as the clinical management of patients, infection control and post mortems fall more within the scope of clinical audit, and have been excluded. The study has been focused on the processing of specimens, though of course this must be seen within the wider context of pathology as a whole.

4. Over the years, the range of investigations available, and the number of requests for them have grown steadily. The technology available has been increasing in sophistication and cost with significant advances in automation, mainly in clinical chemistry and haematology, and the introduction of test kits for many investigations. All of these developments have taken, and will continue to take place within a cash limited National Health Service (NHS). If these technological and demand pressures are to be effectively contained within a budget ceiling, it is vital to ensure that the significant resources available are used to best effect. Advances in the theory and practice of pathology must be matched by corresponding improvements in management techniques and expertise.
THE EVOLUTION OF PATHOLOGY
As medicine has grown more complex, pathology has become more specialised.
BOX 1: MAIN PATHOLOGY LABORATORY DEPARTMENTS
Most pathology laboratories have four main departments.

<table>
<thead>
<tr>
<th>SCOPE</th>
<th>IN THE LABORATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemical Pathology/Biochemistry</strong></td>
<td><strong>The Biochemistry laboratory is characterised by the utilisation of a wide variety of techniques and equipment. A large proportion of the work is processed by automated analysers which are very advanced, require maintenance and are capital intensive.</strong></td>
</tr>
<tr>
<td>Chemical pathology is concerned with the diagnosis and prognosis of disease and with patient management through the analyses of body fluids and tissues for specific constituents. Practice of the subject requires a knowledge of chemistry, biochemistry, physiology and molecular biology. It is increasingly concerned with major screening programmes of neonates and adults. Consultants in chemical pathology are also frequently involved in direct patient care and together with clinical biochemists in the investigation of disease processes.</td>
<td></td>
</tr>
<tr>
<td><strong>Haematology</strong></td>
<td><strong>Work in the laboratory includes such activities as counts of red and white cells, haemoglobinopathy screening of ethnic populations, vitamin and iron assays concerned with blood formation, coagulation testing, and the grouping, screening crossmatching and issue of blood for transfusion. Large automated analysers are used for blood cell counts.</strong></td>
</tr>
<tr>
<td>Haematology is concerned with diseases of the blood and blood forming tissues. The consultant has full clinical responsibility for many of the patients with haematological disorders (e.g., leukaemia, haemophilia, sickle cell anaemia) and may specialise in blood transfusion medicine. Haematology includes hospital blood banking.</td>
<td></td>
</tr>
<tr>
<td><strong>Microbiology</strong></td>
<td><strong>Bacteriology is the largest part of microbiology, typically involving the culture of the specimen on 'agar' plates containing a culture medium. If a growth is observed, the organism is identified (often through a microscope) and sensitivity to different antibiotics is then tested. The scope for automation is limited.</strong></td>
</tr>
<tr>
<td>Microbiology is concerned with the diagnosis of disease and management of patient care through the identification and study of organisms or by the body's response to infection by examination of samples of urine, blood or other infected samples together with advice on management of infective diseases, including policy on the use of antibiotics and surveillance of disease in the community. (see ref 2)</td>
<td></td>
</tr>
<tr>
<td><strong>Histopathology</strong></td>
<td><strong>Within the histopathology laboratory the pathologist prepares the sample for investigation. It is fixed and embedded in wax by an MLSO who then takes thin sections, and prepares and stains a slide, ready for interpretation by the histopathologist using a microscope. There is limited scope for use of automatic equipment.</strong></td>
</tr>
<tr>
<td>Histopathology is concerned with the diagnosis and management of disease through study of cellular changes in tissues. It is also concerned with correlation of the changes with the clinical features of the disease and general advice on management and screening services involving examination of tissue samples.</td>
<td></td>
</tr>
</tbody>
</table>
BACKGROUND

5. There are about 1200 National Health Service (NHS) laboratory departments in England and Wales, with a minimum of four (one for each main speciality) in each health district. They employ some 23,000 staff (tables 1 and 2) and cost over a third of a billion pounds per annum to run or 3% of the total hospital and community services budget. This proportion does not appear high by international standards, although it is difficult to make such comparisons because the practice of pathology varies between countries. (A direct comparison between similar sized teaching hospitals in the USA and England revealed pathology costs in the American hospital are close to the entire budget for the English hospital).

Table 1
PATHOLOGY
Whole time equivalents, March 1990 – except medical staff

<table>
<thead>
<tr>
<th>Medical staff (Sept 1989)</th>
<th>2476</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemists</td>
<td>1371</td>
</tr>
<tr>
<td>Medical Laboratory Scientific Officer, Grade 4 (MLSO 4)</td>
<td>619</td>
</tr>
<tr>
<td>MLSO 3</td>
<td>5057</td>
</tr>
<tr>
<td>MLSO 2</td>
<td>3204</td>
</tr>
<tr>
<td>MLSO 1</td>
<td>5585</td>
</tr>
<tr>
<td>MLSO Trainees</td>
<td>1572</td>
</tr>
<tr>
<td>Medical Laboratory Assistants MLA</td>
<td>3000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>22884</td>
</tr>
</tbody>
</table>

Source: Department of Health

Table 2
PATHOLOGISTS BY SPECIALITY
Whole time equivalents, September 1989

<table>
<thead>
<tr>
<th>Consultants</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haematology and Blood Transfusion</td>
<td>393</td>
</tr>
<tr>
<td>Chemical Pathology</td>
<td>157</td>
</tr>
<tr>
<td>Histopathology</td>
<td>559</td>
</tr>
<tr>
<td>Microbiology (including Virology but excluding PHLS staff)</td>
<td>256</td>
</tr>
<tr>
<td>Other</td>
<td>54</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1419</td>
</tr>
</tbody>
</table>

Source: Department of Health

6. Spending has been rising gradually, both in real terms (Exhibit 3) and as a percentage of the budget (Exhibit 4); but this rise has been less rapid than the rise in numbers of requests so that the average cost per request has fallen in real terms. The interrelationship between pathology spending and total health care spending is complex – with new investigations sometimes reducing spending elsewhere. For example the introduction of fine needle aspiration in thyroid disease has reduced the number of thyroid operations.
Exhibit 3
PATHOLOGY EXPENDITURE
Spending has been rising in real terms...

Exhibit 4
EXPENDITURE AS A PROPORTION OF HEALTH AUTHORITY EXPENDITURE
...and as a proportion of total health authority spending.

Source: Health Service Annual Accounts. Data indexed to 88/89 using the Hospital and Community Health Service Revenue (pay and price) Deflator.

7. The NHS and Community Care Act (1990) will alter the environment within which pathology services operate in a number of important respects, making it even more necessary to ensure that the service is effectively managed. In future there will be a range of purchasers of services who will contract with providers.

— District Health Authorities (DHAs) – who will contract for patient services for their resident populations from directly managed units and/or NHS Trusts, which will contain pathology services.

— GP Fund holders.

— Other agencies (for example, the private sector).
8. The Department of Health has advised that DHA contracts are not likely to specify levels for laboratory services, except in relation to direct access for GPs who are not fund holders. The level of laboratory services will be matters for discussion and negotiation within provider units/NHS Trusts as they develop their own plans for the management and development of their clinical services. These plans will cover laboratory services to hospital clinicians within the provider unit/trust as well as services – provided on a sub-contract basis – to laboratories in other units/trusts (other pathologists etc). These two sets of negotiations (internal and external to the unit) are likely to be main pressures for efficiency.

9. The report has three chapters. Chapter 1 describes in detail the management problems confronting the pathology services. Chapter 2 outlines possible options and solutions for tackling them. Chapter 3 puts forward proposals for implementing change.

10. The issues described are well known to practitioners. Previous attempts to tackle them have met with varying degrees of success (ref 3). The recent NHS Act provides an impetus for promoting change, and a framework within which this change must occur – requiring a new initiative.
If the flow of investigations through laboratories is to be well managed, attention must be given to each stage of the process. The management problems confronting the service are therefore reviewed in a sequential way, using the model of Exhibit 1, with five elements identified (Exhibit 5) in turn:

1. controlling demand
2. controlling resources
3. staffing
4. controlling quality
5. structuring management responsibilities

Exhibit 5
STRUCTURE OF THE STUDY
The flow of requests through the laboratory has been used to provide the structure for the issues addressed in the study.
CONTROLLING DEMAND

12. On all sites visited, provision of the scale of services requested within existing budgets was reported to be difficult. Certainly, the number of requests from doctors has been growing in all branches of pathology in recent years (Exhibit 6). However, in practice, the number of requests is a poor measure of workload. The implications of each request may vary considerably, from a simple test on an automated analyser to a long complex series of investigations requiring much time and skilled effort. There is wide variation between districts in the pathology expenditure per head of population (Exhibit 7), partly because hospital (and hence laboratory) catchment areas do not coincide with district boundaries, and also because the scope of different departments varies with teaching hospitals undertaking a wider range of activities. But different clinical practices almost certainly have an impact too.

Exhibit 6
REQUESTS FOR LABORATORY INVESTIGATIONS
The number of requests for investigation has been growing...

Note: Histopathology excludes cervical smears. The unit of measurement changed in 1987 to be more specifically defined as a patient request i.e everything requested on a patient at one time from one department.

Source: Department of Health Form SBH6

Exhibit 7
PATHOLOGY EXPENDITURE, 1988/9
There is wide variation in the amount spent by each authority

Source: Department of Health Performance Indicators
13. Analysis of the demand for pathology investigations is complex, since it can be affected by:

- the types of clinical specialties served and the numbers of clinicians;
- the numbers and types of patients treated; and
- different clinical practice within a specialty for a given condition.

14. Fluctuations in the pattern of demand can also be caused by changes in NHS policy. The new GP contract provides a case in point, with targets set for increased numbers of cervical smears, for example. A survey in April 1990 (ref 4) has shown that the numbers of cervical smears referred in the first three months of 1990 for cytological analysis were over 20% higher than the same period in 1989 with nearly all laboratories reporting an increasing workload.

15. Against this background it is important that all requests should be appropriate. There is concern among both pathology staff and user clinicians, supported by published literature (reviewed in ref 5) that a proportion of investigations may not be cost effective in terms of patient care, adversely affecting morale and wasting resources ('over utilisation'). This concern applies mainly to certain more common tests, such as blood counts, routine chemical pathology tests, and tests for bacteria in urine for example. Reasons cited include:

(i) Pressures to increase testing. Inexperienced junior doctors may make inappropriate requests to prepare for ward rounds. There is seldom a penalty for requesting too many tests, while requesting too few can leave them exposed. Also, some doctors mention an increasing fear of litigation.

(ii) Repeat testing. Where results are not returned promptly or are lost, repeat tests are ordered – increasing the cost. Where tests patients are referred on (from GP to consultant) results may not be forwarded and may thus be repeated unnecessarily.

(iii) No charge to users. Pathology is a "free good" to clinicians and GPs, and there is no limit on the number of tests they can request. There is no cost to the requesting physician, in terms of money or effort. (Interestingly, where samples are difficult to obtain – eg most histopathology samples – unnecessary investigations are not considered a concern).

16. It should also be recognised that there are circumstantial factors that could depress demand ('under-utilisation'). If the department is inaccessible for whatever reason (poor transport, inadequate procedures, etc) there may be a tendency for doctors not to order tests which they might otherwise have wished to see done. Finally there is the problem of mis-utilisation – the misapplication of the test procedure.

17. In practice the overall impact of these factors on demand is impossible to evaluate and quantify. But there is evidence (albeit limited at this stage) that there is considerable variation in the number of tests ordered by different doctors in similar situations. This is true both of general practitioners and of hospital consultants. Pathologists are aware that practices vary considerably, but there is no systematic evidence of the extent of the variation, and laboratories do not often attempt to monitor in a systematic way the sources of requests for investigation which reach them. Sample data checks were undertaken for the purpose of this study to highlight variations in
demand by GP and by consultant firm, in this case cardiology. Some consultant firms appear to order seven or eight times as many test sets per bed day as others. And among GPs the number of requests per year per hundred patients varies similarly, from 1 to 8 or 9 (Exhibit 8).

Exhibit 8
VARIATION IN REQUESTING PATTERNS
There is wide variation in the use of pathology between specialties as might be expected...

Source: Audit Commission analysis.
18. This evidence does not, of course, necessarily argue that aggregate demand is too high. Low ordering GPs or consultants may not be getting the full benefits of the services which pathology laboratories can offer them. There may be very good reasons in some situations for these wide variations which may result in part from differences in case mix. But other research shows that there remains considerable variation even after adjusting for case mix (Exhibit 9). And there must be grounds for concern when information about demand is not consistently available either to the users or to pathologists. Much of it is collected but is not available in a form that is easily used. This means that pathologists themselves have no opportunity to identify abnormal usage patterns or to provide advice to doctors whose behaviour appears to be significantly outside normal practice.

*Note: Surgeon E did not perform any inguinal hernia repairs

Source: Nightingale, Gama, Peters, Broughton and Ratcliffe 'Towards Improving Laboratory Usage', Wolfson Research Laboratories (ref no.6)
CONTROLLING RESOURCES  
RECEPTION: WORKFLOW, TIMELINESS AND PRIORITIES

19. Once made, the request for an investigation passes with the sample to the laboratory or department reception. Much of the work arrives in batches which can shape the pattern of the day (particularly in haematology, chemical pathology and microbiology, less so in histopathology). This can mean that transport arrangements and portering services on site dominate the pattern of workflow and affect the timeliness of response.

20. It is important that all stages in the process are handled expeditiously. However, laboratories usually only have control over the analysis stage of this process (Exhibit 10) – although where there is a phlebotomy service, blood samples are collected directly from patients by laboratory staff; and where significant abnormal results are found, reports are often made by laboratory staff to the ward or surgery over the telephone.

Exhibit 10  
REQUESTING PROCESS

21. So to ensure a timely service it is not adequate to focus exclusively on the speed of laboratory processes. A wider perspective requires transport arrangements to and from the laboratory to take account of the needs of users and the laboratory.

22. Transport is not often controlled directly by the pathology laboratory. It frequently causes bottlenecks. Specimens are delayed between patient and the laboratory door, reports are delayed or even lost on return, and samples arrive to suit the transport schedules rather than the laboratory. The worst case encountered has resulted in a small "hot" laboratory for urgent tests being set up 300 yards from the main laboratory at considerable cost because of inadequate arrangements for transferring samples over this short distance.
23. Also, to be efficient and ensure full use of staff and equipment, work must be scheduled in a smooth flow. This flow must also take account of when results are needed, and a balance must be struck between speed of response and full utilisation of staff and equipment. It is always possible to make better use of staff time by holding work back to fill slack periods; conversely a short response time may only be achievable by having sufficient staff to meet peaks in demand, at the cost of idle staff at other times – reducing productivity. The impression gained (although further analysis is required) is that departments tend to provide good response times at the expense of productivity.

24. One way of balancing these conflicting requirements is to prioritise work, since users have different needs (see Box 2). All laboratories are able to give priority to very urgent specimens and specimens that deteriorate. But it is less common to find less urgent requests scheduled to allow active management of troughs in demand.

25. From reception, samples then flow to the appropriate workstation for investigation.

Box 2: VARYING PRIORITIES

Different settings generate different workloads with different priorities.

— Acute Hospital Users – treating emergency admissions, performing major surgery, and treating severe medical conditions. Clinical users typically require a wide range of tests, and a turnaround time for most tests of 4 to 6 hours in order to aid diagnosis, monitor progress of disease and treatment and improve bed usage. An emergency service is required out of normal hours with the capacity to provide a response within an hour.

— Chronic Hospital Users - treating the chronically ill and long stay patients. Typically they make relatively light use of pathology services and request a narrower range of tests. They make little use of any emergency service and therefore typically require results on the next day.

— General Practitioners, who make use of a narrower range of tests than acute hospitals. Generally results are required within 2 to 3 days. A consultative service can be of great importance in interpreting results, and unexpected and significant abnormalities must be, and usually are, reported by telephone. Use is likely to increase particularly due to government initiatives on health screening.

— Hospital Out-patients and Clinics. A large and increasing user of services, particularly with the tendency to treat more patients as out-patients. A wide range of tests is required, but a turn round time of only a week is usually sufficient except in the case of test dependent clinics, such as those for anticoagulation therapy, diabetes, radiotherapy and medical oncology, for example.

PROCESSING THE INVESTIGATIONS: CONTROLLING COSTS

26. Fundamental to the efficient and effective use of resources is a knowledge and control of costs. However, there is little or no information available to laboratories about costs or
productivities of workstations. Significant weaknesses in the budgeting and accounting procedures are evident, preventing good control:

— budgets are not comprehensive and are fragmented between separate budget holders; expenditure within budget cannot be vired between headings;

— budgets are determined in an incremental way;

— financial control focuses on inputs and does not provide any insight into how well resources are being used;

CONFUSED BUDGETS

27. Estimation of the full cost of the pathology service is not straightforward. Historically, there have been at least three separate budgets which may have different budget-holders. The three budgets cover:

— capital

— medical pay

— non-medical pay, consumables and overheads

Large sites are even more complex with revenue and capital provided from a variety of different sources. There may be additional funding from universities for teaching and research, and for microbiology from the Public Health Laboratory Service (Exhibit 11), and capital equipment may be funded from research grant. In the extreme it is possible, at least in theory, for staffsalaried by the PHLS to be working in university buildings on NHS work using equipment funded by research grants.

Exhibit 11

FRAGMENTED BUDGETS

Funds in 1988-89 came from various sources, and there were a variety of budget holders.
28. At present, these budgets are not managed or monitored together so it is difficult to calculate and monitor the full cost of the service. Capital is treated as a “free good”, with little monitoring of its use and no inclusion of the costs of depreciation of capital equipment in budgets. Decisions based on partial information could have a distorting effect on decision making.

29. Exhibit 12 (overleaf) shows the full costs of laboratory departments on one site compared with the costs usually appearing on laboratory budget statements showing that these statements significantly under-estimate the full cost of the service. Under the NHS and Community Care Act (1990) both capital charging and medical pay will be included in unit budgets from 1 April 1991.

30. The first step in the cost review process therefore involves building up total budgets for each department. As would be expected, the contribution of the different components of cost vary significantly across sites (Exhibit 13 overleaf), because of the different mixes of activity.

INCREMENTAL BUDGETING

31. The different budgets and different mixes of activity between departments have been established incrementally rather than in any planned way. Pathology, like most of the NHS, relies on incremental budgeting with small changes at the margin each year. Budgets are based upon previous years’ expenditure adjusted for inflation. Small sums may be negotiated for additional activities, or removed for efficiency savings. Incremental budgeting can provide an environment in which efficiency is less important than the winning of additional resources in the annual budget round. Reinforcing this is the lack of incentives to increase efficiency as those who make savings rarely reap the benefits. The ”reward” for initiatives to increase efficiency and productivity is that resources are taken away.

POOR FINANCIAL CONTROL SYSTEMS

32. Once total budgets have been calculated, the second step in the cost review process is the division of the budgets between different activities. First, the cost of activities not directly related to investigations, such as teaching, must be separated. The Royal College of Pathologists has proposed (ref 7) that such activities should be funded separately as part of a “core component”. The core component in teaching hospitals could be quite large. Investigations should then be costed and funded either en bloc as at present (“primary funding”) or individually from clinical budgets (“secondary funding”). The Commission endorses this separation of core costs from the cost of investigations in order to ensure that comparisons can be made between departments on an equal basis.

33. However, the separation of costs in this way, and indeed the apportioning of the remaining budget to give the costs of individual investigations is seriously hampered by the way information is recorded. Accounting procedures are designed to control the cost of inputs, not activities. Specific sums are budgeted each year for staff, reagents, telephone calls etc., and provided that these budgets are not overspent, all is considered to be well. While this approach avoids overspending, it does not give any insight into how well resources are being deployed. It
**Exhibit 12**

**TOTAL COSTS OF PATHOLOGY**

Excluding certain costs may have a distorting effect on decision making

![Graph showing total costs of pathology](image)

*Note:* Key also applies to Exhibit 13

*Source:* Audit Commission analysis of costs of pathology on a site with Biochemistry, Haematology, Microbiology and Histopathology departments.

---

**Exhibit 13**

**THE COMPONENTS OF COST**

There is significant variation across sites

![Bar charts showing components of cost](image)

*Note:* Excluding overheads and figures for sites B and D where data were not available

*Source:* Audit Commission analysis
can lead to inflexibility, since it is sometimes difficult to vire funds between heads of expenditure to get better use of resources to meet changing needs.

34. Given the lack of procedures for providing activity-based information, and the consequent lack of accurate information about the cost of investigations, with the inappropriate inclusion of some costs (e.g. teaching) and exclusion of others (e.g. capital) it is impossible to compare costs between departments in a meaningful way at present. This in turn inhibits the development of benchmarks and sensible cross-purchasing strategies between laboratories.

35. The reasons for slow progress in the development of financial control systems are as follows:

— there is limited incentive to develop costing systems at present since decisions about the use of the service are not based on cost (although this situation is now changing);

— there is a lack of local financial expertise and guidance to build costing systems. Costing seems to have advanced furthest where both the local accountant and pathology management have shown an interest;

— there has until recently been a lack of consensus on how to measure workloads;

— the large number of different investigations acts as a deterrent since a costing approach is thought to be too complex;

— separate budgets mean that there is a tendency to monitor only the part of the expenditure for which the laboratory is accountable.

36. The NHS and Community Care Act (1990) is intended to promote greater cost awareness, and inter-laboratory cooperation is likely to increase. Laboratories are seeking extra sources of revenue, with guidance issued by the Department of Health (ref 8). All of this activity must be based on a clear understanding of costs, since prices must at least cover costs. Where prices are based on the components currently included in laboratories’ budget statements, this may not happen. It would be unwise for laboratories with poor knowledge of their costs to seek additional work. At present some investigations referred to the private sector are subcontracted back to other NHS laboratories and it is unclear whether total costs are recovered.
37. To overcome the current preoccupation with measuring inputs and to calculate the cost of individual investigations there is a need to establish management accounting systems which link resources with activities rather than with inputs (Exhibit 14). The Commission has developed its own costing approach based on past work (ref 9) which builds up costs from the individual components shown in Exhibit 15. It also allows the component elements of each cost to be displayed and compared with the averages for other sites (Exhibit 16). To cost staff time, the WELCAN system has been used (Box 3). The analysis of costs in this way then starts to reveal a number of patterns.

**Exhibit 14**

**CHANGING THE ACCOUNTING APPROACH**

There is a need to establish a management accounting system which links resources with activities rather than with inputs...

![Image](image-url)

**Exhibit 15**

**COSTING INVESTIGATIONS**

...building costs from all individual cost components directly related to investigations...
BOX 3: WORKLOAD MEASUREMENT

A key factor which has held back the development of workload measurement and subsequent evaluation of costs and productivities has been the lack of a widely agreed means to measure workload. In the past laboratories measured work in terms of requests, defined as all the tests requested of a department by a clinician during one visit to a single patient.

The request has been the main measure for many years and was adopted by the Korner review of information systems in the NHS in the 1980's. However, its use is limited since it does not take account of the amount of effort expended in performing an investigation. This can vary considerably from a single quick automated test to a multitude of different complex sequential investigations. If the mix of work varies across sites it is therefore difficult to compare performance.

The Welcan system is an attempt to get over many of these problems. Developed initially in Canada, and then adapted for use in Wales, it provides standard times for carrying out specific procedures or tests (ref 10). The item for count could be a slide, a test or a specimen. The workload can then be obtained by multiplying the number of items by the unit value in minutes. The problem of how to allow for the amount of effort involved in processing work is therefore addressed. The Royal College of Pathologists together with other pathology bodies has taken the Welsh initiative further, and a working party has developed a set of standard Welcan measures.

There are problems in applying the system in situations where initial findings generate further investigations. It is impossible to anticipate when this will occur, and hence when extra time will be required.

The unit values include work performed directly on samples by MLSOs, MLAs and secretarial staff. They do not include time for annual leave, training or management, nor the time of medical consultants or other scientific staff.

The Commission’s costing methodology includes the use of standard Welcan together with other factors.
38. Capital costs show significant variations between departments. For example where numbers of tests carried out are few, the capital component can be high because the equipment is operating at levels far below the optimum (Exhibit 17). The costing approach can be used to

Exhibit 17
CAPITAL COST PER TEST
The capital component for low volume tests may be well above the minimum.

Source: Audit Commission analysis
calculate equipment utilisation, comparing time utilised (number of tests multiplied by time per test) with the time available.

39. Considerable benefits can be derived from the use of total costings analysis. Exhibit 17 shows that the capital cost per test falls rapidly with utilisation. Cooperation between neighbouring authorities when considering provision or replacement of capital-intensive facilities could generate options which produce significant savings. Regional Scientific Committees have a clear role in using such data to promote the best use of capital.

40. Staffing costs show similar variations. Tests which are less common can take significant staff time. The staff cost component of these tests make up a large element of the total costs, while more routine tests can be relatively cheap. This point is illustrated using the WELCAN figures to compare the percentage of tests carried out at different workstations in a chemical pathology department, with the percentage of staff time spent doing them (Exhibit 18).

STAFF PRODUCTIVITIES

41. The costing approach can also be used to work out staff productivities. Thus the productivity of a workstation is the ratio of the product of investigations done and their

Exhibit 18
RELATIONSHIP BETWEEN TEST NUMBERS AND STAFF TIME
Tests which are low in number can take significant staff time and therefore have high staff costs.

Source: Audit Commission analysis of a biochemistry department in an NHS hospital.
WELCAN values to the amount of staff time available. In practice productivities are found to be very variable, being high on high volume, automated workstations, and sometimes low on other workstations (Exhibit 19).

Exhibit 19

PRODUCTIVITIES

Productivities vary considerably between sections.

Source: Audit Commission analysis.

42. However, some care is needed when interpreting these results as WELCAN times may not always be appropriate. Thus the values used in the cytology screening example may be too low because of particular local complexities; and conversely the values used in other sections (the automated section for example) may be too high, giving productivities which appear to be in excess of 100%. A number of laboratories are adopting their own times that are lower than the WELCAN values (which can err on the generous side) giving more meaningful productivity values. Conversely, times above WELCAN values should be permitted where there are sound reasons for doing so, although such reasons may need to be subjected to clinical audit. There may be a need to review WELCAN as experience is gained with their use.
NEAR-PATIENT TESTING

43. There are problems with pathology investigations carried out outside the laboratory. New equipment and chemical kits are being developed which allow doctors to perform tests for patients at the hospital bedside or in the GP's surgery. Some biochemistry, haematology and microbiology tests can be carried out in this way. The extent of near-patient testing is difficult to measure directly as there is no requirement at the moment to register equipment and its use, although there seems to be more awareness of hospital-based activity. While the extent of the activity is uncertain, where testing does occur there are a number of possible problem areas, with significant implications for the practice of pathology:

— **Quality.** There is a growing worry, both in the laboratory and among users, that clinicians and nurses are taking over near-patient testing with insufficient knowledge about the equipment to buy, its use and maintenance, the provision of adequate quality control, and how to interpret results.

— **Safety.** There is concern about the safety of staff working without correct training with samples which could be potentially hazardous.

— **Economics.** There is concern that near patient testing is more expensive and duplicates work being done in the laboratory.

— **Strategy.** Local testing is carried out on a piecemeal basis with no coherent strategy or policy to minimise costs and ensure quality

— **Effect on Laboratory Workload.** Near-patient testing could affect the pattern of work requested from laboratories. For example in one hospital infection screening of urine is done by multisticks, which include screens for pus cells and presence of organisms. These are provided to wards with the result that the number and proportion of samples sent to the microbiology laboratory producing a negative result has decreased. However, near-patient testing could equally lead to increases in workload, with abnormal results being referred to the laboratory.

STAFFING

44. Planning the provision of capital equipment and the throughput of work are important first steps. However, pathology is very largely a people business. MLSOs account for around half of total costs and undertake the bulk of the routine analysis work in Microbiology, Chemical Pathology/ Biochemistry, Haematology and Cytology. They also carry out the preparation work in Histopathology. Using and developing staff to their full potential is therefore an important management task. However, staff appraisal systems are uncommon.

RECRUITMENT AND RETENTION

45. Both management and staff in the service accept that there are important staffing problems to resolve particularly in recruitment and retention:

(i) The ability to recruit differs widely, of the sites visited the vacancy rate varied between 19% in the South East to 6% in the North;

(ii) There is some evidence of greater problems in histopathology and microbiology, which could be related to the limited opportunities for on-call work in these areas;
(iii) Some sites are still keen to recruit graduates, partly because in some cases, they may be easier to train. But they are often harder to retain because their pay and promotion expectations tend to be higher:

(iv) The percentage of the total workforce leaving varied widely between districts. Some MLSOs interviewed mentioned pay and limited promotion prospects in particular as important factors affecting recruitment, retention and motivation. The Whitley Council has taken a number of initiatives in the past two years in an attempt to tackle these issues; these are described in Chapter 2.

ONCALL COVER OVERNIGHT

46. The out of hours, or oncall service provides cover for the urgent investigations which need to be carried out outside the normal working hours of the pathology departments (usually 9 to 5). These might include tests on patients admitted through Accident and Emergency who have taken drug overdoses, patients on wards who have undergone surgery and need regular monitoring, etc. The provision of blood and blood products for transfusion is particularly important. The oncall service is a critical part of the laboratory service, and it is essential that urgent investigations are carried out by suitably skilled staff.

47. The service is run by volunteers and mainly covers biochemistry and haematology, although some microbiological tests may be needed urgently out of hours (e.g. examination of cerebro-spinal fluid). MLSOs are oncall for a stand-by fee (currently £9.84) and receive a fee per call out, (currently £11.75), where the officer carries out investigations requested.

48. There are a number of problems with the maintenance of the oncall service:
— some departments find it hard to maintain the service due to a decreasing pool of volunteer full time qualified staff;
— staff who are oncall and called out overnight may have to be allowed time off on the following day;
— there is limited flexibility. The oncall system is based around a national agreement although this can be varied by a local variation order subject to agreement of the Whitley council.

TRAINING & DEVELOPMENT

49. Training has become increasingly specialised; new entrants are now only trained in one main specialty. As a result there are problems maintaining an oncall service and staffing small local laboratories doing urgent work. There is also a need to restructure training to suit the changing composition of new entrants. There are increasing numbers of women returning to work who because of family commitments want more opportunities for distance learning.

50. As a result of these different pressures the traditional staffing and organisation of the pathology laboratory are under some strain. Management need to take various initiatives to tackle these problems in order to sustain the service in the future.

CONTROLLING QUALITY

51. The final stage in the investigative process of Exhibit 5 is the reporting of findings to the users. This stage is the culmination and synthesis of all that has gone before. However, the
result itself is only one aspect of the service. A consultative report from a pathologist or senior scientist accompanies the result where appropriate. And the quality of this advice will in turn be enhanced by the wider context within which pathology is practised.

52. Quality is the key issue in the practice of pathology, as it is with all medicine. The accuracy of the findings produced is of paramount importance. There are effective schemes in place to monitor accuracy, and this aspect of quality is well managed. However, the practice of pathology in this country extends beyond the provision of a results service, and pathology departments must ensure that their vision of quality is wider than accuracy.

53. A sequence of quality objectives can be defined with every component adding to a quality service (Exhibit 20). Only some of these components are addressed in this report; others are the province of clinical audit and accuracy is monitored by the National External Quality Assurance Scheme (NEQAS). A major new initiative is producing a National Accreditation Scheme (Box 4) which will address all of the components except cost-effectiveness. Producing a synthesis to deliver a quality service is the challenge confronting pathology management.

Exhibit 20
A QUALITY SERVICE
A sequence of objectives can be defined, with every component adding to provide a quality pathology service.
Box 4: National Accreditation Scheme

Accreditation schemes have been well established in North America and Australasia for some time and there is now a developing initiative to introduce a similar programme in the United Kingdom (ref 11).

The idea arose within the Royal College of Pathologists and is now being refined by a group which includes representatives from the other professional groups in pathology - including the private sector and NHS management.

The process is profession-led and involves an applicant department claiming compliance with pre-determined standards of service quality. This claim is then put to the test of an on-site inspection visit by a senior pathologist, or in chemical pathology by a senior chemical pathologist or clinical biochemist, and an MLSO from a distant region. Approval or otherwise is awarded based on an assessment of every aspect of the laboratory service including facilities, staffing, methods, organisation, management, and safety. Opinions are solicited from user clinicians and institutional managers about their pathology services.

The scheme has been subjected to two pilot studies involving some 70 laboratories and plans are well advanced to launch a “live” national programme in the latter part of 1991.

STRUCTURING MANAGEMENT RESPONSIBILITIES

54. In order to ensure that the issues raised so far in this chapter can be properly addressed, management arrangements must be appropriate.

55. At present senior staff in pathology laboratories do not always have clear lines of accountability. There is a range of different management structures across departments with greater complexity in larger laboratories (Exhibit 21). Arrangements within departments tend to be more uniform, consisting of a medical or scientific head of department, supported by a senior management-graded MLSO who manages the laboratory on a day to day basis, supported by senior MLSOs in charge of particular sections.

56. These management structures tend not to have been planned, but rather to have evolved over a period of time in response to the pressures of local circumstances. Sometimes the separate management of different laboratories within a service is driven by their diverse location. In other places, laboratories have been subdivided to facilitate the management of large numbers of staff. Elsewhere, a strong chairman of pathology has sometimes imposed a more centralised structure.

57. Most pathology services recognise the need for co-ordination of the activities of different laboratories. This co-ordination role can be played by the chairman of pathology. In other cases, it is accepted that a greater degree of central control is now required. This control may be exercised by a chairman of pathology with executive powers or, more recently, by a director of pathology.

58. Directors of pathology, where they exist, tend to have executive control over management issues which affect individual departments. The director also acts as a central point of contact with other medical colleagues and general management. At present, these posts, though growing in number, appear to be confined to sites where there is an individual consultant with the interests and qualities required, and where the post is acceptable to heads of individual pathology departments and to the hospital’s general management.
Exhibit 21
MANAGEMENT STRUCTURES VARY
There is a range of different management structures, with greater complexity in larger laboratories.

Note: Since the recent regrading exercise, the term ‘senior chief’ has been replaced by MLSO grade 3 or 4, but it is retained on many sites to describe the function of head MLSO.
59. Where a central co-ordinating or directing role exists, the structure is managerially tidier and also facilitates the setting of priorities and control of resources. But there is often tension in such arrangements between the executive powers of the director or chairman and the traditional freedom and autonomy of individual heads of department. So these managerial hierarchies may appear more structured on the page than they are in the laboratory. On the ground, different patterns evolve to suit different requirements and to respond to the complexity caused by the interlinked professional and managerial roles of pathologists, scientists and senior technical staff. Managerial structures need to balance the three main components of the pathologist's job:

— clinical advice
— medical direction, and
— laboratory management (Exhibit 22).

Exhibit 22
INTERLINKING RESPONSIBILITIES
Further complexity is caused by interlinked professional and managerial roles.

60. Different departments often share some common concerns, such as the recruitment and management of similar types of staff, common requirements for the transport of specimens, and the provision of a service to the same patients and doctors. However, they rarely adopt an integrated approach to these aspects of their services which could be managed together. For example:
— there is sometimes double handling and booking-in of specimens at both central and departmental reception points.

— few sites share an integrated data processing and information system which could make better use of equipment and clerical staff.

— specialist tests such as radio-immuno-assays and various immunology tests are often spread between different departments with duplication of equipment materials and expertise.

A co-ordinated management structure could generate economies of scale in each case (depending upon local circumstances), while at the same time promoting a more responsive service to users.
2. Options and Solutions

61. In chapter 1, some of the key problems confronting the pathology service were outlined. Fortunately many of these problems can be resolved, and departments around the country are getting to grips with them. In each of the five areas identified there are emerging ideas of good practice which could with benefit be adopted throughout the service.

MANAGING DEMAND

62. Demand management requires a set of supporting structures and systems if it is to be successful (Exhibit 23).

Exhibit 23
STRUCTURES AND SYSTEMS FOR SUPPORTING DEMAND MANAGEMENT
Pathologists require a set of structures and systems if they are to manage demand successfully

63. Within this general framework a number of strategies have been tried to modify test-requesting patterns including (ref 12):
   - Limitation of availability of tests
   - Education of clinical staff
   - Feedback of information on test numbers and costs
   - Financial incentives
   - Introduction of agreed requesting protocols
   - Redesign of request forms to provide guidance to the user on good practice.

   The evidence for success is mixed, with the redesign of request forms identified as one of the more promising approaches. An appropriate strategy is likely to require elements of all the above options.
USE OF AGGREGATE DATA

64. Computerised information systems can be used to identify the numbers of different types of request from different users. Much of the information is already collected, but needs to be processed and presented in a more useful way. One way of doing so is to analyse and feed back to users comparative patterns of use, with users’ own patterns identified within a range and average for other users, who remain unidentified to preserve confidentiality. Such information stimulates reviews of demand and typically leads to a reduction in numbers of requests. Equally typically, such reductions are not sustained once the supply of information is discontinued.

65. A study in the USA of the effect of informing users of the charges for out-patient diagnostic tests found that physicians ordered 14% fewer tests (13% reduction in charges) per patient visit (ref 13). Again, these effects did not persist after the provision of the information was discontinued.

66. These approaches rely on the use of aggregate data, with all of the usual difficulties of data comparison and interpretation (with complexities caused by different case mixes, for example as already illustrated in Exhibits 8 and 9). While they can be useful, it is not always easy to make the link between general principles and specific situations. More recent developments focus attention on individual decisions through the application of protocols.

PROTOCOLS

67. Protocols have been developed recently for radiologists setting out the circumstances under which certain procedures are to be followed. The same approach could also be followed for pathology, setting out standard good practice procedures for different symptoms and conditions. They have advantages for both users, providing some legal safeguard in the event of patient litigation, and for pathologists, strengthening and clarifying their position when advising users. The problem is often that such protocols need to be complex if they are to address the subtleties of everyday situations.

68. The British Committee for Standards in Haematology Blood Transfusion Task Force has recently published (ref 14) details of a protocol for blood transfusion procedures known as the Maximum Surgical Blood Order Schedule (MSBOS). This schedule is a table of elective surgical procedures which lists the number of units of blood routinely cross-matched for them pre-operatively. The schedule is based on a retrospective analysis of actual blood usage associated with the individual surgical procedure. It aims to correlate as closely as possible the amount of blood cross-matched to the amount of blood transfused. The introduction of a MSBOS has the following advantages:-

— a reduction in crossmatching workload

— a reduction in the level of stress

— more efficient use of blood stocks and a reduction in wastage due to outdating
69. A development based on computer systems for clinical decision support is under way at the Wolfson Research Laboratories Computer Laboratory in Birmingham (case study 1) which makes use of protocols in an interactive way, simultaneously ensuring that requesting patterns are appropriate while streamlining and speeding the requesting process, saving both medical and laboratory staff time. The computer program acts as a highly structured request form with agreed requesting protocols included. It has a direct educational effect in that it continuously and consistently reinforces agreed local practice to junior medical staff in a non-threatening way. It also records patterns of demand – simultaneously employing four of the strategies set out in paragraph 62. These are promising approaches, and the Commission has been invited to work with the Royal College of Pathologists to assist with the production of realistic and workable guidelines on the management of demand for pathology services.

**CASE STUDY 1: APPLYING PATHOLOGY PROTOCOLS**

Wolfson Research Laboratories Computer Laboratory, Birmingham

The Wolfson Computer Laboratory has been developing a computerised approach for applying pathology protocols. Clinicians have a computer terminal on the wards which they use if they wish to request an investigation. The computer program contains within it a protocol worked out between clinicians and pathologists ensuring ownership of the principles behind the program. The program provides information to the requester on the appropriateness of the request itself and the time since any previous request. It will also set out potential complications, such as the potential effect of other drugs, or any particular restrictions on when and how a sample should be taken.

The form of the protocol can be adjusted to match the skill and expertise of the user if necessary. A program for requesting levels of serum digoxin has been developed as an application prototype to illustrate the principles involved. The digoxin system guides a generalist through the perils and pitfalls of undertaking the test, and eliminates the possibility of both over utilisation (too frequent monitoring) and misutilisation (incorrect procedures). At the same time the system acts as a request form, passing on the request to the laboratory and issuing labels and sampling details for the phlebotomist.

For more specialised users a protocol for the investigation of patients with liver disease has been developed for the Queen Elizabeth Medical Centre Liver Unit, where considerable expertise can be anticipated. Indeed, the physicians adapt the protocol continuously as experience is gained. Again the system ensures that tests are requested in accordance with the protocol, but, equally significantly, there is considerable reduction in the time spent by junior doctors on processing requests.

**THE ROLE OF THE PATHOLOGIST**

70. These arrangements – particularly the development of demand information systems and protocols – should provide tools for managing demand. It is important that pathologists should take a firm lead, and in practice they are likely to need to pursue a number of initiatives, keeping up the pressure on a broad front. Thus, in addition to information and protocols, advice can be
provided through hospital and GP meetings and newsletters (case study 2). Also, increasingly, medical audit provides an important forum in which to offer open and objective advice on good medical practice, including the use of pathology services.

CASE STUDY 2: DEMAND MANAGEMENT

Newcastle General Hospital : Clinical Biochemistry

The department provides a service mainly to clinicians in Newcastle General Hospital together with a significant service to local GPs (12% of total requests in 1988-89).

The department has a computerised system which provides monthly details of:
- which hospital clinicians and GPs are making requests;
- which tests are being requested;
- how much these investigations cost.

The management team of consultant chemical pathologist, top grade biochemist and Grade 4 MLSO use this information monthly to monitor requests and see where resources are being used.

The information is used as a basis to discuss with clinicians the use of the service. Contact with hospital clinicians is maintained by informal contact on the wards, users visiting the department, and through the consultants dining room. Contact with GPs is maintained by fortnightly meetings with GPs which are attended by pathology staff, with a formal talk by the pathology staff every term. GPs are also sent regular circulars to update them on changes in the service, as well as contact through the telephoning of abnormal results.

71. Pathologists must recognise that their job entails persistent contact and persuasion - not as a "one off" special exercise, but continually with consultants and with each intake of junior staff. They must accept responsibility for ongoing improvement and effectiveness of pathology services. This will allow them to play a major part in managing demand in close cooperation with other clinicians. A senior member of pathology staff should attend the regular clinical audit meeting in each speciality, and review the use of pathology services seeking to promote common approaches or protocols where possible. Regular meetings with GPs in the locality should also be arranged with similar objectives.

72. Some may challenge the right of the pathologist to question demand patterns. But under present financing arrangements the pathology service is custodian of the budget for investigations, and with this stewardship goes responsibility for ensuring best use of scarce and expensive resources.

73. The current arrangements may change depending on how the financial relationship between pathologists and users develops as the government reforms are introduced. If clinical budgeting is introduced, the concept of managing demand may no longer be the responsibility of the pathologist but could shift to the budget holding purchaser – be he or she a GP, clinician or manager. However, the need for information systems to monitor demand (including comparative information), and the need for checks at the laboratory and advice from the pathology department will remain if good practice is to ensue. It could be difficult for a laboratory trying
to maintain a competitive position to offer this support funded by charges to users. Indeed, it could become financially more advantageous to undertake as many tests as possible. Care will be needed if such a conflict of interests is to be resolved.

**USING RESOURCES MORE EFFECTIVELY**

**IMPROVING WORKFLOW**

74. In order to overcome problems of uneven workflow and to improve the timeliness of reporting, managers could:

- monitor the performance of transport arrangements, by following through a sample of specimens from the ward, clinic, or surgery to the return of the report, to ensure prompt and predictable delivery. Clinicians' views can be sought to identify problems, bottlenecks and awkward collections. Negotiations can then be held with transport managers to reschedule collections and deliveries where possible to improve workflow in each department and delivery of reports when needed. If negotiations prove fruitless, a separate pathology transport system could be considered - funded by savings as outlined in the following section;

- establish clear priorities in processing work. At present urgent work is given priority, but it may be possible to schedule work better if other priority gradings are introduced – or if the time reports are required could be specified, to fit with times of clinics, theatres, ward rounds etc;

- monitor process times within the laboratory, building up a knowledge of times taken to process urgent, routine and oncall requests (and any other priority grading). If it is too time consuming to log all requests, a sampling approach could be used;

- develop regular performance indicators for clinically significant areas of work, for example:— the percentage of blood films reported the same day;
— the percentage of routine chemical pathology tests for hospital clinicians reported in 24 hours;
— the percentage of bacteriology specimens found positive reported with antibiotic sensitivity in 48 hours;
— the number of cervical smears reported in 4 weeks;

- review possible technical improvements for receiving samples and returning reports – such as computer links to wards and remote sites, and use of facsimile machines.

**IMPROVING CONTROL OF COSTS**

75. A number of key problems were highlighted in Chapter 1 including fragmented budgets and poor financial control. To counter these problems laboratories should be developing costing systems with no separate treatment of capital and medical pay, and accounting and information systems which allow proper costing of procedures. Under the NHS and Community Care Act (1990) capital will be costed in the same way as other resources from April 1991 which should introduce more flexibility, for example allowing funds not used for MLSO posts that are difficult to fill to be applied elsewhere. Medical pay is henceforth included in unit budgets. It should also be possible for pathology departments to reinvest at least part of any savings realised in order to encourage and reward cost saving initiatives.
76. Improving the control of costs should highlight opportunities for savings, or for undertaking more work for other laboratories, by identifying opportunities for interlaboratory cooperation.

PROMOTING COOPERATION

77. The steadily increasing demand for investigations has been absorbed into the existing service in an incremental way. As a result, each district has one or more laboratories equipped and staffed to provide a near comprehensive service (although rare investigations may be referred to national and regional centres). This pattern has been re-inforced by the policy of district self-sufficiency which has been pursued by most districts up to now.

78. In practice, the volumes of less common investigations are relatively low in some laboratories - producing high costs. Where this is the case, laboratories could reduce costs by buying from others which can carry out the investigation at lower cost and probably, because of the higher volume of work, with better quality.

79. At present, apart from the rare investigations mentioned above, and small "satellite" laboratories, there are relatively few examples of investigations being undertaken in one laboratory on behalf of another – not least because laboratories are not usually aware of cost differences (and hence cost-saving opportunities), and transport arrangements may not be satisfactory. The potential savings of such cross-laboratory working appear significant.

AN ILLUSTRATIVE EXAMPLE

80. In order to demonstrate this potential, an example has been worked through using an illustrative geographical area with a population of 800,000, served by three health districts with a total of five acute hospitals and 2,422 acute beds (including maternity services). The centres of the three areas are about 15 miles apart. A "typical" workload mix has been assumed, based on data from the sites visited.

81. Three options have been explored. They involve the reorganisation of all services, and are based on performance data collected from the sites visited. The bulk of the resource changes are experienced in biochemistry and haematology. In the calculations it has been assumed that medical staff remain unchanged in all three options, with pathologists based in all five hospitals. The options are as follows (Exhibit 24):

(i) Option 1:. The traditional option, with laboratories based in all five hospitals.

(ii) Option 2:. All five hospitals retain the main biochemical and haematology analyser machines, and perform all urgent tests (requiring an immediate analysis, or certainly a response within two hours such as emergency cross matching) as well as all routine tests. All less common tests are sent to a central laboratory.

(iii) Option 3: All five hospitals retain sufficient capacity to perform urgent tests only. All routine tests as well as other tests are sent to a central laboratory.

RESULTS

82. Exhibit 25 shows the revenue costs incurred for these three options. This is an illustrative example only, and real situations will produce different patterns. Option 1 – the
Exhibit 24
THREE OPTIONS
Three options for organising pathology services have been explored using an illustrative geographical area served by three health districts.

Exhibit 25
COST BREAKDOWN FOR THREE PATHOLOGY OPTIONS
The traditional service costs substantially more than services with co-operation between laboratories.
traditional arrangement – costs about a fifth more than the other two options for the particular combination of circumstances chosen for this example. Other situations give different values, but in general option 1 is more expensive than the other two options, while there is little difference between options 2 and 3. Most of the savings are realised by moving the more specialised investigations to a central site, and gaining from significant economies of scale for these investigations:

— reducing the number of staff;
— saving on specialist equipment;
— reducing the use of occupied space.

83. Transport costs would need to be increased to enable the service to operate efficiently with a dedicated transport system, but these increases are far outweighed by the savings.

84. A fourth option could involve centralising more specialist tests as in option 2, but with this work shared between laboratories. Thus one laboratory could specialise in one set of investigations for all five hospitals, while another specialises in another. This option appears to realise some but not all of the economies of option 2. A more detailed economic analysis in each location would be needed to decide the most suitable option.

85. Any apparent economic advantages would also need to be balanced carefully against professional and operational requirements. MLSO staff in laboratories which do urgent and routine investigations only would have a restricted range of interest. And in smaller laboratories it might become even more difficult to provide staffing cover - especially for oncall arrangements at night. But some cross-specialisation could help to counter these difficulties simultaneously reducing the number required oncall and broadening the interest of the MLSOs concerned. Great care would be needed to ensure that such cross-specialisation continues to meet the necessary standards.

86. It is argued that the separation of pathologists from the process of investigation could also cause difficulties. However, inter-laboratory cooperation between neighbouring hospitals could overcome some of these difficulties if pathologists get to know the staff carrying out the tests and methods used, albeit on a neighbouring site. Scientists would probably tend to be concentrated in larger laboratories undertaking a wider range of tests. For simplicity, the complement of both medical and scientific staff was assumed to be unchanged in all three options in the worked example, but in a real situation, this assumption would need to be reviewed along side all other relevant factors.

87. A further possible development that could formalise interlaboratory working could be the introduction of consortia, with several existing laboratories pooling resources and effectively operating as one inter-hospital service (with the degree of integration varying to suit each particular situation). Staff of all types could work for the consortium rather than an individual hospital – opening up the possibility of better career planning (with staff moving between sites to broaden experience) and new management structures, with inter-laboratory directors covering a discipline for example (Exhibit 26).
88. Clearly, any changes of this magnitude will have to be carefully managed. Implementation should not be rushed and could be introduced gradually as opportunities arise (although within an overarching strategy). Co-operation on certain investigations could be introduced as equipment wears out and staff vacancies occur. Progress could perhaps be expected to occur more quickly where vacancies are high. The extent and form of cooperation could be adjusted as experience is gained and trust grows, with decisions to form consortia postponed until management and staff are sure of the right way forward.

89. However, pressure is likely to grow for greater cooperation, and reduction in unnecessary duplication. The analysis above reveals sufficient potential savings to warrant considerable further consideration. The savings produced in the example by the new pattern implied by option 2, even if only partially realised, should be more than sufficient to tackle many of the problems identified in chapter 1. The significant productivity gains could be shared with staff (as they are in industry) to provide improved staffing arrangements using the flexibility recently introduced by the Whitley Council (see section on staffing below), or in the case of hospital trusts through the negotiation of local arrangements. And the savings could also be used to plug another major gap – the absence in most laboratories of an efficient computer system for management information.

90. The first step in the exploration of possible frameworks for inter-laboratory cooperation is the development of the costing approach outlined earlier in this section. Auditors will be starting this process in laboratories in the near future.

NEAR-PATIENT TESTING

91. Just as there are opportunities for laboratories to co-operate between districts, there are opportunities for laboratories to take a lead within hospitals to counter some of the problems of near-patient testing. Already some laboratories are recognising that they have a potential key
role to support near-patient testing since they have the expertise to ensure the service provided produces accurate and correctly interpreted results. Support for GP services would present considerably more problems, however.

92. The action required includes:
   (i) Identifying the level of activity. The issue of a questionnaire to gauge the extent of activity among hospital clinicians may be required.
   (ii) The (Voluntary?) Registration of Equipment. The construction and maintenance of a central register of all near-patient equipment bought.
   (iii) Identifying costs to ensure that near-patient testing is cost-effective.
   (iv) Provision of support. By providing advice on the choice in purchase of equipment, the training of staff in safety and interpretation of results, the maintenance of the machinery and monitoring of the quality of the results.

Though this may involve extra effort it will ensure the closing of a potential loophole in the quality of pathology services and ensure that near-patient testing is only carried out when it is safe, appropriate and cost effective to do so.

**TACKLING STAFFING DIFFICULTIES**

93. Given the current problems of recruitment and retention and the expected problems of the 1990s, management has to ensure that it is making the best use of what is likely to be an increasingly scarce resource. Management has a range of options it can employ to ease problems locally (Case Study 3).

94. If laboratories are to move away from single site self sufficiency and toward some degree of cooperation numbers and types of staff needed could be affected. As suggested there may be reductions in the total numbers of staff needed due to factors such as the more economic batching of work, and improving labour productivity.

95. The Whitley Council has taken a number of initiatives in the past two years aimed at removing the inflexibility of the national conditions of service agreements and giving considerable local flexibility which should assist employing authorities in the recruitment and retention of MLSOs:
   — a flexible grade structure;
   — discretion to increase pay by up to 12% to recognise special job skills and responsibilities;
   — the ability to supplement pay by up to 20% (30% in Thames regions) to deal with local labour market conditions;
   — discretion on starting pay and annual leave entitlements to help make recruitment packages more attractive;

   Use should be made of this increased local discretion where appropriate. Improvements could be linked to productivity gains, in order to make the changes self-financing.

96. Other initiatives to ease the pressure of staff shortages might include:
   — **Selected use of capital**, with greater use of more automated equipment – for example using machines with automatic sample feeding (although the economics of the capital/revenue balance will need careful evaluation);
— **Targeted recruitment strategies** with possible use of flexible hours and job sharing to take advantage of the changing labour market in the 1990s;

— **Skill mix changes**, possibly with broader skills for MLSOs on the one hand, and increased use of medical laboratory assistants (MLAs) on the other;

— **Use of staff appraisal systems** to review the match of skills available with the needs of each department, developing staff careers in a systematic way.

97. Given the problems with current oncall procedures there is a need for local management and staff to have flexibility to negotiate local agreements, although within guidelines established at the national level such as the use of properly trained staff. The Whitley Council is currently discussing a national enabling agreement which will enable the parties locally to develop alternative systems of organising and remunerating out-of-hours work. In the meantime, the Management side will approve schemes through validation order. Possible options for the future might include:

— the ability to share resources across a number of neighbouring sites particularly if transport facilities can be improved by any offsetting savings;

— the possibility of providing cross disciplinary cover provided always that the necessary skills and quality are ensured;

— the option of bringing in a shift system to replace a call out based system, particularly for the busier periods (such as evenings);

— the redesign of the remuneration system possibly making use of a guaranteed payment as part of a standard contract.

98. Eventually, it may be possible to aim for self-financing packages which include a smaller, better paid workforce with improved productivities and inter-laboratory co-operation, and with renegotiated contracts including shift systems.

**CASE STUDY 3: STAFF RECRUITMENT**

Norwich Health Authority

The pathology service is faced with a relatively fixed pool of labour caused by the geographic isolation of the authority, with staff often reluctant to move into the area to take up a post. In order to maintain the service the management:

— keep track of past employees and approach them when vacancies occur (Histopathology)

— offer "as and when" contracts which allow flexible working (Histopathology)

— allow job-sharing where the onus is on the individuals involved to find and keep a job share partner (Microbiology)

— use flexitime as a means to meet peaks of work and to provide flexible hours for staff (Microbiology)

These measures have helped to reduce turnover and have made vacancies easier to fill.
PROMOTING QUALITY

All of the initiatives so far described in this chapter should help to promote a quality service. But they must be set along side other initiatives to provide the following wider framework, covering the issues raised in Exhibit 20:

- Demand should be appropriate. As already outlined, better information is required, and protocols would also assist the control of demand;

- Results must be accurate. Nearly all laboratories have good arrangements in place for monitoring accuracy, and the national schemes (NEQAS), to which all laboratories subscribe, are well recognised;

- Results must be timely – which means on time, rather than as quickly as possible since producing results early can cost extra. Transport arrangements must be monitored, and improved priority systems and workflow scheduling may be appropriate;

- Results should be produced as cost-effectively as possible, and the Commission's costing approach should help to indicate where savings may be possible. Improvements are also required to financial control systems and budgeting arrangements;

CASE STUDY 4: REVIEWING USER NEEDS BY QUESTIONNAIRE

Bristol Royal Infirmary

The pathology service had issued a questionnaire in order to provide information to improve the service offered. Responses from 14 hospital doctors and 11 GPs were forthcoming, of 60 questionnaires issued. The main conclusions drawn were:

Requesting
- most users identified being served by the lab rather than individual departments
- 80% occasionally sought advice from the consultant pathologist
- most users were happy with the design of forms but thought there were too many of them
- many thought transport arrangements for routine work were satisfactory but the oncall arrangements needed improvement

Reporting
- most users wanted a proactive service ie. additional tests should he performed if the lab thought these appropriate
- current turnaround for out-patients and GPs were acceptable but urgent requests were not
- the use of electronic means to receive reports was popular

Quality
- the current level of overall satisfaction with the service was high
- few reporting errors occurred to the knowledge of users but reports often did go astray
- 9% of respondents thought that customer relations were poor with the worst aspect being the speed in answering the telephone
- the area most in need of improvement was oncall

Other
- need for a single request form for all departments

Concerns
- users should be provided with the costs of investigations

The local pathology service used the information in order to identify areas requiring action to improve the service.
• Staffing arrangements need to be appropriate, with improved conditions, oncall arrangements, and training and development;

• Good operational arrangements should be in place. Appropriate consultative advice should be provided – ideally within a framework of clinical audit;

• Services should be attuned to the needs of users, and methods are required for researching user needs. In practice, much necessary intelligence can be gleaned through clinical audit, informal meetings and telephone contact to discuss results. But sometimes more systematic initiatives may be appropriate, including newsletters, presentations and seminars, and questionnaires (case study 4). Certainly in the private sector, great store is placed on satisfying users (case study 5).

• The wider range of other activities in addition to investigations in laboratories should also be undertaken effectively – again the province of clinical audit. Research is extensive, and there is increasing involvement in clinical audit. Many laboratories undertake infection control, set antibiotic policies and monitor patterns of infection in the community. Histopathologists carry out autopsies, and haematologists undertake extensive clinical work with direct management of patients.

**CASE STUDY 5: FOCUSING ON CUSTOMER CARE**

**J S Pathology Ltd**

JS Pathology is the largest private pathology laboratory in the country. The main sources of work includes health screening for health insurance schemes, private hospitals' and GPs' work, and clinical trials work.

**CUSTOMER CARE**

The company places a great emphasis on customer care in terms of providing a timely and cost effective service to both clinicians and patients. The company guarantee a specific turnaround on test results, and are responsible for the whole process from taking the blood by the phlebotomist to delivering the result back to the clinician.

Emphasis is placed on developing the service in order to meet customer needs. Customers are telephoned on a routine basis to collect their views on the good and bad points of the service. Other means such as seminars and newssheets are used to publicise new and existing services. An active effort is made to identify segments of the market which could be developed either in terms of new tests or particular groups of users.

Specialist staff are employed to cover reception, data processing and computer software maintenance and development. A large investment is made in automated equipment to maintain efficiency, reduce labour costs, and provide a quick and user-orientated service.

100. All of these activities have resource consequences, and compete for scarce funds. There are sometimes different sources of finance for different activities – not always closely related to the activity in question (eg university finance for teaching and research). The final quality issue, which brings all of the others into balance, is whether laboratories are developing some
form of overarching strategy for co-ordinating all of the above activities and initiatives within the finance available. This strategy should be clearly set out in a plan for each laboratory.

101. The review of the content and balance of such a plan would be a matter for clinical audit. But the development of a suitable plan, appropriately costed and clearly set out in a form that can be put in practice is a matter for management. Some preliminary proposals for starting such a plan are made in Chapter 3. But before a plan can be established, management lines of accountability must be clear as outlined in the next section.

IMPROVING MANAGEMENT STRUCTURES

102. There is unlikely to be any single best way of organising pathology laboratories. The most suitable arrangement will depend on local circumstances. But there are some fundamental principles that should be observed:

(i) **Clear demarcation of responsibilities**: Clear job descriptions should be produced for the Director/Chairman, Heads of Departments and most senior MLSO.

(ii) **Clear reporting lines**: Staff must know who their line manager is and line managers know whom they are responsible for managing.

(iii) **Well established and well used lines of communication**: Regular management meetings and staff briefings should be held to identify and resolve issues of concern.

(iv) **Good co-ordination**: Activities between sites and/or departments must be properly co-ordinated to ensure a co-ordinated service is provided to users which also makes best use of staff and equipment.

(v) **Functions** should be discharged at an appropriate level

Case study 6 shows how changes in the management structure can produce results.

**CASE STUDY 6: DIRECTOR OF PATHOLOGY: BARNET DHA**

The pathology service is split between two sites in the district, at Barnet and Edgeware. The Director post has now been established for 18 months. It is occupied by a chemical pathologist who is allowed 2 sessions per week to carry out the duties of the post, taken from existing laboratory duties. The Director reports directly to the Unit General Manager and is supported by a Grade 4 MLSO. The establishment of the Director has helped to develop:

- sharing of equipment across departments
- joint working across departments by MLSOs
- shared common services including data entry and a central enquiry point
- rotation of staff between sites within disciplines

CONCLUSION

103. A number of ideas and initiatives are emerging for addressing the problems confronting the pathology service described in chapter 1. Further progress could be made by adopting a more systematic approach using some preliminary proposals set out in the next chapter.
3. Implementing the Changes

104. Over the next year, the Commission's auditors will be reviewing in each health authority the management issues outlined in this report. Some of the recommendations for change require additional expenditure, while others may produce savings. In the Commission's view, within a cash limited NHS, pathology plans which specify how new initiatives and savings are to be co-ordinated are an essential prerequisite of effective resource management. The findings of the audits will form the starting point for this planning process.

105. Departments will in any case need to address some of these issues as they prepare for the implementation of the NHS and Community Care Act (1990). But it will be helpful to pull them together within a plan to explore ways of balancing new investment and potential savings. This will have the particular advantage of allowing opportunities for cost-saving through facility rationalisation to be considered alongside the need for new investment elsewhere.

CHECKLIST FOR A PATHOLOGY PLAN

106. Every plan will be different, tailored to fit the specific needs and style of each laboratory and department. And each will need to be developed and to evolve over time. Considerable further work will be required to produce a prototype plan, but the checklist below is put forward to provide a starting point.

POLICIES AND STRATEGIES

107. Any plan should start with clear statements of policies and strategies which can be translated into action with resource requirements quantified. Pathology departments undertake a wide range of activities from research to post mortems and all should be undertaken within some overarching policy framework, for example:

— the proportion of time to be spent on research, and the topics to be covered with timetables, resources, and objectives.

— methods for collecting and recording epidemiological data, the scope and aims of any analyses, and the amount of time, effort and resources required.

— the numbers of autopsies to be carried out and the circumstances under which autopsies should be performed.

— the amount of time spent on infection control monitoring.

108. Within this whole framework, there should be a set of policies shaping the pattern of laboratory work. To assist this process, information is required on patterns of requests for investigations, existing resources and costs, technical developments, etc.
RESOURCE IMPLICATIONS

109. All policies must be costed and the total compared with the budget. There will then need to be an extensive period of review to overcome the inevitable mismatch between the two. The findings of the pre-planning analysis should be incorporated at this stage setting out (and costing):

— any potential for release of funds by improving productivity or by promoting co-operation between laboratories;

— improvements required to information systems (both for demand management and control of cost and productivity);

— the staffing consequences of any changes proposed;

— any deficits in the service revealed by analysis of user needs.

110. Flowing from this analysis will be modifications to policies and strategies and a list of action points for the forthcoming year.

ACTION POINTS

111. Examples might include (depending on the policies and resources):

— the elements of the service needing development/reduction;

— the mix of investigations to be provided on site;

— the response times to be set for urgent and non-urgent investigations;

— the capital programme taking account of technical development, equipment, the staff/equipment balance and resources available;

— the management structures and division of responsibility required both across and within departments;

— any developments in medical practice or technology to be incorporated into the service offered, (eg. changes to GP contracts increasing requests for cervical smears).

DEVELOPMENT SCHEDULE AND MONITORING

112. Finally, the changes identified above will need to be ordered in a sequence with costs attached so that the cashflow can be evaluated and compared with the budget cashflow. And the timetable ensuing should have monitoring arrangements specified so that managers can check on performance and achievement of the objectives. Some examples of possible performance indicators for the issues addressed in this report are proposed in Exhibit 27. Others covering clinical audit issues may also be appropriate. These indicators must be provided by appropriate information systems, and will require careful interpretation within context if they are to be meaningful. Departments should be developing the indicators they think are most appropriate.
To ensure delivery of a quality service, pathology departments should aim to start developing their own monitoring systems and performance indicators. Examples might include:

**INVOLVEMENT OF OTHERS**

113. While pathology laboratories and departments must take the lead in the planning process, key roles are also played by others.

**UNIT GENERAL MANAGERS**

114. The general manager responsible for each pathology laboratory will have to ensure that management structures are appropriate with clear lines of accountability. Responsibility should be matched with authority (and vice versa). Without clear management structures, it will be impossible for change to be managed in any coherent way.

115. Secondly the UGM will need to agree with the pathology plan, and to the balanced mix of investment and savings.

**DISTRICT GENERAL MANAGERS**

116. The future purchasers of services will need to ensure that the cost of the pathology services offered by the provider hospital units are reasonable, and press for greater co-operation between units if diseconomies of scale persist.
REGIONS

117. The Regional Scientific Committees could play a key role in ensuring that patterns of co-operation make sense. Laboratories make bids for large items of equipment in competition with others in the region. This arrangement is to ensure that heavy but irregular demands for capital do not cause local difficulties. It also means that laboratories must agree their strategies with Regional Scientific Committees, which therefore can ensure that co-operation takes place by only approving new equipment in centres which can demonstrate appropriate economies of scale.

CONCLUSION

118. The development of pathology plans will involve a wide range of people in the NHS. It will be essential for all to work together if the management issues outlined in this report are to be addressed appropriately, in order to allow the very considerable skill and dedication of all engaged in pathology to be utilised to the full.


8. NHS Management Executive (1990) Pathology Workbook, Department of Health Income Generation Unit.


Appendix

REPORT APPENDIX 1

The following Health Authorities were visited, and our thanks go to the staff for their help, co-operation and ideas which were influential in shaping this report:

- Bristol and Weston DHA
- Coventry DHA
- Gwynedd HA
- Huddersfield DHA
- Lancaster DHA
- Newcastle DHA
- Norwich DHA
- The Hospital for Sick Children (London) SHA
- West Berkshire DHA

The Project Advisory Group was:

Mr B Chessum, Principal Medical Laboratory Scientific Officer, PHLS, St George's Hospital, Tooting, London

Dr J R Davies, formerly Deputy Director of the Public Health Laboratory Service

Mr K Hyde, Senior Chief Medical Laboratory Scientific Officer, Department of Clinical Haematology, The Royal Infirmary Manchester

Mr K Jones, Grade 4 Medical Laboratory Scientific Officer, Department of Chemical Pathology, Bristol Royal Infirmary

Dr J R H Pinkerton, Honorary Consultant Pathologist, Salisbury Health Authority

Dr P F J Sewell, Consultant Clinical Chemist, Doncaster Royal Infirmary

Dr J K Wood, Consultant Haematologist, The Leicester Royal Infirmary

The following organisations were consulted on earlier drafts of this report:

- Conference of Medical Royal Colleges
- Royal College of Pathologists
- Association of Clinical Pathologists
- Department of Health Welsh Office
- NHS Management Executive
- Institute of Medical Laboratory Sciences
- Association of Medical Microbiologists
British Committee for Standardisation in Haematology
British Society for Haematology
Association of Clinical Biochemists
Trades Union Congress
Manufacturing, Science and Finance
Institute of Health Service Management National Association of Health Authorities
Public Health Laboratory Service
JS Pathology plc

Our thanks also go to the following individuals who commented on the earlier drafts of this report.
Dr Barry Murphy, Consultant Haematologist, Torbay Hospital
Professor Gerard Slavin, Professor of Histopathology, St. Bartholomew's Hospital, London
HMSO Publications are available from:

HMSO Publications Centre
(Mail and telephone orders only)
PO Box 276, London, SW8 5DT
Telephone orders 071-873 9000
General Enquiries 071-873 0011
(queuing system in operation for both numbers)

HMSO Bookshops
49 High Holborn, London, WC1V 6HB 071-873 0011 (Counter service only)
258 Broad Street, Birmingham, B1 2HE 021-643 3740
Southey House, 33 Wine Street, Bristol, BS1 2BQ (0272) 264306
9-21 Princess Street, Manchester, M60 8AS 061-834 7201
80 Chichester Street, Belfast, BT1 4JY (0232) 238451
71 Lothian Road, Edinburgh, EH3 9AZ 031-228 4181

HMSO's Accredited Agents
(see Yellow Pages)

and through good booksellers

£8.50 net