Inspecting Informing Improving

Healthcare Commission

Getting results

Pathology services in acute and specialist trusts

Acute hospital portfolio review

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The Healthcare Commission

The Healthcare Commission exists to promote improvements in the quality of healthcare and public health in England. We are committed to making a real difference to the provision of healthcare and to promoting continuous improvement for the benefit of patients and the public. The Healthcare Commission's full name is the Commission for Healthcare Audit and Inspection.

The Healthcare Commission was created under the Health and Social Care (Community Health and Standards) Act 2003. The organisation has a range of new functions and took over some responsibilities from other Commissions. It:

- replaces the Commission for Health Improvement (CHI), which ceased to exist on 31st March 2004
- takes over functions relating to independent healthcare previously carried out by the National Care Standards Commission, which also ceased to exist on 31st March 2004
- carries out the elements of the Audit Commission's work relating to the efficiency, effectiveness and economy of healthcare

We have a statutory duty to assess the performance of healthcare organisations in the NHS and award annual ratings of performance, to coordinate inspections and reviews of healthcare organisations carried out by others, and register organisations providing healthcare in the independent sector on an annual basis.

We have created an entirely new approach to assessing and reporting on the performance of healthcare organisations. Our annual health check examines a much broader range of factors than in the past, enabling us to report on what really matters to patients and the public.

Executive summary

Pathology is the largest of the diagnostic services – in the numbers of requests that it meets annually (175 million), in expenditure (5% of the total budgets of NHS trusts) and in the proportion of clinical decisions that it affects (reputedly over 70%), many of which relate to the diagnosis and management of what are potentially life-threatening conditions.

This report presents the key national findings of an acute hospital portfolio* review carried out by the Healthcare Commission of pathology services in NHS acute and specialist trusts in England during 2005/2006. This work formed one of three components of an integrated review of the main diagnostic services in NHS trusts, the others being imaging and endoscopy. We collected data from all NHS pathology services, and in a voluntary survey, more than 5,500 hospital doctors and nurses commented on the service in their own trusts.

Where possible, we used the same definitions for data as those specified by the Audit Commission in an acute hospital portfolio review carried out in 2003, so that we could measure improvements as well as assess each trust's current performance against that of others.

Auditors have already agreed local findings and recommendations for action with each NHS trust. In March 2006, we distributed comparative data and presentation software to enable trusts to identify and prioritise areas for improvement. We also used the review's top-level performance indicators in our annual health check assessment of the provision of diagnostic services by each trust, which we published on August 25th 2006.

The review took place at a time when the pathology service was two-thirds of the way through a 10-year programme of modernisation, which is being promoted by the Department of Health, and it examined progress on many of the key issues addressed by that programme.

The recently published report[1] of an independent review of NHS pathology services chaired by Lord Carter of Coles proposes a number of radical changes. These include the development of a national specification for pathology services with clear standards of performance and the establishment of pathology service providers that are independent of NHS acute trusts. Our acute hospital portfolio data provided evidence for that review, and this report contains data that complements and supports many of the findings of Lord Carter's review. However, compared with Lord Carter's longer-term agenda, our report focuses on issues that can be addressed by existing providers of pathology services, trusts and commissioning bodies in order to achieve the maximum gain in quality and value for money in the short term.

* A collection of reviews of key services, resources or issues of national concern and importance to patients, NHS trust managers and clinicians. From 2007 it will become part of a programme of service reviews. More information is available on our website: www.healthcarecommission.org.uk/acutehospitalportfolio.

Key findings

The majority of the hospital clinicians who responded to our survey commented favourably on the pathology services in their trusts, particularly on the quality of guidance and interpretation provided. The most common criticisms were of the lack of timely phlebotomy (blood collection) services and of occasional delays in ensuring that pathology results were available when they were needed for clinical decisions.

Faster results

The results of many pathology tests were available faster on average in 2005 than they were in 2003. For example, troponin tests – which check whether A&E patients with chest pain have had a heart attack – were turned around 20% more quickly. Many non-urgent tests were also completed more quickly than in 2003, raising complex questions as to whether the improved turnaround results in clinical benefits that justify the extra cost. However, there was still wide variation in how long it took the same laboratory to perform a specific test, and even less consistency between different laboratories. There were also significant variations in how long it took to transport samples for tests requested by GPs to the laboratory.

Longer opening hours

Many pathology laboratories had extended their opening hours since the previous review. Full biochemistry and haematology services were provided 24 hours a day and throughout the weekend at 30% of laboratories. Trusts provided a wider range of specialist services themselves rather than contracting them out to other trusts as they did previously. However, while this may have benefited the care of some patients, it also raises complex questions about value for money and may conflict with the modernisation agenda's objective of an increase in joint working between trusts.

Increased demand for tests

The number of requests for biochemistry, haematology and microbiology tests is increasing rapidly, although not as quickly as it was between 2000/2001 and 2002/2003. The average number of tests requested on each sample is also increasing. In 2000/2001 an average of 5.93 biochemistry tests were carried out for every request. This had risen to 7.36 by 2005. However, there was little consistency between trusts. Some performed more than twice as many tests as others in relation to the number of requests that they received.

The average number of tests requested by A&E doctors has also been rising significantly faster than the number of A&E patients: there were 16% more tests per A&E attendance in 2005 than in 2002/2003. However, some A&E departments reported four times as many tests per attendance as others.

An increasing proportion of the tests were for GPs: requests from GPs accounted for 41.7% of biochemistry tests and 30.6% of haematology tests in 2005, compared to 37.2% and 25.8% respectively in 2002/2003.

Better control of demand

Many pathology departments have sought to reduce work that is of limited clinical value as well as the number of tests duplicated unnecessarily, but there is scope for them to be more proactive. The incidence of possibly inappropriate repeated thyroid function tests

and full blood counts on the same patient had fallen since the previous review, but there was still a greater variation among trusts than could be explained by differences in case mix.

Need for greater involvement in point-of-care testing

Pathology services are playing a growing role in the oversight of point-of-care pathology testing (POCT) in hospitals, but as yet have little involvement with POCT in the community. There was little central recording of POCT test results, even those carried out elsewhere in the same hospital, increasing the possibility that tests could be duplicated or vital results overlooked by other clinicians.

Variable quality assurance

There was wide variation in quality assurance practices such as consultant oversight, and in the seniority of quality assurance managers. For example, in some trusts a consultant reviewed the results of more than 15% of cytology smear tests, while at others fewer than 3% were reviewed.

Slow adoption of new technology

Some pathology services have been slow to adopt more efficient or clinically effective technology. For example, although central funding for the introduction of liquid-based cytology was provided in 2003, this technique was used for only 22% of the smear tests carried out in 2005. We understand that there has since been significant progress.

Incomplete requests

Mini-audits of the forms used to request pathology tests suggest that since 2003, the way that clinicians fill in these forms had improved. But too many clinicians still failed to provide details that could affect the interpretation of results.

Greater productivity

Since the previous review, productivity, in terms of the average number of requests and tests performed compared to the number of biomedical scientists (BMSs) employed, had increased substantially (by 23% for biochemistry tests and 10% for microbiology requests). However, this may reflect increased automation and changes in the role of BMSs. In some trusts, more work was delegated to medical laboratory assistants (MLAs), although the mix of skills differed widely from one trust to another.

More senior staff retiring

Many senior pathology staff were close to retirement age. This is especially true of biochemistry: in a quarter of trusts more than a half of the consultants and senior BMSs were aged 55 or over.

The configuration and delivery of services may have to change to reflect the resulting loss of experience.

Wide variation in costs and productivity

Differences in the ways that trusts count the activity and costs of pathology services make it more difficult to evaluate the comparative efficiency of NHS laboratories with those in the independent sector. However, the variations in unit costs and staff productivity – some trusts were more than twice as efficient as others – were greater than can be explained by differences in counting alone. Productivity tended to be higher in larger biochemistry laboratories, although split-site working (having laboratories in several different locations) by itself had little effect on productivity. We also found more automation of the handling and storage of samples in larger laboratories, although there is ample scope for development and further economies to be made.

Slow development of pathology networks

Only 8% of trusts belonged to formal managed pathology networks. Some of these networks had rationalised services, an example of this is when all requests from GPs are processed by one laboratory. More than half of the remaining trusts belonged to federated pathology networks, in which each trust retains its own laboratory staff and budgets. However, the membership and functions of federated networks were unclear and they had made only limited progress on developing joint working among trusts.

Summarised recommendations

Standardise the measurement of activity and costs

The way that trusts quantify the activity of pathology services should be standardised nationally and a robust measure of workload established. Better information about marginal costs and overheads is also needed as a prerequisite for the rationalisation of services, the setting of realistic tariffs for tests requested by GPs, and the devolution of budgets to the clinical directorates of trusts.

Plan for effects of new service developments

Trusts and commissioning bodies should consider the impact of all major decisions about the development of services on the workload and expenditure of pathology services. Trusts should use such developments as an opportunity to promote more joint working across pathology networks.

Set time targets

Pathology departments should agree targets with local clinicians and commissioning bodies for how quickly the different types of tests are to be completed. They should ensure that these targets reflect the clinical urgency of each type of test. However, they should not pursue faster turnaround at the expense of quality or efficiency when cases are not urgent. National guidelines would be useful in promoting consistency between local targets. Trusts should also set standards for the availability of phlebotomy services. Performance should be monitored routinely against these standards.

Rationalise provision of non-urgent services

The provision of non-urgent pathology services for GPs should be rationalised across pathology networks. Greater specialisation of laboratories would promote efficiency through, for example, increased automation of the handling of samples, elimination of out-of-hours working in those laboratories that perform only non-urgent tests, better use of scarce specialist skills and experience elsewhere, and economies of scale from the more cost-effective use of high capacity analysers.

Improve quality of care

Greater use of point-of-care testing in clinics and in primary care may improve the quality of care. However, relevant test results should be collated to avoid inappropriate duplication and to provide a ready source of epidemiological data. Pathology services are well placed to advise clinics when they are setting up point of care testing, helping them to create a service that is high in quality and value for money. This advisory role must be funded.

Understand geographical differences in demand

There should be further investigation of the geographical differences in the number of tests requested and carried out in relation to the number of attendances at A&E and the population of patients. Pathology services should continue to work with requesting clinicians to improve their understanding of what the services offer, the appropriateness of tests to specific clinical situations, and the quality and completeness of requests. This should help to reduce the amount of pathology activity that is of little or no clinical value. Clinicians should use the patient's NHS number routinely as a common way to identify them on all requests. This should help to reduce the number of unnecessarily duplicated tests.

Check value for money

Commissioners and trusts should ensure that pathology departments whose unit costs or productivity figures differ widely from the norm are providing good value for money. There should be a continuing review of the mix of skills within departments to ascertain whether there is scope for further extension of roles and use of laboratory assistants. Trusts should, where appropriate, invest in further automation of sample handling. Commissioners should ensure the timely implementation of nationally-funded procedural and technological changes such as the use of liquid-based cytology.

Introduction

In 2005, some 175 million samples were sent for analysis to NHS pathology laboratories. Pathology services have a vital role to play in the diagnosis and treatment of cancer and cardiac conditions and in the monitoring of long term chronic conditions. It has been estimated that the results of these analyses affect over 70% of all healthcare decisions.

The cost of providing these vital services is also significant. Pathology departments in England had a combined gross budget of £1.8 billion in 2005/2006, and on average each trust spent 5.1% of its total budget on pathology. The independent review of NHS pathology services[1], chaired by Lord Carter, concluded that the full cost of pathology services in England would be closer to £2.5 billion if trusts' overheads were included.

Pathology services are usually organised into a number of separate disciplines (see table 1), with little interchange of staff and facilities. This report focuses on the four biggest disciplines – clinical biochemistry, haematology, microbiology and histopathology. Larger trusts may have separate departments for other, smaller disciplines such as cytology, immunology, virology and infection control, and neuropathology, while elsewhere these may be sub-specialties of other disciplines. Pathology departments also perform post-mortems, which usually fall under histopathology. Many haematology departments operate the trust's blood bank and supply phlebotomy (blood collection) services within the hospital and to the local community.*

Nearly all NHS acute and specialist trusts still have their own separate pathology departments, although a few trusts have formed jointly-managed services. Initiatives to increase cooperation among trusts through less formal pathology networks appear to have had limited success so far (see page 38). A few very specialised tests are referred out to other laboratories or regional laboratories. Private laboratories and the independent sector make only a small contribution to pathology services for the NHS.

The pathology department at most trusts serves local GPs and clinics as well as hospital clinicians. The proportion of work that is requested by GPs varies. Our review found that on average 47% of biochemistry, 34% of haematology, 40% of microbiology, 12% of histopathology and 77% of cytology tests performed by acute (non-specialist) trusts were requested by GPs. However, at some trusts up to 73% of biochemistry tests were for GPs. Conversely, pathology departments in specialist trusts performed little or no work for GPs, while those in large teaching trusts also tended to handle below-average levels of work referred by GPs.

Demand for pathology services continues to rise. Much of the added laboratory workload has been absorbed by increased automation of the most common biochemistry and haematology tests. However, for several reasons NHS pathology services will face significant uncertainties and pressure for change over the next few years due to:

- introduction of new technologies (including cytogenetics)

* Lord Carter's report contains an excellent overview of the organisation of these services that need not be duplicated here, other than to add quantification based on the results of the Healthcare Commission's review.

Table 1: The main pathology disciplines	
(Clinical) Biochemistry	Examination of the levels of enzymes, hormones and other chemicals present in the blood and body fluids to support diagnosis and monitor treatment.
Haematology	Checks on the status of a patient's blood and its component elements, including abnormalities of blood coagulation.
Microbiology	Isolation of disease-causing micro-organisms such as bacteria, viruses, fungi and parasites by culturing specimens and seeking suitable antibiotics for the treatment of bacterial and fungal infections.
	Virology (the detection, isolation and identification of viruses and the diseases they cause) is usually included in microbiology; otherwise it is carried out in Health Protection Agency laboratories.
Histopathology	Detection of abnormalities in tissue samples such as those collected from surgical operations and autopsies.
Cytology	Examination of cells in (semi-) fluid substances to check for cancerous growths or infections. Often associated with histopathology departments.
Immunology	Investigation of the role of the immune system in infectious diseases, allergies, parasitic infestations, tumour growth, transplantation and immunodeficiencies.

- workforce issues, including a forthcoming increase in retirement by senior staff
- payment by results (PBR). The cost of diagnostic tests is currently included in treatment tariffs or block contracts, but there are moves to extend PBR to individual tests
- practice-based commissioning (PBC). Developments such as more point-of-care/high street testing and the potential use of laboratories in the independent sector could reduce the number of requests from GPs to laboratories in NHS trusts. In the longer term, PBC and extension of choice for patients could result in the movement of some treatments and associated pathology tests away from the acute sector to the community
- emergency service reviews. Full A&E services may be concentrated in fewer hospitals, reducing the need for urgent out-of-hours pathology tests elsewhere
- the spread of foundation trusts. Foundation trusts may take a more commercial approach to the provision of pathology services that could result in reduced cooperation across networks. Trusts might opt for greater specialisation, which could reduce the volume of routine pathology work carried out. Those specialising in emergency care would face increased pressure to provide a round-the-clock service

In 1999, the Department of Health launched the Pathology Modernisation Programme with the aim of improving the efficiency of NHS pathology services and their contribution to the care of patients. It proposed that pathology networks should be formed to improve flexibility and cooperation between trusts, that systems to manage services and the mix of skills in the workforce should be reviewed, and that the management of information and audit should be improved.[2]

More recently, the Department commissioned an independent review of pathology services, chaired by Lord Carter of Coles[1], which identified six main priorities:

- development of a national specification with clear standards of performance
- creation of stand-alone providers of pathology services in the form of managed networks
- integrated IT systems, including improved order communications
- a national system for reimbursement
- improvements in systems and processes, linked to a review of the functions and mix of skills of the workforce
- development of stronger clinical leadership and skills in the management of change

The acute hospital portfolio pathology reviews

The conclusions of an Audit Commission report on pathology published in 1993[3] provided the starting point for the first acute hospital portfolio review of NHS pathology services, which was based largely on data for the 2002/2003 financial year. In addition to the local reports prepared for individual NHS trusts during 2003/2004, the Healthcare Commission published key findings of that review in 2005.[4] The work on which this publication is based is referred to as the 2003 review, reflecting the period over which data was collected. Key findings included:

- variable turnaround times
  - limited out-of-hours services
- variations in demand and in the number of tests carried out in response to each request
  - poor internal information on controlling demand, definitions of activity and related costs
  - significant numbers of duplicate requests
  - poorly completed pathology request forms
- lack of development and support for point-of-care and near-patient testing
- little involvement of pathology departments in the wider planning of services
  - a need to improve the understanding and engagement of people who use services

This report is about our 2005/2006 review, which followed up these key issues and addressed current concerns. We collected data from all NHS pathology departments of acute and specialist trusts in England during the autumn of 2005 (similar reviews took place in Wales and Northern Ireland, but these are not included in this report). We used the same definitions for much of this data as those employed by the 2003 review so that we could both measure improvements and assess each trust's current performance against that of others. Each trust also rated a sample of pathology requests for their completeness and legibility and calculated

rates of possibly inappropriate requests for repeats of two common tests. In addition, we asked a sample of clinicians in each trust for their views on the pathology services that they received (it was not feasible to conduct a similar survey of GPs within the timescale and constraints of the review).

Based on the data collected, we defined indicators and produced a framework of performance, databases and guidance. We used the most important indicators as measures of performance to provide scores for diagnostic services in our annual health check in acute trusts* for 2005/2006 (these scores were published on August 25th 2006).

This report draws on a wider set of indicators than those used in the annual health check (see figure 1), including those used by reviewers appointed by the Audit Commission (working in partnership with the Healthcare Commission). These reviewers have now produced local reports for each trust based on standard templates and have agreed conclusions and action plans with them. Since March 2006, trusts have also had access to these databases and to 'Compare' presentation software (which enables them to compare their performance with others) and many have already used them to improve their services.

This report

This is one of three reports on diagnostic services to be published by the Healthcare Commission in 2007. The other two concern endoscopy and imaging services. In contrast with these, pathology services face less pressure to reduce diagnostic delays. However the three diagnostic services do have several problems in common. These include rapidly rising demand, projected shortages of staff, uncertainties about funding, and pressures to modernise to keep up with new technological developments and establish patterns of service that address the needs of patients.

This report provides national summaries and further analysis of the data collected for the acute hospital portfolio review and draws conclusions from them.** It first discusses whether pathology departments are meeting the needs of the people who use these services. It then reports trends in the demand for pathology services and their levels of activity, and deals with the staffing, efficiency and management of departments. In conclusion, the report looks at pathology networks and draws conclusions on how services should develop in the short to medium term to provide even better value for money.

* Specialist trusts were not included in the Commission's annual health check of diagnostic services because their restricted range of services (for example, no A&E or direct GP referrals) meant that too few of the indicators were applicable. In pathology the specialised nature of many of the tests performed in specialist trusts made it difficult to benchmark their efficiency against that of acute trusts. However, other data collected from specialist trusts is included in this report, except where otherwise stated.

** The data in this report relates to numbers (or percentages) of pathology services rather than of individual NHS trusts. For clarity, the report refers to these managerial units as pathology departments. Although these departments are generally associated with a single acute trust, there are a few instances of a single pathology service that serves more than one acute trust. Conversely, four large trusts each had two or more managerially independent pathology departments that were assessed separately.

Figure 1: Framework of performance for the review of pathology services

Theme	Issue	Example indicators
Do people receive a good service?	Are test results available within appropriate timescales?	Turnaround times for selected procedures (and changes since 2003)
		Operational hours per week
	What does the service do to communicate with people who use these services?	Communication with referring clinicians: checklist of 10 issues
Are pathology services of a high clinical quality?	Are pathology laboratories accredited?	Percentage of laboratories with full or provisional accreditation
	How well-developed and supported is point-of-care testing?	Support for use of point-of-care testing in the trust and community
	How much importance is attached to quality issues?	Seniority of the quality manager/percentage of smears reviewed by a consultant
	Are up-to-date processes and techniques used?	Use of molecular techniques, liquid-based technology, NAATs*
	How well are pathology requests from GPs and wards completed?	Percentage of required information missing
Is there enough capacity to meet demand?	What is the workload and how is it changing?	Numbers of tests/requests, casemix: percentage of requests from GPs, annual growth
		Percentage of work from GPs
	How succesfully has demand been managed?	Tests (or slides) per request/tests per A&E attendance
		Demand management initiatives
Are services efficient and well-managed?	Are unit costs in line with expectations?	Staff costs and total costs per test/request by discipline
	Is there a stable workforce with low sickness and absence?	Sickness and absence, vacancy and turnover rates, forthcoming retirements
	How productive are staff?	Annual tests/requests per BMSs and per medical staff/clinical scientist
	Are tests repeated unnecessarily?	Percentage of thyroid function tests repeated within four days and full blood counts three days in a row
	Could better use be made of technology and automation?	Checklists for extent of use of IT and automated sample handling
	Does the trust belong to an active pathology network?	Network membership, frequency of meetings, modernisation fund allocation
	What is the network doing to rationalise/integrate services?	Checklist of issues/procedures standardised across network and trust

Note: Issues included in the annual health check of diagnostic services are shown in bold boxes.
* NAATs – nucleic acid amplification tests.

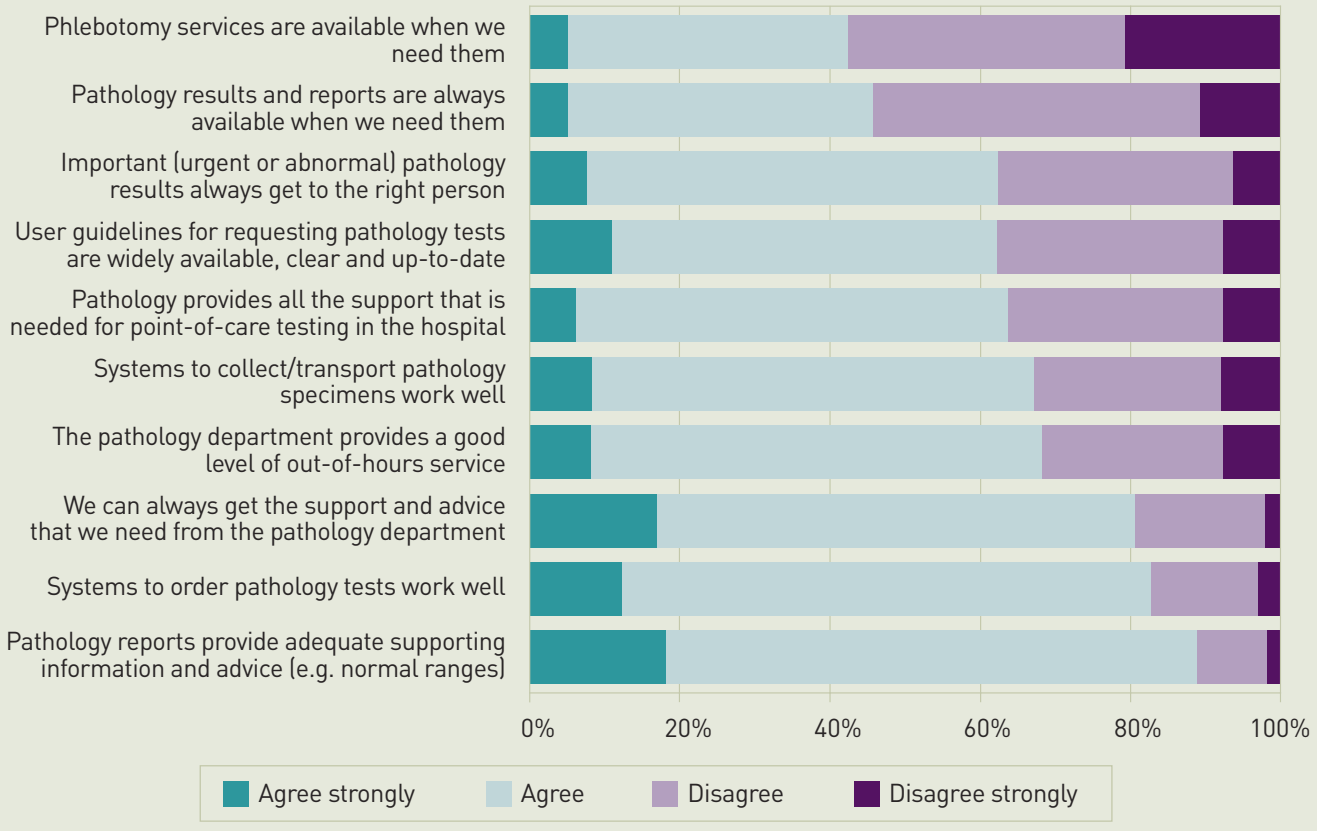
Do clinicians receive a good pathology service?

Clinicans' views on their pathology services

We invited clinicians in acute and specialist trusts to complete a questionnaire giving their opinions on various aspects of the pathology services in their trusts (see figure 2). Levels of response varied between trusts, but we gathered the opinions of more than 5,500 doctors and nurses. Though these views may have been influenced by local factors outside the control of the pathology service, they nevertheless provide a valuable supplement to the data provided by the pathology departments and confirm that our review addressed issues that are important to the care of patients.

These clinicians considered that the main problems lay in the timely availability of phlebotomy services and pathology results. Only 46% of those who completed this part of the survey agreed with the statement "Pathology results and reports are always available when we need them," and only 62% agreed that important (urgent or abnormal) pathology results always reached the right person. They disagreed even more strongly with the statement "Phlebotomy services are available when we need them" (dissatisfaction with availability of phlebotomy services may reflect the timing of phlebotomy ward rounds). In response to another question, 34% of respondents said that problems with the

Figure 2: Satisfaction of clinicians with pathology services



Source: Healthcare Commission survey of clinicians in acute and specialist trusts – autumn 2005

availability of the results of pathology tests affected the care of patients daily or several times a week, and 19% said that they delayed discharges with a similar frequency.*

Such problems were said to occur more often during normal hours than in the evening or at weekends. However, views varied markedly between trusts. At the trust with the services perceived to be the worst, seven out of every 10 clinicians said that delays in pathology services affected decisions on the care of patients at least several times a week. The collection and transport of pathology samples was a significant concern at some trusts but worked well elsewhere.

In general, clinicians had positive views on the availability of support and advice from pathology departments and on the quality of supporting information included in reports, (for example, normal ranges for test results) with 81% and 89% respectively of positive responses. Eighty-three per cent of respondents were also broadly content with the systems used to order tests. But there was more criticism of the clarity and availability of guidelines to help those using services to request tests, with a 37% negative response.

A similar proportion thought that the pathology service should provide more support for point-of-care and near-patient testing in the hospital.

Improving communications with clinicians

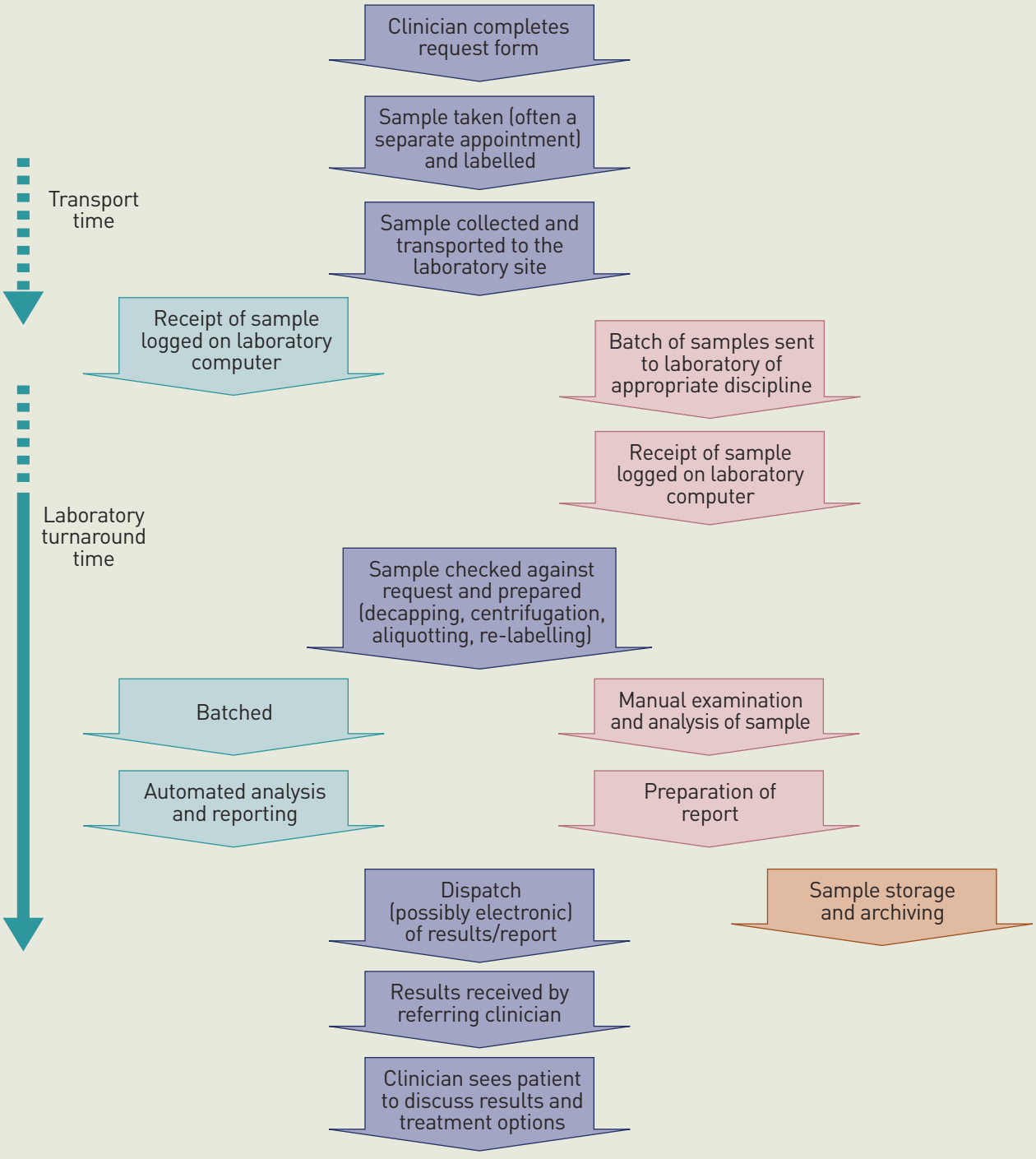
Despite the generally good opinion of pathology services expressed by many clinicians, the 2003 review reported that many pathology staff believed those who used the services did not adequately understand which services were available and how they operated. It is therefore important that pathology departments further improve communications with these clinicians, and doubly so in the light of the changes likely to come about in patterns of referral.

Four out of five pathology departments made a full pathology handbook available online; a further 10% offered partial guidance. Nearly all had updated this guidance within the past two years. Two out of three departments conducted their own opinion surveys of hospital clinicians, and 70% surveyed referring GPs. Feedback is also important, however, and fewer than half of the departments ensured that the results of surveys and any subsequent action were reported back to the people who use the services. One department in three produced a newsletter for people who use these services; 12% of these newsletters appeared quarterly or more often.

Communications could be improved further if every pathology department had a single telephone number that people could call with enquiries, regardless of the pathology discipline required. Only one department in three had this and just over one in four had an integrated GP request form covering all disciplines.

* To put these findings into context, clinicians completing the survey at three out of four trusts were less critical of the timeliness of pathology reports than that of imaging services, which 45% of respondents said delayed discharge at least several times a week, as reported in the Healthcare Commission's acute hospital portfolio report *An improving picture? Imaging services in acute and specialist trusts* (2007).

Figure 3: Simplified process map for receipt and processing of biochemistry and haematology samples



Turnaround of tests

Speed and reliability are very important to clinicians using pathology services. We collected turnaround times (the time taken to process a pathology test, from request to receipt of result) for 14 types of test, chosen to include tests from each of the four main disciplines that are performed in most trusts. Data for some of these tests had also been collected in 2003, allowing us to assess any changes in the speed of response. As in 2003, we measured only the 'in-lab' time from arrival of a sample* in the laboratory to issue of the report (see figure 3).

The latest data shows that pathology laboratories vary widely in how quickly they carry out tests (see figure 4). However, urgent tests were generally completed more quickly than in 2003. For example:

- the time taken to complete urgent troponin tests (a blood test to determine whether a patient with chest pain has had a heart attack or suffered injury to a heart muscle) requested by A&E departments had improved by 20% on average and by 25% at the quarter of trusts that previously provided the slowest service. It still averaged more than 143 minutes at the slowest 10% of trusts, however, compared with less than 34 minutes at the fastest 10%
- the average turnaround time for urgent D-dimer tests (used to exclude symptoms caused by blood clots reducing or blocking the flow of blood to important tissues) had improved by 23%. Ignoring the slowest 10% and fastest 10% of trusts, the best performance was less than 30 minutes, the worst more than 74 minutes

Average turnaround times for less urgent work and GP-referred tests had also fallen. For example:

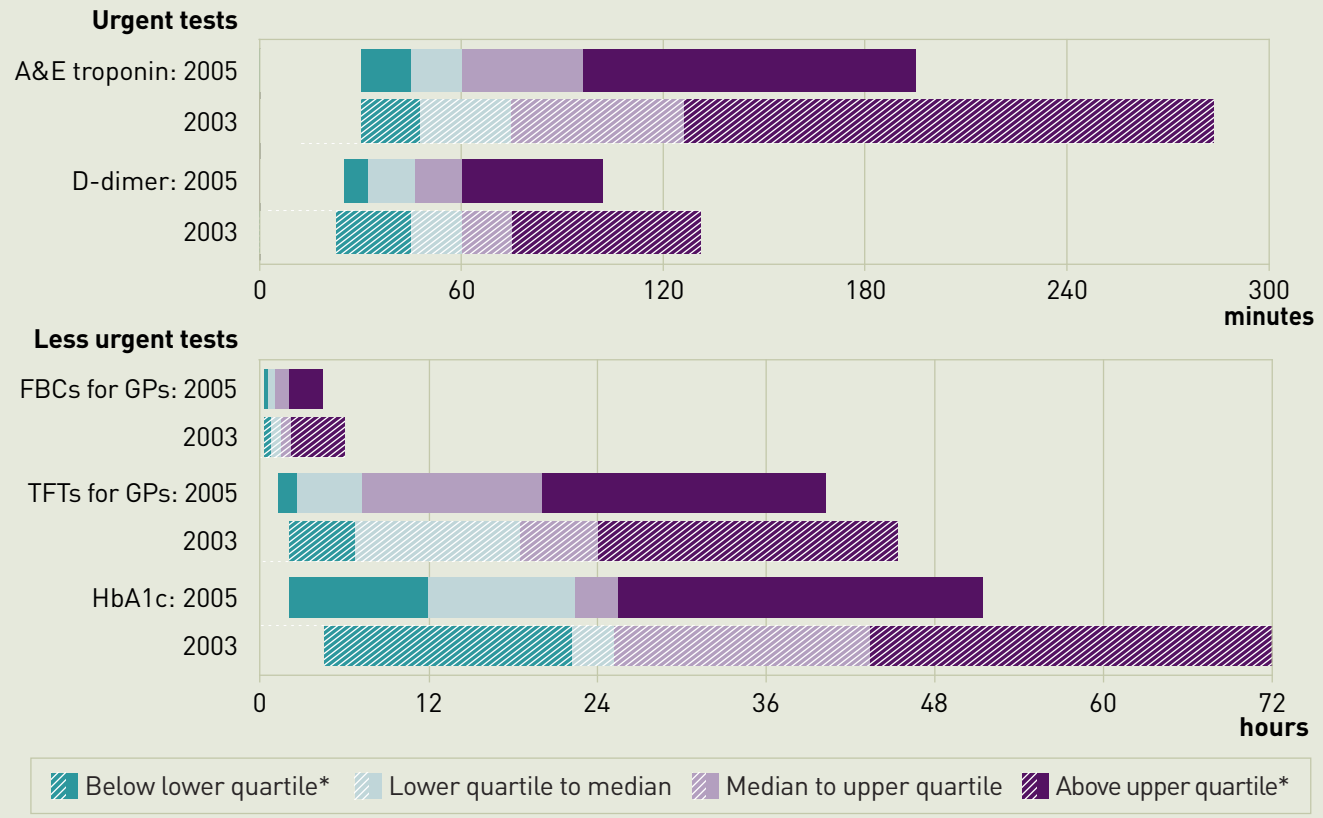
- full blood counts (FBCs) for GPs were completed in 60 minutes on average, compared with 87 minutes in 2003
- median turnaround of thyroid function tests for GPs had fallen from 19 hours to seven hours
- there had been an 11% reduction in median turnaround times for HbA1c (glycosylated haemoglobin) tests, used to check that diabetes is under control. Ten per cent of laboratories completed these tests in little over three hours, although the slowest 10% took more than 44 hours

While all increases in speed might at first sight be considered beneficial, there may in fact be little or no clinical benefit in performing non-urgent tests more quickly. Improvements such as those described here may have been achieved at little or no marginal cost, but equally they may not always represent good value for money. These are complex issues that are discussed at the end of the efficiency section of this report.

We also asked about the longest turnaround times recorded by trusts for each of the 14 tests. The results were less encouraging, revealing wide inconsistencies related to factors such as the time when requests were received, availability of staff and the pressures of other work. For example, a quarter of trusts reported

* Some laboratories could supply turnaround times only from the point at which the request was logged on their computer system, after samples had been batched and transported from a central reception point to the laboratory of the respective discipline. Using the trusts' own estimates of delays in logging requests, we calculated that turnaround times at these trusts have been underestimated by an average of 25 minutes. This estimate was confirmed by comparing the average turnaround times reported by these trusts for specific types of test with the averages reported by trusts that start their timings from receipt of the sample.

Figure 4: Variation and change in average turnaround times for selected pathology tests



Source: Healthcare Commission/Audit Commission acute hospital portfolio data returns, September 2005 and spring 2003

* The ranges shown exclude the fastest 5% and the slowest 5% of laboratories because of doubts about the accuracy of these data. Turnaround data for each of the 14 types of test reviewed are included in a statistical appendix on the Healthcare Commission's website (www.healthcarecommission.org.uk/acutehospitalportfolio).

that some urgent troponin tests for A&E patients had taken more than five hours to complete and that some thyroid function tests for GPs had spent three days or more in the laboratory.

Such uncertainty cannot be good for the care of patients. It suggests that either there are no agreed local standards for how quickly work should be done, or that such standards exist but are not being met. Pathology services, referring clinicians and commissioning bodies should agree local targets for the turnaround of different categories of pathology tests, reflecting their clinical urgency. National guidelines could be useful in setting targets. Trusts should monitor their performance against their local targets routinely. Pathology laboratories may need to streamline their practices or reschedule the availability of staff in order to ensure that tests are turned around within acceptable times, even during busy periods.

Transporting samples to the laboratory
The time taken to perform and report on a test in the laboratory is only a small part of the total turnaround time for many tests requested by GPs or by hospitals lacking an on-site laboratory. In such cases, the total turnaround time depends more on the frequency with which samples are collected and how long it takes to transport them to the laboratory.

Only 15% of departments, generally those in large teaching trusts, had dedicated transport services for pathology samples. More usually they were sent in vans that also deliver and collect mail between hospitals and GP surgeries. It is therefore difficult to schedule collections so that they best fit the needs of GPs and so that samples can be processed during the normal working day at the laboratory.

There was wide variation in the frequency of scheduled collections from GPs. Almost half of the laboratories that processed samples from GPs had only one daily collection from each surgery, and none at weekends. Only 8% had more than two collections a day. Trusts estimated the average elapsed time between collection and receipt in the laboratory at four and a half hours, although this can be expected to vary widely with the location of the GP's surgery. On arrival there was then a further delay averaging 20 minutes before the sample was available for processing.

Transport delays are usually far less significant within a hospital. Fifty-seven per cent of the sites surveyed had a hospital-wide vacuum tube system to send samples to the pathology laboratory. A further 31% of sites had limited vacuum tube coverage of critical areas such as A&E. The estimated average time between dispatch of an urgent sample from A&E and its logging on the pathology computer was 22 minutes less at sites with a tube system than at those lacking such equipment.

Availability of pathology services

Since 2003, the number of hours each week during which pathology services are provided on-site had increased. This may reflect an added emphasis on swift diagnosis of emergency admissions, but operational hours had also been extended at hospitals that do not routinely deal with emergency admissions. In such cases the clinical benefit of extended hours should be evaluated against the extra cost.

Sixty-one per cent of the laboratory sites surveyed provided a full biochemistry and haematology service for more than 50 hours a week, compared with 50% in 2003. Thirty per cent provided full services in these disciplines 24 hours a day, seven days a week. While there has been less change in the hours during which full microbiology and histopathology services are available, the percentage of sites providing selected microbiology services for more than 50 hours a week had risen from 33% to 72%.

Provision of specialist services
A growing number of trusts also provided more specialist services in-house rather than referring requests out to other laboratories. For example, the proportion of trusts providing specialist coagulation services rose from 68% in 2003 to 86%, and the proportion providing paediatric pathology rose from 24% to 33%. We observed a similar increase across all of the specialist pathology services covered by our questionnaire. This may not, however, be a cost-efficient way of providing these services.

Ensuring that the service is of high clinical quality

British pathology laboratories have an excellent reputation – based on sound systems for quality assurance and regular accreditation of facilities and procedures against national best practice – for the accuracy and quality of their results. For example, international studies quoted in Lord Carter's report concluded that the UK has lower laboratory error rates and shorter delays in communicating abnormal results than the USA or Canada. Although lapses are rare, they are however, heavily publicised when they do occur. On the other hand, commentators also point to lower investment in and slower introduction of new, more efficient technologies in the UK than in many other countries. This lower expenditure may not be cost-effective.

Accreditation of laboratories

The periodic accreditation of the facilities and processes of pathology laboratories by Clinical-Pathology Accreditation (UK) Ltd is designed to ensure that a high quality of service is maintained. We asked about the accreditation of five disciplines – clinical biochemistry, haematology, microbiology and histopathology, plus cytology – at each laboratory site. A revised scheme of accreditation was introduced shortly before our review. Overall, 17% of laboratories were fully accredited under the new criteria and a further 38% under the previous scheme. Many of the latter had completed the necessary preliminaries for renewing their accreditation under the new scheme but were awaiting an inspection visit. Accreditation rates were somewhat higher for biochemistry, haematology and microbiology than for histopathology and cytology. A further 33% of laboratories had been given provisional or conditional accreditation, often because of a defect in accommodation that could not be remedied by the pathology service without major capital expenditure. Some 5% of laboratories had not yet applied for accreditation and a further 7% were recent applicants awaiting an initial accreditation visit.

Helping to develop high quality point-of-care testing

The care of patients can be improved if certain pathology samples are analysed without having to send them to a laboratory. Clinical decisions can then be taken on the spot without a further appointment. Such point-of-care testing (POCT – also known as near-patient testing) also makes it possible for some tests to be conducted in a primary care setting or even by community pharmacists, whereas previously they required a hospital visit. At present POCT is most likely to involve relatively straightforward, high-volume tests such as regular monitoring of glucose levels.

POCT can have some disadvantages, however, if it is not properly controlled. Test results may never be collated on a central computer system, leading to unnecessary duplication of requests made by different clinicians and potentially reduced quality of care. Equipment may also be duplicated or under-used. Although much POCT equipment has a good record of reliability, quality assurance and maintenance may be less rigorous than in major laboratories or may depend on the goodwill of the staff of a pathology department. The cost of supplies such as reagents and chemicals may be higher than in a laboratory, where there are economies of scale, though the additional expenditure may be offset by reduced transport costs, an improved experience for the patient and a more efficient operation for the clinic.

There can therefore be tensions between the convenience of POCT and concerns about quality assurance, governance and value for money. It is important that expert pathology staff are fully involved in advising on further introduction of POCT within trusts and in the community, on quality control and on securing the best prices for supplies. More involvement of pathology staff in setting up, monitoring and servicing POCT – including ensuring that results are recorded on central electronic records for patients – can reduce unnecessary duplication of work.

The use of POCT devices in hospitals increased rapidly between 2003 and 2005. The number of glucose meters rose by 17% and the percentage of trusts reporting the use of complex POCT coagulo-meters and thromboelastographs rose by 6%.

There was also increased recognition of the need for central coordination of POCT and further work on quality assurance in trusts, although the involvement of trusts in providing such coordination seldom extended to the community:

- the percentage of trusts with a committee to oversee POCT rose from 50% to 73%, although some of the committees had only limited responsibilities
- pathology departments were required to advise on and agree the deployment of new POCT analysers in 59% of trusts, compared with 48% in 2003
- 56% of departments supervised the quality assurance of all POCT devices in the trust, with a further 18% doing the same for some types of device
- 78% of departments coordinated the purchase of consumables for at least some POCT devices

Most importantly, more of the results of POCT tests carried out in trusts were being recorded on a central laboratory computer system. The percentage of centrally-recorded POCT HbA1c results rose from just 1% in 2003 to 37% in 2005 (although much of the data transfer was still manual) and that of FBC analysers from 28% to 41%. Figure 5 shows the use of POCT devices in trusts during 2005 and indicates whether their results were recorded centrally.

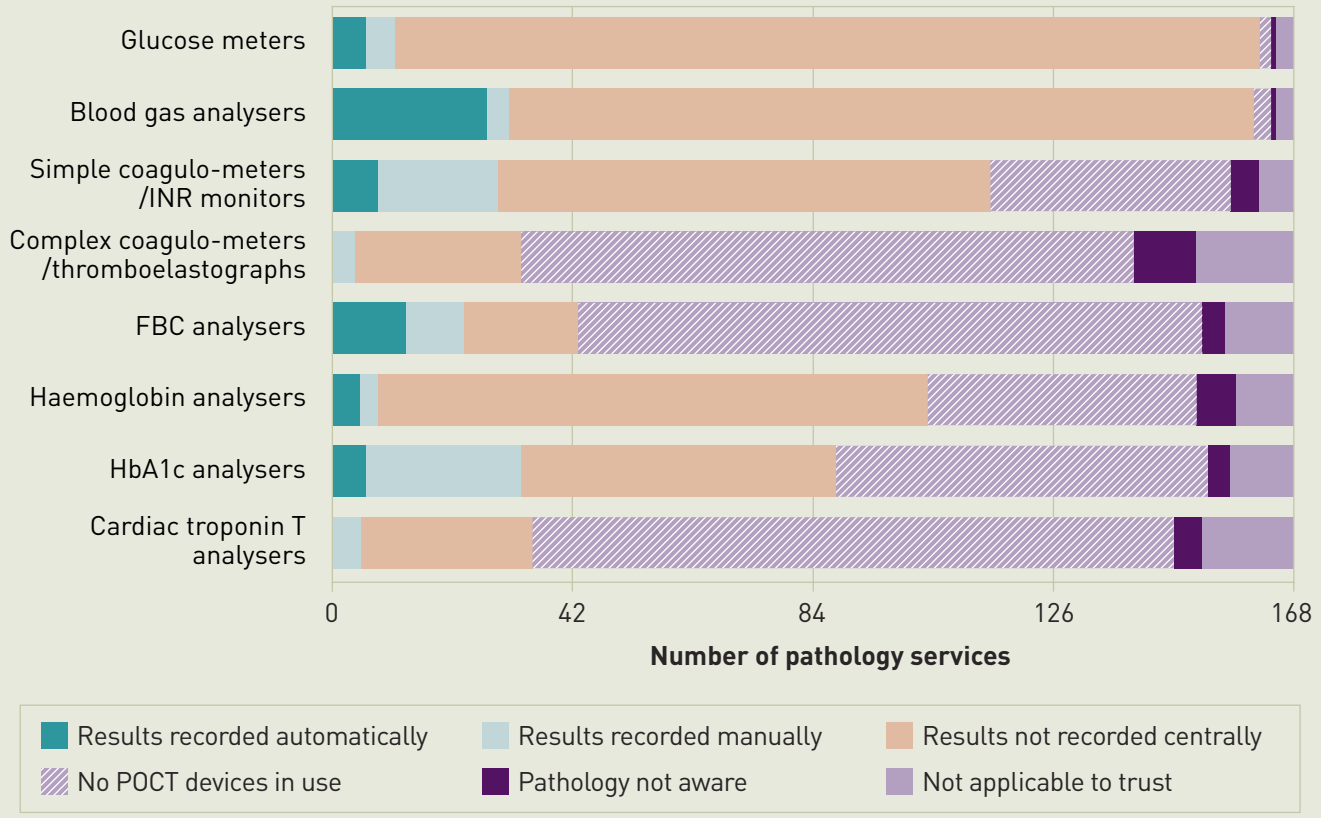
Quality assurance

Each pathology service or managed network should have a quality manager of sufficient seniority to exert real influence. However, 9% of pathology departments said that they had no quality manager at all, while a further 2% of departments said that this role was performed by a junior member of staff.*

Consultants also have a key role to play in ensuring that clinical quality is maintained. For example, they should review a sufficiently representative sample of cervical cytology smears; the right proportion is a matter for debate and may depend on the experience of other staff. The extent that consultants review smears varies significantly. One in 10 of the pathology departments that provided a cervical cytology service reported that more than 15% of smear tests were reviewed or seen by a consultant, while a similar number of departments reported review by a consultant of less than 3% of tests.

* 45% of quality managers were graded MLSO3 (Agenda for Change Band 7), 27% were graded MLSO4 (Band 8A) and 16% were senior managers.

Figure 5: Use of point-of-care testing devices and central recording of results



Source: Healthcare Commission acute hospital portfolio data returns, September 2005

Quality of requests and samples

The ability to provide a high quality pathology service also depends on the quality of the requests and samples received. Poorly completed requests or spoilt samples can delay diagnoses, inconvenience the patient and hinder the efficient operation of pathology departments. We asked each department to repeat the small audit of the completeness of requests from GPs and from inpatient wards that they carried out as part of the 2003 review. Based on the average of trusts' results, this showed an overall improvement since 2003 but also revealed some major shortcomings:

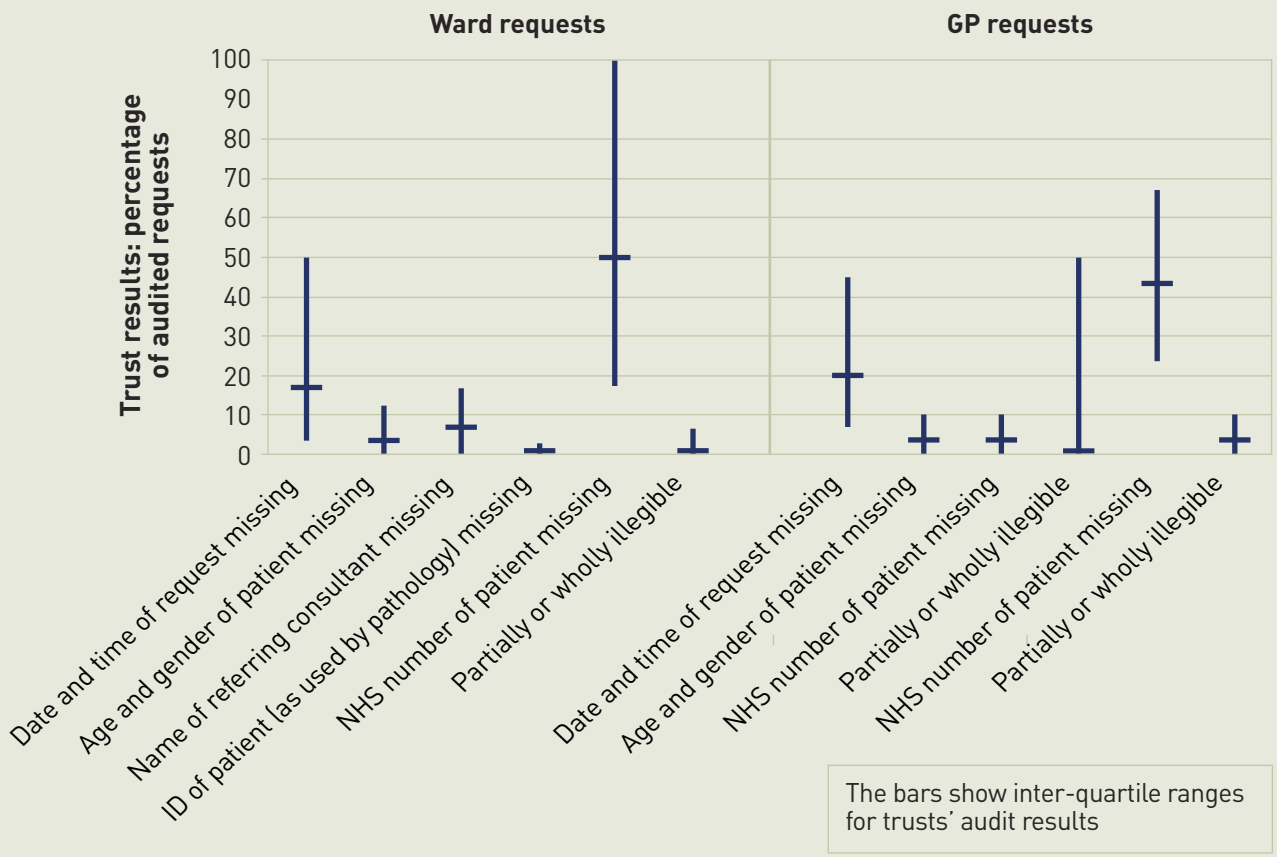
- about half of all the requests reviewed failed to include the NHS number of the patient, increasing the likelihood of unnecessary duplication of tests (comparable results for 2003 are unavailable)
- 30% of requests lacked a time or date (compared with 40% in 2003), hindering the monitoring of the quality of service
- the name of the referring consultant or GP was missing on 9% of requests from wards and 7% of requests from GPs (a slight improvement on the 2003 results), making it more difficult for the pathology service to contact the referring clinician to discuss abnormal results

- 7% of requests from GPs and 9% of requests from wards (both about 3% less than in 2003) did not state the age and sex of the patient, factors that could affect the interpretation of results
- pathology departments judged an average of 7% of requests from GPs and 5% of requests from wards (compared with 11% and 7% in 2003) to be wholly or partially illegible

While the averages indicated an overall improvement, the trusts varied widely in their findings (see figure 6).* The performance of individual trusts may have been affected by local policies on the minimum data required and the extent to which their computer systems include mandatory fields that force staff to enter the data.

We also asked how many of the samples received for testing were unusable. On average this was put at just under 1% of biochemistry, haematology and microbiology

Figure 6: Quality of pathology requests



Source: Small audits of biochemistry and haematology requests undertaken by pathology departments as part of the Healthcare Commission's acute hospital portfolio review, autumn 2005

* The minimum sample size for the audits was 60 forms (30 from each source), so that the results give only a broad idea of where problems may exist.

requests. Three per cent (and higher for haematology) was a typical level of unusable samples in the worst-affected 5% of trusts; these were predominantly located in London and other metropolitan areas.

Adopting up-to-date technology

The introduction of up-to-date technology has been slow. We examined the take-up of newer testing methods by asking about the use of nucleic acid amplification tests (NAATs) in the diagnosis and treatment of chlamydia trachomatis, of molecular techniques in testing for novovirus, hepatitis B and C and varicella zoster virus, and of liquid cytology for cervical cancer screening.

The review showed that at the time of our survey in 2005, 70% of testing for chlamydia trachomatis was carried out using NAATs, which are substantially more sensitive than earlier tests. Initial funding of £7 million was provided for the introduction of NAATs in 2004. It encouraged chief executives of health authorities to explore regional networks of laboratories where chlamydia testing could be performed most cost-effectively. However, we found wide variations in the speed of take-up. Of those pathology departments that either tested for chlamydia trachomatis in-house or referred these tests out, just under 50% used NAATs for almost all of them (over 95%), while 28% made virtually no use of NAATs (less than 5%). The Department of Health has informed us that NAATs testing is now available in every health authority area and that they are used for all tests in the National Chlamydia Screening Programme.

Molecular techniques are faster and more sensitive than classical methods of testing for novovirus, hepatitis B and C and varicella zoster virus, and for monitoring infected patients. In-house provision of molecular techniques ranged from 21% for hepatitis C down to 4% for novovirus. Though it is quite appropriate for such tests to be referred out to specialist laboratories, 19% of departments made no use (either in-house or referred out) of molecular techniques for testing for hepatitis C, while 73% did not use them for novovirus.

The advantages of liquid-based methods for cervical cancer screening over traditional techniques include a reduction in the number of inadequate smear specimens and improvements the sensitivity of smear tests. Though national funding was provided in 2003, our survey found that only 22% of requests for smear tests during the period between April and September 2005 were met with liquid-based cytology. Sixty-four per cent of trust pathology services did not use liquid cytology at all. The Department of Health has informed us that there has been significant progress since the time of our review and that 83% of the 140 laboratories that provide cervical screening services will have converted to liquid-based cytology by the end of March 2007. Commissioning bodies need to ensure that this change takes place at all laboratories.

Workload of staff

This section of the report shows that the recent improvements in quality and the speed with which pathology tests are completed have been achieved in the face of a rapidly rising workload. But it also questions why there are such large regional and inter-departmental variations in the number of requests and tests in relation to the number of patients. It then examines what trusts are doing to audit activities that may be of little clinical value, and to reduce them where possible.

Trends in workload and activity

In the review, it was impractical for us to collect the substantial volumes of data that would have been needed to estimate workload comprehensively, test by test from each trust. Instead we considered the number of requests in each discipline as the most reliable broad indicator of demand. We then looked at the number of individual tests performed (or, for histopathology, slides and blocks prepared). We asked trusts to use the definitions of requests and tests developed by Keele University's National Pathology Alliance benchmarking service (to whom we are grateful for help and advice). However, these definitions may differ from the way that some pathology departments normally record requests and tests, so the data may have some element of error.

The number of pathology requests received each year has continued to rise in each of the four disciplines (see figure 7). However, the data that we collected from trusts suggests that annual rates of growth in demand between 2002/2003 and 2005* were lower than those between 2000/2001 and 2002/2003. Total requests for microbiology had risen by 9.5% a year, (including additional testing for MRSA), those for biochemistry and haematology by 6.4%, but those for histopathology by less than 1%. Individual trusts reported widely disparate levels of growth in demand. Some of this variation reflects reconfiguration of services: for example, in some cases there is now greater specialisation of services on certain sites, with requests by GPs redirected to other laboratories or trusts.

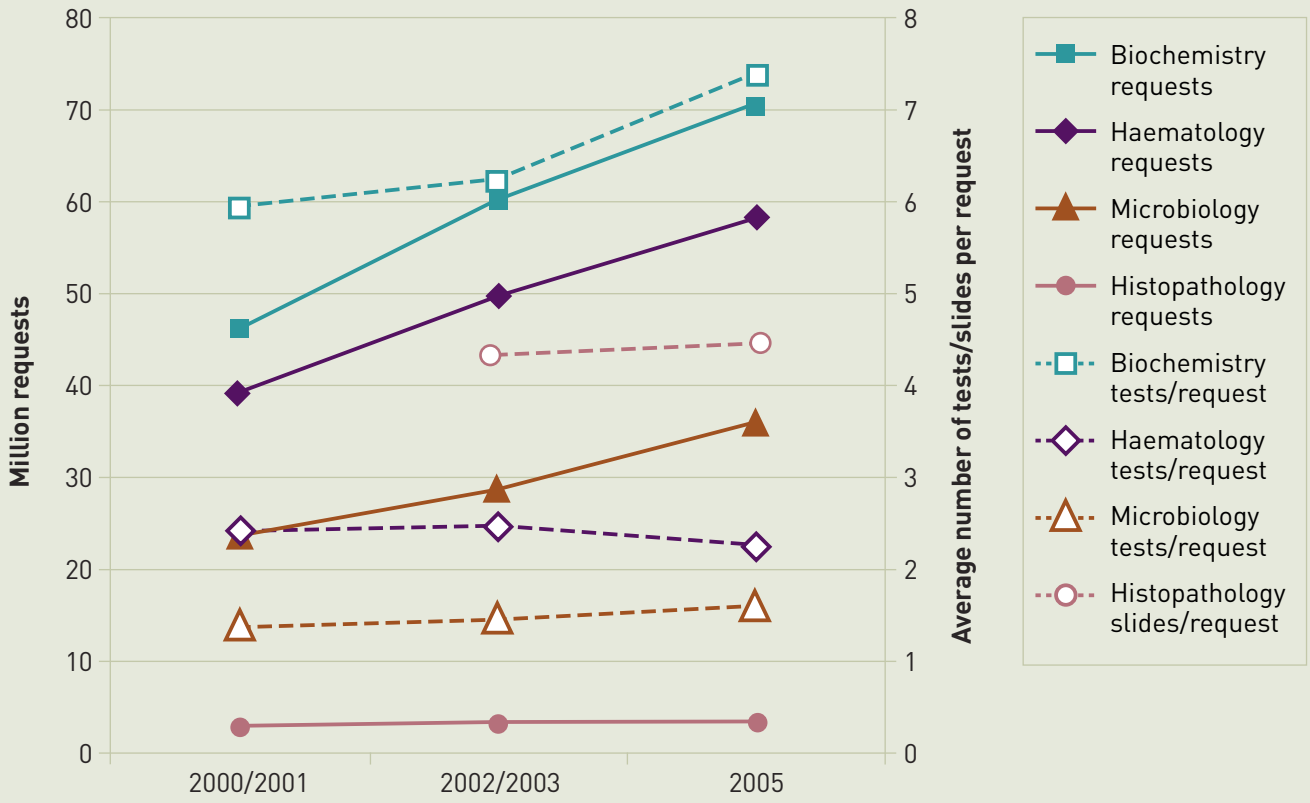
More tests were also being performed on each sample. In 2000/2001, there was an average of 5.93 biochemistry tests per request, a figure that grew to 6.20 in 2002/2003 and 7.36 in 2005/2006. This may reflect the ease and low marginal cost of carrying out additional automated tests on the same samples.** Nevertheless, laboratories should review the appropriateness of such additional tests to determine whether they contribute to the diagnosis and management of the patient and to protect against the possibility of supplier-induced demand.

The average number of tests per microbiology request also grew during this period, from 1.35 to 1.57, as did the number of histopathology slides per request, from 4.29 to 4.41. Changes in haematology were less marked.

* Data for 2005/2006 is based on activity during the six-month period from April to September, doubled to give an estimate for the year. Baseline data on activity during 2000/2001 was collected as part of the 2003 acute hospital portfolio review.

** Much of the biochemistry work exhibiting the greatest growth in demand is carried out on large analysers, most of which still have significant spare capacity. Comparisons of the capacity of the main biochemistry analysers with current workload are crude and potentially misleading, since they exclude set-up time and assume that they can be run at full capacity 24 hours a day. With these reservations, there is currently 14 times as much capacity as demand.

Figure 7: Growth in the number of requests and tests for pathology services



Source: Healthcare Commission/Audit Commission acute hospital portfolio data returns, 2003 and 2005

* 2005 data is based on an April to September sample

These averages mask wide variation among trusts: one pathology department in 10 performed an average of more than 2.26 tests per microbiology request, while a similar number carried out fewer than 1.10 tests per request.

Demand from GPs – in terms of both the number of requests and the number of tests on each sample – had grown particularly rapidly. For example, the number of biochemistry tests requested by GPs increased by over 20% a year between 2002/2003 and 2005. Requests from GPs accounted for 41.7% of biochemistry and 30.6% of haematology tests in 2005, compared with 37.2% and 25.8% respectively at the time of the 2003 survey.

Conversely, less work (other than work on clinical trials, which was not counted by our returns), was being referred to laboratories from other trusts or non-NHS sources: the median percentage of work referred to acute trusts (other than from primary care) fell from 2.2% to 1.2% for biochemistry requests, from 1.8% to 0.8% for haematology, and from 7.1% to 2% for histopathology. Specialist trusts also appeared to have seen a reduction in the

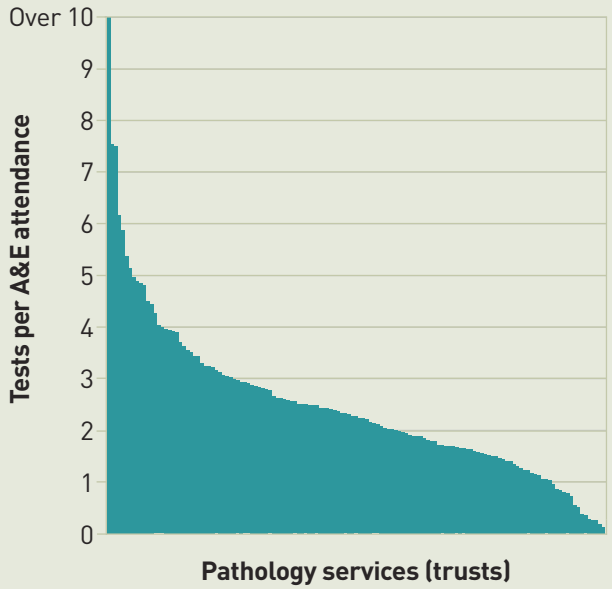
proportion of requests referred from other hospitals. It is open to question whether such changes reflect an increased ability of laboratories in each individual trust to perform a wider range of tests for more hours a week.

The number of requests for biochemistry tests from A&E doctors illustrates the growth and the extent of inter-trust variation in the demand for pathology services. In 2002/2003 there was one biochemistry request from A&E for every 3.81 attendances; by 2005 demand had increased to one in every 3.58 attendances. A&E doctors requested an average of 8.52 biochemistry tests per referral in 2005, compared with 7.83 in 2002/2003. It may be that the average A&E patient is now sicker, but it is more likely that A&E doctors are becoming increasingly reliant on pathology tests to confirm their diagnoses.

A&E departments differed widely in the number of pathology tests that their doctors requested (see figure 8). One in 10 requested more than 4.08 biochemistry tests for every A&E attendance (counting all attendances, not just those for which pathology tests were required), while at the other extreme one department in 10 requested fewer than 0.95 tests. There were also geographical differences: A&E departments in London (not just those in teaching hospitals) requested on average in excess of 30% more biochemistry tests for each patient than those in the south west.

Such variations among trusts and regions invite further study of the extent to which they result from differences in case mix or clinical practice. It may be that some A&E doctors request additional tests before it is decided whether a patient should be admitted, in case they are required later. Do patients receive better or timelier care in hospitals where more tests are requested? Are these decisions based on sound evidence of clinical need or value for money? Interestingly, on average, those trusts that said that the number of biochemistry tests carried out on each sample was determined by clinically derived protocols rather than by how many boxes had been ticked on a form received fewer requests for each patient from A&E but carried out more tests for each request (this relationship did not extend to biochemistry requests by GPs).

Figure 8: Biochemistry tests for A&E patients per attendance

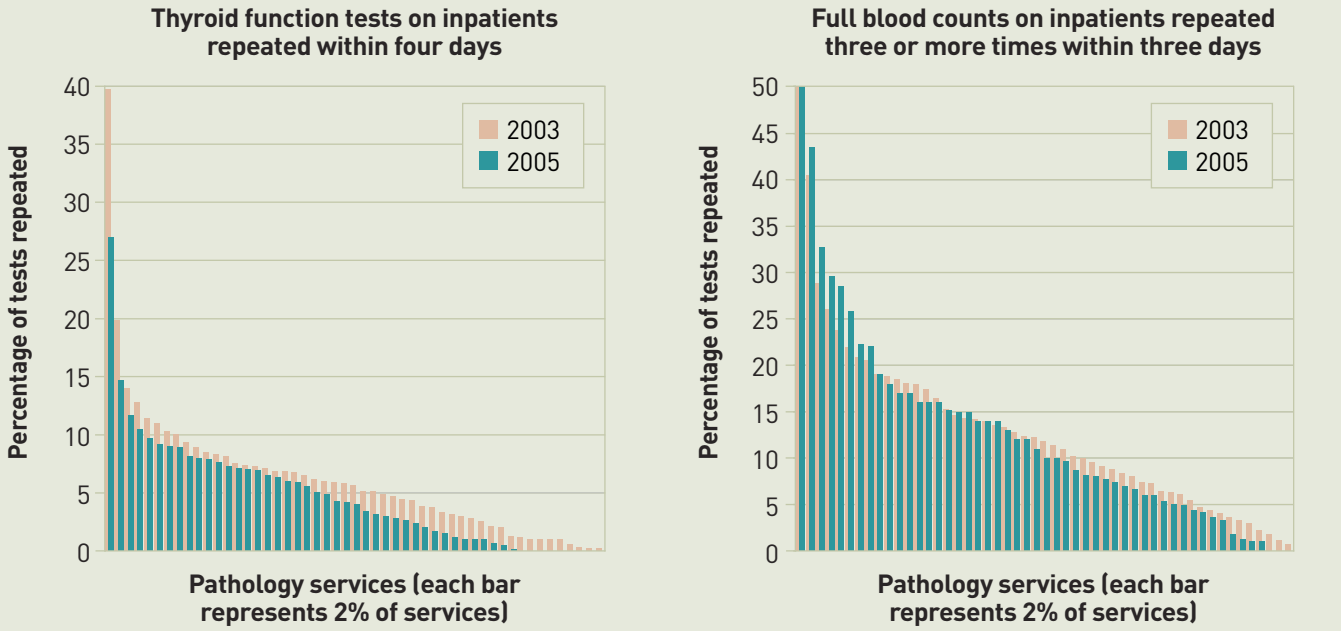


Source: Healthcare Commission acute hospital portfolio data returns, April to September 2005

Reducing activity of limited clinical value

It is widely accepted by pathologists that some requests contribute little to clinical decisions. While it is not easy for pathology departments to influence demand, most had conducted initiatives to manage demand during 2004/2005. In biochemistry, haematology and

Figure 9: Repeated pathology tests of questionable clinical value



Source: Healthcare Commission acute hospital portfolio data returns, April to September 2005

microbiology, these resulted in amendments to guidance for those using services in three-quarters of trusts, in changes to the training for users (especially in haematology – 52% of trusts), and in changes in the availability of tests (most notably in biochemistry – 76% of trusts). In many cases the starting point for the changes was multidisciplinary discussion.

There is a national agenda for reducing activity of limited clinical value in histopathology[5]. Responding to guidance from the Royal College of Pathologists, 57% of pathology departments had held multidisciplinary discussions and 47% had audited their current practice, though only 29% had issued revised local guidance.

Repeated tests

Pathology departments can also control their workload by reducing the number of tests for the same patient that are repeated unnecessarily. We collected data on the percentage of thyroid function tests (TFTs) for inpatients that were repeated within four days (see figure 9). The incidence of such tests had fallen from 5.6% to 4% nationally since the data was last collected, in March 2003, but there was still great variation among trusts. Excluding the highest 5% of trusts, the percentage of repeated TFTs varied between none and 11%.

However, such repeats are sometimes clinically justified. Higher levels of repeats can reasonably be expected in trusts with more complex workloads (those with high numbers

of intensive care beds, for example, or a high specialist cardiac workload). But a high incidence at hospitals where such special factors do not apply should prompt an audit to identify the reasons, which could include poor communication among doctors, and reports missing from the patient's notes. Ensuring that each patient's NHS number is used on request forms and that systems to request tests draw attention to previous tests can also reduce duplication.

We also asked how many FBCs for inpatients were carried out for the same patient three times within three consecutive days. Excluding the highest and lowest 5% of trusts, this varied between 1% and 32%. Again, in certain circumstances such repeats can be justified, but very high rates suggest that results are not being well communicated within the trust. Nationally, this percentage had fallen since March 2003 from 11.8% to 10%.

Further repeated tests may occur following discharge because the results of inpatient investigations are not necessarily recorded in discharge summaries. Such unnecessary repeats should be greatly reduced following the introduction of two-way electronic information links between hospital pathology systems or patient records and clinicians in primary care.

Questions about the cost-effectiveness of some laboratory work may also arise if significantly more blood than is required for transfusion is routinely cross-matched. One department in 10 reported that it cross-matched more than twice as many units of blood as were transfused, compared with an average ratio of 1.5 for all trusts. There is no single ratio that is right in all settings: hospitals with a more complex case mix need a higher ratio than most district general hospitals, for instance. However, the hospital transfusion committee should set and impose agreed protocols for the number of units to be cross-matched for each procedure. Alternatively, current recommended practice is to adopt electronic selection and issue of bloods, which results in lower wastage, lower stock levels and a reduced need for staff by comparison with traditional cross-matching.

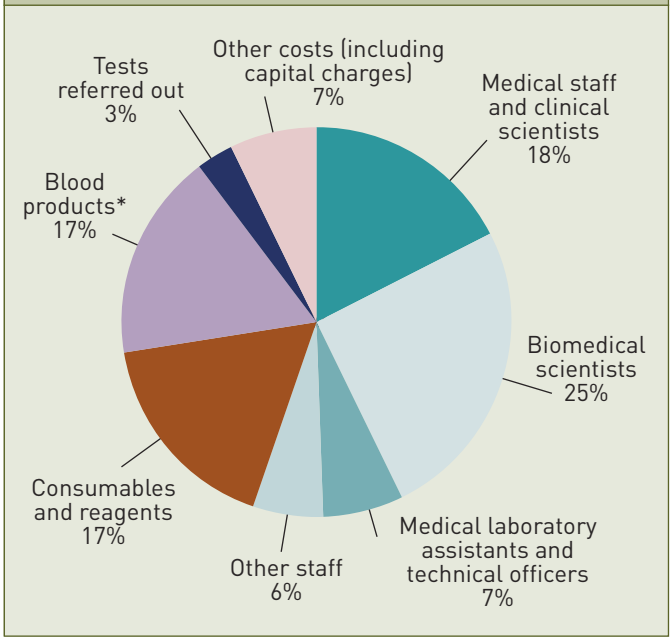
Departmental efficiency and management

Costs of pathology departments

Since the 2003 review, the budgets of pathology departments had risen by an average of 13.3% a year. Salaries and other staff costs accounted for 55% of total budgets (see figure 10), followed by laboratory consumables and reagents (17%) and blood products (17%), although the last were sometimes recharged to clinical directorates. Trusts also varied as to whether the salaries of staff such as infection control nurses and phlebotomists were charged to the budgets of pathology departments. Many departments received some offsetting income from clinical trials and specialist work.

There was great variation among pathology departments in different acute (non-specialist) trusts in the average cost by discipline of meeting each request (see figure 11). For example, one acute trust in 10 spent less than £4.67 for each biochemistry request, while at the other extreme an equal number of trusts spent over £8.45 for each request. Equivalent figures for the other disciplines were: haematology (less than £5.95/more than £12.08), microbiology (£7.26/£13.71), histopathology (£68.42/£118.71). Higher costs are to be expected in trusts with a more complex case mix (teaching hospitals, for example) but they also occurred in small district general hospitals. High costs would have a major impact on the finances of pathology departments if tests for GPs are unbundled from existing block tariffs following the introduction of payment by results.

Figure 10: Composition of the budgets of pathology departments



Source: Healthcare Commission acute hospital portfolio data returns, April to September 2005

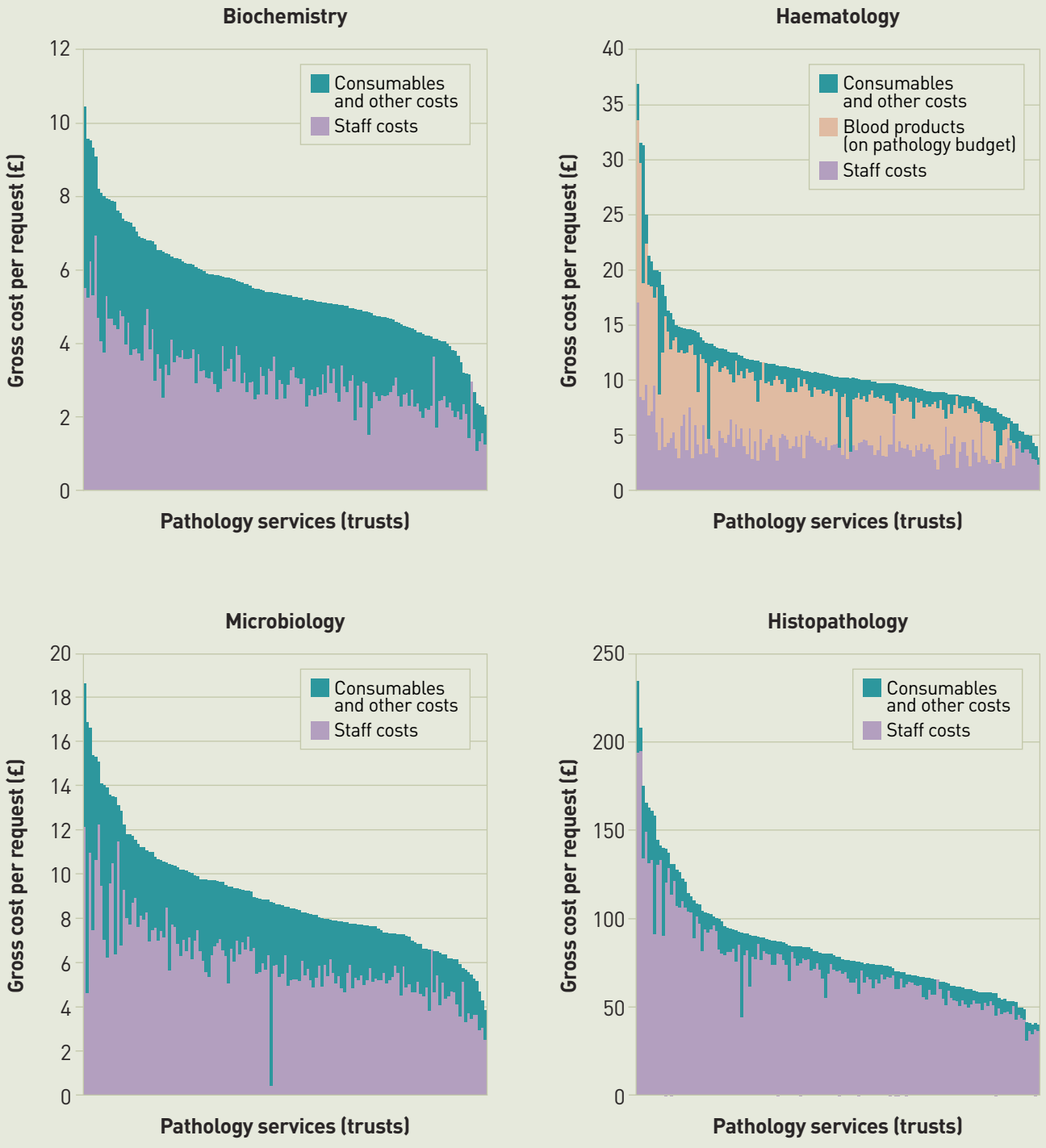
* In a minority of trusts, blood products are not charged to pathology budgets

Differences in salary costs for each pathology request were the main source of variation in unit costs*, though there was also wide variation in the costs of consumables and reagents, and in other elements. In biochemistry and haematology, there was more inter-trust variation in cost for each test than in cost for each request because the marginal cost of performing an additional automated test is often trivial.**

* No adjustment has been made for London weighting or for any Agenda for Change back-payments made during the period of data collection. However, these factors alone would not account for variations of the magnitude reported here.

** Details of distributions of unit costs per request and per test are contained in a data appendix on the Healthcare Commission's website. Local reviewers were instructed to look for abnormal values of both cost per request and cost per request before drawing conclusions.

Figure 11: Inter-trust variation in gross costs per pathology request



Source: Healthcare Commission acute hospital portfolio data returns, April to September 2005

The pathology workforce

The NHS pathology services described in this report were provided by*:

- 1,980 consultant pathologists and 713 other medical staff, many of whom also have clinical responsibilities outside the pathology laboratory. Histopathology, which accounts for under 2% of pathology requests, accounts for 47% of the consultants, a result of the complex nature of much of this work and the experience that is required
- 911 clinical scientists, a majority of whom are biochemists
- 12,264 biomedical scientists (BMSs). These graduates form the backbone of the service, preparing and carrying out the more complex analyses and managing the laboratories
- 5,165 medical laboratory assistants (MLAs) and medical technical officers (MTOs), who prepare samples for analysis and carry out more automated processes, as well as 979 other staff directly involved in processing samples
- 3,063 clerical, administrative and managerial staff
- 1,909 phlebotomists, infection control nurses, porters, IT and other staff employed by pathology departments in roles that fall under different directorates in certain trusts

The mix of staff and extended roles

The Department of Health has encouraged pathology departments to review the mix of skills of their staff to ensure that it accords with current working practices and patterns of demand. Pathologists now have a greater clinical role, working directly with patients and with multidisciplinary teams to ensure that severely ill patients receive the best possible care. Some of their former laboratory role has been taken over by clinical scientists. Medical staff and clinical scientists form a growing proportion of the pathology workforce.

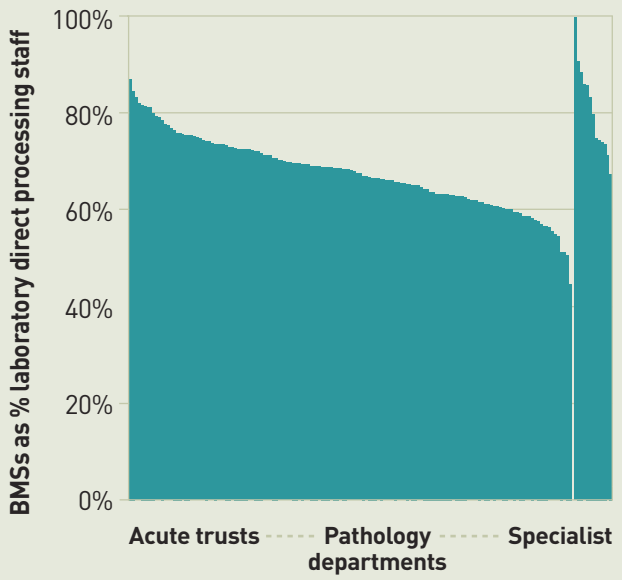
In many trusts, BMSs have also been encouraged to extend their role. For example, the proportion of trusts in which BMSs dissect and describe histopathology specimens** rose from 45% to 59% between 2003 and 2005.

At the same time, the pressing need to control costs in the face of spiralling demand means that assistants now carry out some tasks formerly handled by BMSs. The latter form just over 70% of the laboratory workforce (excluding doctors, clinical scientists and staff with no responsibilities for processing samples) compared with 75% in 2003. However, this percentage varied from 45% to 87% across acute trusts (see figure 12). There is no obvious reason for this degree of variation. For example, we could find no significant inverse correlation between the percentage of BMSs in a department and the percentage of tests that were referred by GPs. This suggests that some departments with very high percentages of BMSs could be missing an opportunity to reduce their staff costs with no reduction to the quality of service.

* The numbers quoted are whole time equivalent (WTE) pathology staff at English acute and specialist trusts at September 30th 2005, excluding vacancies but including locums. Also excluded are posts funded by medical directorates and a few pathologists employed in a purely clinical role and performing little or no work in the laboratories.

** Typical specimens include small skin biopsies, vasa (blood vessels supplying the walls of veins and arteries), tonsils and adenoids, lymph nodes, foreskins and temporal arteries.

Figure 12: Biomedical scientists as a percentage of the workforce of laboratories



Source: Healthcare Commission acute hospital portfolio data returns, September 2005

Productivity

Since March 2003, the number of medical staff and clinical scientists reported to be working in pathology laboratories had increased by 14%, broadly in line with the increase in the number of requests. In the same period, the number of BMSs working in biochemistry, microbiology and histopathology grew by 8%*, well below the rate of increase in the number of tests performed. In compensation there was a 25% increase in the total number of MTOs, MLAs and other staff handling tests; many of these staff cannot be attributed to individual disciplines.

Nearly all trusts could therefore point to a marked improvement in productivity if this were measured only in terms of the number of tests carried out by each biomedical scientist: 23% more for biochemistry (perhaps reflecting the increased sophistication of equipment) and 8% for haematology. In microbiology too there had been a 10% increase in the number of requests by each biomedical scientist.

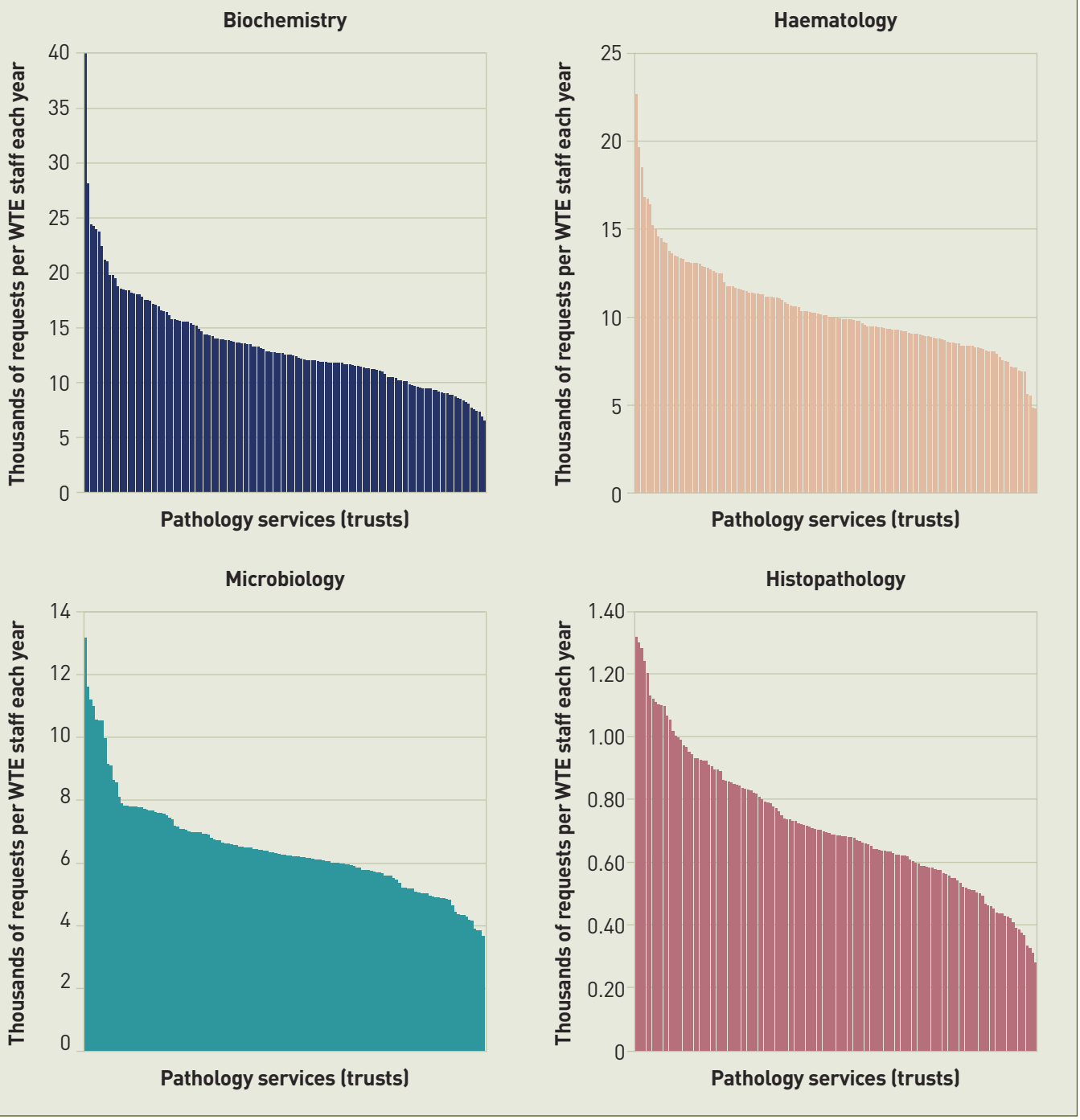
The overall picture of the extent to which the productivity of pathology staff has increased is less clear, however. The trusts still varied widely in terms of the ratio of activity in each discipline to numbers of whole time equivalent staff (see figure 13). Excluding the top and bottom 10% of departments, the number of microbiology requests received in a year varied between 4,800 and 7,900 for each member of staff. This variation is greater than could be explained by differences in case mix within each discipline, by the type of work that is referred to other laboratories, or by the profiles of staff and the way staff are attributed to disciplines.**

We measured activity in terms of both the number of requests and the number of tests performed (with the exception of histopathology, in which case we briefly considered the number of slides as an alternative to requests). For biochemistry, we also collected data on the number of profiles or sets of related tests performed. The local reviewers who produced reports on the performance of individual trusts looked for productivity that appeared to be out of line, regardless of which indicator of activity was used.

* The total increase in BMSs across all disciplines including those who could not be attributed to a specific area of work was just 1.4%.

** The ratios shown here do not include clinical staff that could not be attributed to individual disciplines. However, we did test whether our conclusions were robust when a number of differing assumptions were made about the attribution of these general staff to disciplines.

Figure 13: Productivity – requests met in relation to number of staff



Source: Healthcare Commission acute hospital portfolio data returns.

Requests: April to September 2005 – doubled to give an annual estimate.

Staff in post: September 30th 2005, including proportionate allocation of managers, administrative staff and assistants who could not be ascribed to a single discipline.

For national comparisons we considered the total number of staff in pathology departments, excluding phlebotomists, infection control nurses, departmental porters and IT staff, who in some trusts do not come within the responsibility of the pathology department. We used the number of requests to indicate activity in each discipline because this explained the variation between trusts in total numbers of staff levels better than the number of tests performed.

We then examined whether any of the other data collected could explain variations in productivity in terms of the average number of requests handled by each member of staff.* For biochemistry we found that:

- the productivity of staff was higher, as would be expected, if fewer tests were performed for each request. But this explained only 12% of the variation in productivity
- productivity was higher in trusts where a greater proportion of requests came from GPs. This is probably because such requests tend to be less complex, with a higher proportion of automated tests, than those from trusts' clinicians
- the number of requests processed by each BMS was higher in trusts with larger pathology laboratories. This could however be partly because larger sites have more scope for BMSs to delegate tests to junior staff. Other than this, productivity was no lower in trusts whose pathology laboratories were located at more than one hospital.

Together, these factors explain just 22% of the variation in the overall productivity of staff.

We also checked whether our data supported the suggestion that productivity had been reduced as a result of the need to comply with the European Working Time Directive. We found no statistical difference between the productivity achieved by the 67% of trusts that were already fully compliant with the directive and that of those that had yet to act.

Out-of-hours remuneration

Many laboratories need to be staffed in the early evening to process samples from afternoon admissions and clinics and from the late afternoon peak that occurs in many A&E departments. When laboratories (other than histopathology) need to have staff on-site out of hours, this is usually achieved by means of either a shift system or out-of-hours payments. Some also rely to a limited extent on time off in lieu. Sixteen per cent of sites operate on a multidisciplinary on-call basis.

Some pathology managers suggested to us that traditional out-of-hours payments have become a particularly expensive way to staff laboratories: not only is a full shift often paid to cover a few hours of work, but the working time rules mean that staff cannot then work the next day and may have to be covered by locum or agency staff. At first sight, the review data supports the hypothesis that shift systems could be a more economical way to staff biochemistry laboratories out-of-hours, since the average number of requests is greater at laboratories using this system in relation to the number of BMSs and other laboratory staff that they employ. However, it is mainly the larger laboratories that have introduced shift systems and, once allowance is made for economies of scale, the data suggests that these were no more economical than other ways of providing out-of-hours services.

* Details of these findings are contained in a statistical appendix on the Healthcare Commission's website. The number of WTE consultants available for laboratory pathology was adjusted to take account of their clinical workloads.

Stability of the workforce

A stable workforce is important to the success of any enterprise. The local reports prepared for each trust by Audit Commission reviewers examined factors such as staff turnover, sickness and absence, vacancy rates and the use of locums and other temporary staff.

Turnover of staff*: a high turnover of staff can have a detrimental effect on risk and efficiency. There were particularly high rates among MLAs and MTOs: the median was 14.3% but one department in 10 exceeded 30%. Turnover of BMSs averaged 7%, similar to the rate among other professional NHS staff, but again one department in 10 reported a rate that was twice the average.

Sickness and absence: pathology departments reported lower rates of short-term sickness and absence (median 1.1%) for BMSs, MLAs and MTOs than the other diagnostic services and NHS staff groups such as nurses. Even so, if maternity leave is included, 10% of departments had more than one in seven of their MLAs/MTOs sick or absent.

Vacancy rates: rates of funded vacancies in pathology departments vary by region and by type of staff. The north east had the highest percentage of vacancies for medical staff: 15% overall, double the rate of London and the south east. Conversely, the highest vacancy rates for BMSs occurred in the south east excluding London: 12% overall, compared with less than 3% in the north east. Vacancies for laboratory assistants were highest in London and the south east (13%). Departments with high vacancy rates will rely more on the use of locums and overtime if they are to maintain high levels of service. Nationally, at one department in 10, more than 18% of medical posts were vacant, the greatest shortages being in microbiology.

An ageing senior workforce

One member of senior pathology staff in five was aged 55 or over. Impending retirements will lead to high turnover among the leaders of pathology services – consultant pathologists, Grade C clinical scientists, BMSs of Grade 4 and above – over the next five years. This has been identified by pathology services as a potential national problem, and it is particularly acute in longer-established disciplines: in a quarter of trusts more than half of the senior biochemistry staff were aged 55 or over.** The resulting changes may precipitate a rethink of how services are delivered, which will be informed by the current national workforce pilot schemes that have been funded by the Department of Health.

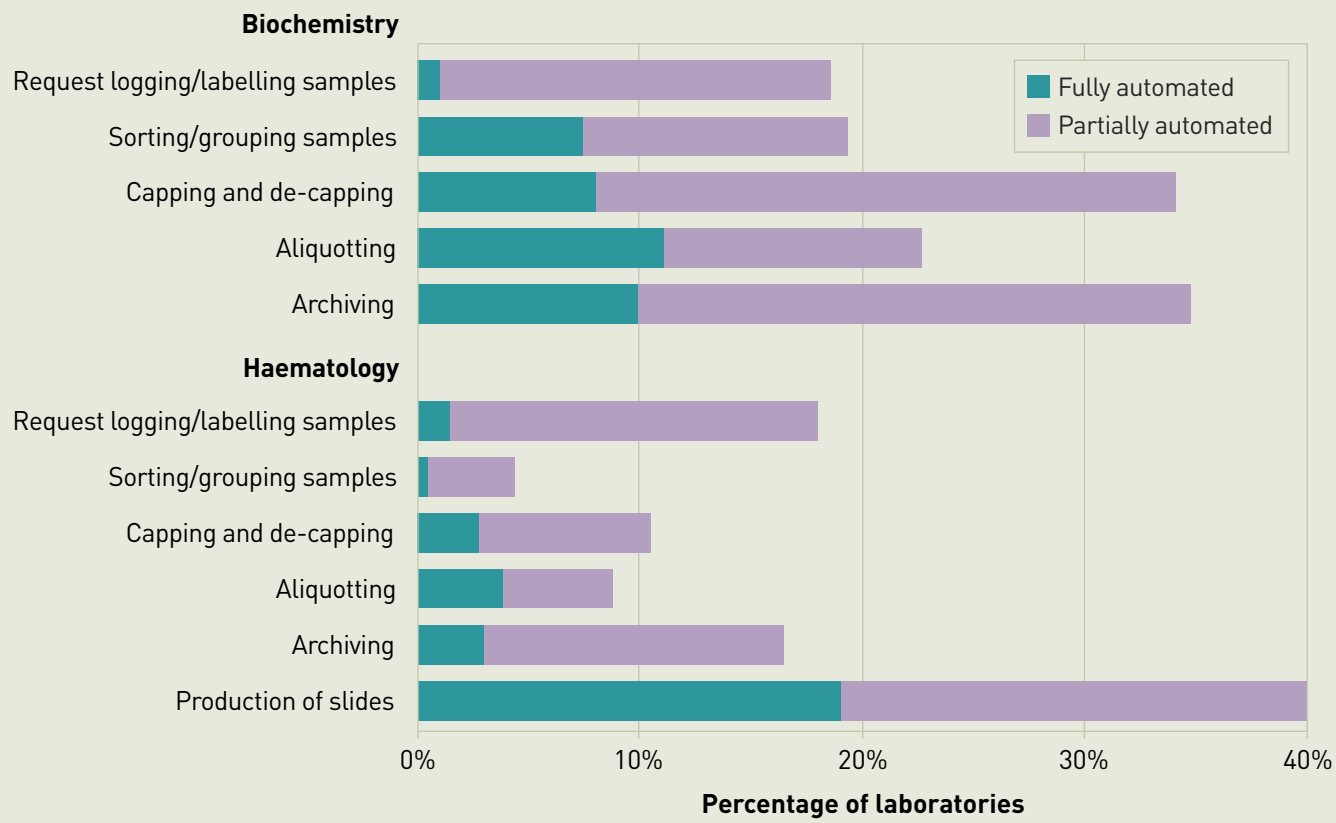
Automation

One of the objectives of the Pathology Modernisation Programme is to increase the level of automation in the handling of samples. The national service improvement programme aims to streamline work within pathology laboratories and promote better use of technology. We asked about the automation of a number of preparatory processes and the archiving of samples, focusing on biochemistry and haematology. The responses suggest there is ample scope for further automation (see figure 14). The logging and labelling of samples was fully automated at only 1% of laboratories, and these operations were still

* Staff turnover during the year was calculated as numbers of staff that left during the year divided by numbers (not WTE) in post at the end of the period. The calculation assumes that there were no major changes to the service during the year and that the numbers of staff in post at the end of the year were not atypical of the total period.

** For details see the data appendix on the Healthcare Commission's website www.healthcarecommission.org.uk/acutehospitalportfolio

Figure 14: Biochemistry and haematology automation



Source: Healthcare Commission acute hospital portfolio data returns, September 2005

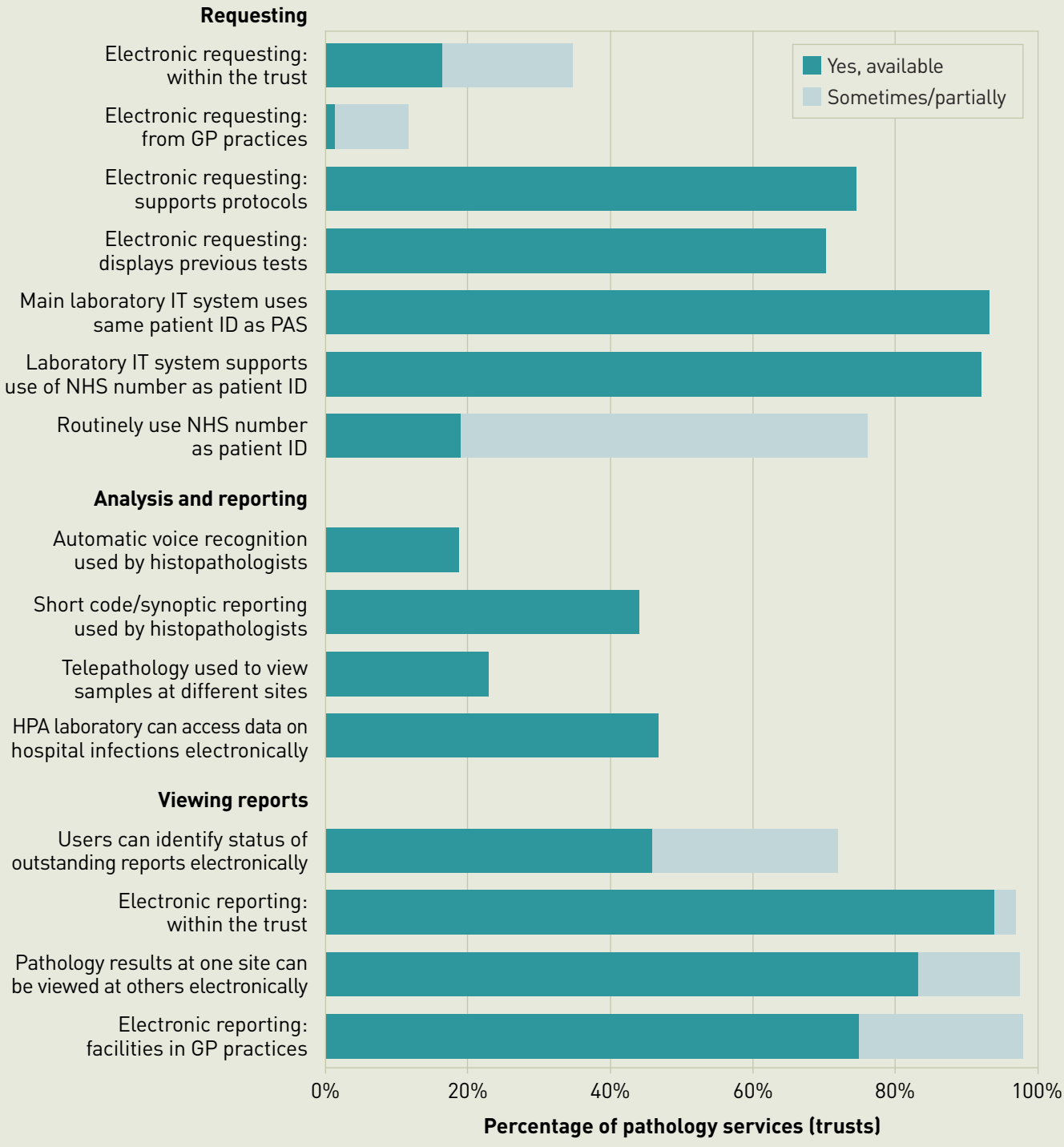
completely manual at 81%. Biochemistry exhibited more automation of subsequent processes than haematology, but in both disciplines most were still manual. For example, a third of sites had wholly or partially automated capping and de-capping in biochemistry, against only 10% in haematology.

Automation was not confined to larger laboratories but they were more likely to have automated processes. For example, the biochemistry laboratories with fully or partially automated archiving of samples – amounting to a third of the total – handled 45% more requests each year on average than those that still had manual archiving. This is an area where larger laboratories could achieve economies of scale and improve efficiency.

Information technology

Under the modernisation programme, pathology departments have been encouraged to increase their use of information technology to make it easier for users to select and request appropriate tests, to improve the efficiency of processing and reporting, and to speed the return of reports to requesting clinicians. We examined the current use of 15 aspects of IT by pathology departments (see figure 15).

Figure 15: Use of information technology by pathology services



Source: Healthcare Commission acute hospital portfolio data returns, September 2005

The pace of introduction of some of these facilities – for example electronic requesting, which, at the time of our review, was not widespread – is being influenced by the timetable of the Department of Health's national Connecting for Health programme.

The advantages of electronic requesting include the fact that most systems (75%) can question the user to ensure that the most appropriate tests are requested, while 70% display a list for each patient of previously ordered tests and their results. This can help to reduce unnecessary testing and also improve the care of patients. Thirty-five per cent of trusts made some use of electronic requesting, although in half of these cases it was available only in a few areas of the hospital. Electronic requesting from primary care was rare. The Department of Health is currently funding a national project to develop and support electronic requesting and decision support in primary care.

Many of the benefits of electronic requesting depend on the ability of pathology computer systems to use the same means of identifying the patient as the GP or the hospital's patient administration system (PAS). Though nearly all pathology departments (93%) could do this, 24% of trusts did not use the NHS number on requests and a further 57% used it only sometimes.

Use of automatic voice recognition systems (19% of trusts) or synoptic (short code) reporting (44%) can greatly reduce the time it takes to produce reports. If a second opinion is required, this can be obtained more swiftly if, as at 23% of trusts, there are facilities for transmitting images of samples to other laboratory sites, something that is particularly important in large trusts. Forty-seven per cent of microbiology laboratories shared data electronically with the local Health Protection Agency laboratory, enabling outbreaks of infectious diseases to be identified more speedily.

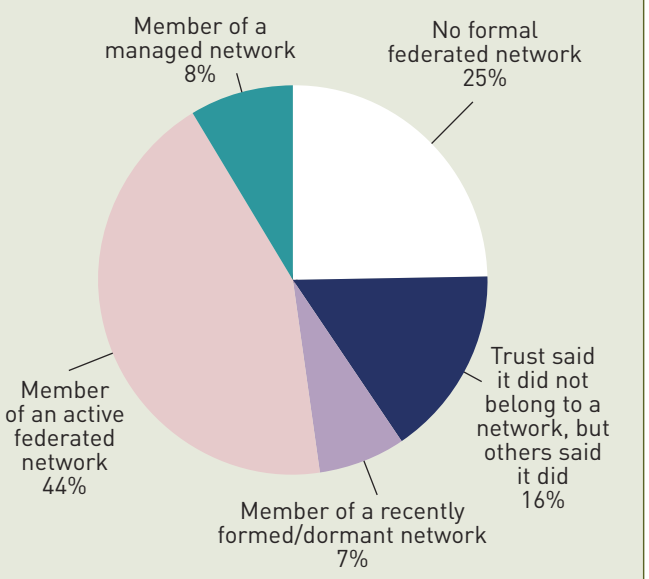
Requesting clinicians could electronically check the status of outstanding reports in 46% of trusts, limited facilities being available in a further 26%. Electronic communication of pathology results to requesting clinicians is now widespread, although there were still some GPs and remote hospital sites that did not have this facility. It could also be beneficial to notify GPs of the results of tests performed following outpatient appointments as well as in response to direct requests.

Pathology networks

The report *Modernising Pathology*[2] encouraged pathology departments to form networks which are in addition to any purely clinical networks to which individual disciplines/specialities subscribe (see figure 16). The nature of these networks was not prescribed. Eight per cent of trusts belonged to managed networks with integrated planning, management and staff. Some of these networks had started to rationalise services: laboratories in one trust led on work requested by GPs, for example, while those of another concentrated on specialist work requested by hospital doctors. Such specialisation facilitates more economical staff rosters that are tailored to the timing of demand from each source of referral and provides enough work to justify automation.

The majority of networks were federated, however. The pathology services of the constituent trusts retain their independence but meet to discuss issues of common concern and recommend action to their management and to commissioning bodies.

Figure 16: Trusts' membership of pathology networks



Source: Healthcare Commission acute hospital portfolio review set-up and data returns, autumn 2005

Forty-four per cent of trusts belonged to an active federated network* and a further 7% to a recently formed or dormant network. The remaining 41% of trusts said that they did not belong to a network. Worryingly, these non-participants included some –16% of the total number of trusts – that had been named as members of an active network by several of its other members. There was much disagreement among managers as to who belonged to which network.

About half of the federated networks had a full time manager. On average, their management boards met quarterly, although the most active held monthly meetings. Fifty-five per cent of trusts said that their networks had had a major say in the allocation of pathology modernisation funds during 2005. In general, they said funds were allocated to member trusts in accordance with their individual development needs. But 16% admitted that the distribution had been on the basis of equal shares or in proportion to the size of the trusts. Ideally, networks should agree on basic infrastructure needs, set priorities to bring all member trusts up to these standards, and allocate funds accordingly. However, some networks opted for developments from which the majority of members could benefit, or shared the funds among all member trusts, regardless of their needs.

As well as agreeing investment priorities, federated networks can do much to:

- reduce duplication of specialist or non-urgent services, through:
  - joint service planning (53% of federated network members had done this to some extent), joint workforce planning or joint budget planning (very uncommon)
  - instituting formal 'hub-and-spoke' arrangements whereby some specialised tests are sent for processing to one laboratory in the network (40%)
  - joint on-call arrangements (13%)
- band together to reduce costs, by:
  - procuring some equipment jointly (57%)
  - buying certain consumables jointly (38%)
  - integrating management of transport for GPs' specimens (16%)

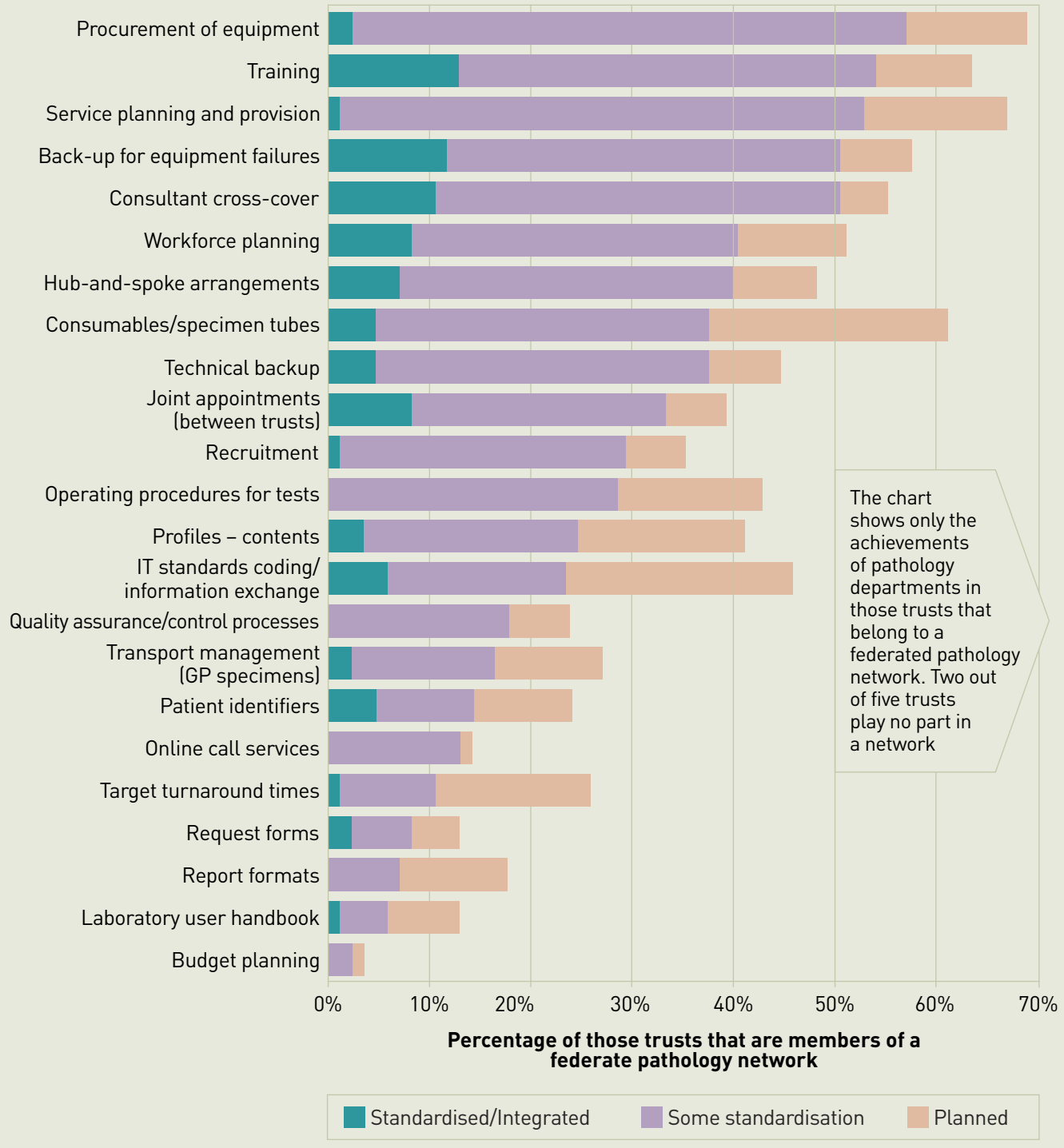
* We classified federated networks as active if the board or steering group met more than twice a year and/or they had a full time network manager and/or the network had a major say in allocating pathology modernisation funds.

- increase the robustness of the delivery of services in case of equipment failures or staff sickness, through:
  - joint arrangements for continued provision of services if vital equipment fails (51%)
  - 'consultant cross-cover' whereby a pathologist from one trust may substitute for an unavoidably absent colleague from another trust in the network (51% partial, 11% fully)
  - a degree of technical back-up (38%)
- adopt common standards and procedures for the benefit of those who use services and to facilitate movement of staff and work among laboratories, by:
  - organising joint training (54% to some extent, 13% fully)
  - standardising operating procedures (29%, although no network had fully standardised procedures across all its laboratories)
  - recruiting some staff jointly (29%; a similar percentage reported some joint appointments among trusts or with other organisations)
  - standardising which tests are performed when certain profiles are requested (25%)
  - harmonising IT and data coding to facilitate exchange of information (24%, although only 6% had full standardisation across the network)
  - standardising processes for quality assurance and quality control (18%)
  - agreeing turnaround targets for tests, standardised request forms, report formats and handbooks for users

Though this is a substantial agenda, many federated networks had made a promising start (see figure 17). But it is disappointing that only 10% of network members had agreed any turnaround targets (and only 1% claimed full standardisation of turnaround targets), since this is an essential first step towards standards of services that meet the needs of users and provide good value for money. Furthermore, only 6 to 8% of network members had made any attempt to standardise request forms, the format of reports or handbooks for users.

The review also found that some of these issues had yet to be addressed across different laboratory sites within the same trusts. For example, there was no integration of on-call arrangements among sites at 27% of trusts. At 21% of trusts, sites had separate arrangements to manage transport for samples from GPs. One trust in five had yet to agree any turnaround times as targets for tests, and only 62% had the same targets for all tests, regardless of where in the trust they are performed. Only 69% used common formats for reports at all laboratory sites.

Figure 17: Standardisation/integration to date across federated pathology networks



Source: Healthcare Commission acute hospital portfolio data returns, September 2005

Conclusion and recommendations – the way forward

This report has shown that pathology services are generally held in high esteem by hospital clinicians, particularly as to the quality of guidance provided. Results of tests were available more quickly than they were in 2003. This was the case for non-urgent tests as well as for those that are time-critical. However, there was scope for improvement in the consistency of the speed of turnaround within the laboratory and in the time it takes for samples from GPs to reach the laboratory.

Nationally, the number of requests for biochemistry, haematology and microbiology tests was rising rapidly, as was the number of tests requested on each sample. GPs are responsible for an increasing percentage of the requests for biochemistry and haematology tests. The average number of tests requested by A&E doctors was rising much more quickly than attendances, while some A&E departments requested up to four times as many tests per patient as others. There were significant unexplained regional differences in the numbers of tests per patient as well as variations among trusts.

Many pathology departments had continued their efforts to reduce work that is likely to be of limited value for the care of patients, although there was scope for them to be more proactive. The percentages of possibly inappropriate repeats of thyroid function tests and full blood counts on the same patient had also fallen since the previous review, but there was still greater variation among trusts than can be explained by differences in case mix.

Since the previous review, the productivity of staff measured in terms of average numbers of requests and of tests performed by each biomedical scientist (BMS) had increased substantially. At the same time, the roles of BMSs had changed, with more work delegated to assistants in some trusts. There were, however, still wide differences in the mix of skills among pathology services that could not be explained simply by differences in case mix, suggesting the possibility of further cost savings. There was also scope to make savings through better efficiency, by automating the handling and archiving of samples, which the review showed to be little developed.

A comparison of the value for money achieved by pathology services is complicated by differences not only in the mix of tests that each performs but also in how workload is counted and in accounting practices. However, this report has shown that the unit cost per request in each discipline at some trusts was more than twice than at others, a variation that is considerably greater than can be explained by such factors.

Since the 2003 review, many pathology laboratories had extended their opening hours and had widened the range of specialist services that they offered in-house. In the same period, the proportion of laboratory work referred from other hospitals fell markedly across all four disciplines. It is not possible to tell from the data how much of this change resulted from a change in case mix, but it seems likely that it reflects the increased ability of many trusts to perform a wider range of tests for more hours per week.

The increased availability of pathology services for more hours a week and faster turnaround of requests may have benefited the care of some patients, but the marginal costs of achieving these improvements and their consequences for efficient laboratory operation need to be considered.

Unnecessarily fast turnaround of non-urgent tests does not add any clinical value. It may be that the additional cost of performing such tests out-of-hours are often small because they share capacity and staff with urgent tests, but that cannot always be assumed to be the case. When there is little urgency, faster turnaround should not be pursued at the expense of quality or efficiency. If the longest times currently achieved are generally regarded as acceptable, is there ever any need to turn around tests more quickly than that? Could they be performed more economically if left to the following day or referred to a laboratory that is staffed and equipped specifically for that kind of work?

Extended hours and increased in-house provision of specialised tests by every pathology service would also appear to conflict with the modernisation agenda's objective of promoting more joint working among trusts. A few trusts had entered into managed pathology networks, some of which have rationalised services so that, for example, a laboratory site at one trust may concentrate on the work of GPs. Of the remaining trusts, about half participated in a federated network, though the membership and functions of these networks were unclear. Overall, there had been only limited progress in agreeing joint targets and reorganising services between trusts.

In conclusion, the managers of pathology services must be applauded for managing to maintain and improve services in the face of increasing demand, but the day-to-day pressures may have left them with less time to rationalise services between trusts on a wider scale. The implications for value for money of some apparent improvements of services should not go unquestioned and should be evaluated in the context of need. Such evaluation will be usefully informed by the results of the current analyses of cost and activity data from pilot sites in the national pathology review when these become available. The Department of Health is also funding national workforce pilots, projects to support the management of demand and appropriate testing, and to streamline work within pathology laboratories to make better use of technology and the workforce.

Recommendations

The recent independent review of NHS pathology services commissioned by the Department of Health and chaired by Lord Carter of Coles proposed a radical agenda, including the development of a national specification for pathology services and clear performance standards, and the creation of providers of services that are independent of NHS acute trusts. The recommendations set out in the following table focus primarily on issues that can be addressed in the shorter term, whether or not this major reconfiguration of services goes ahead.

	Recommendation	Who should do this?
	Agree service level targets	
1.	Agree local targets reflecting clinical urgency for how quickly different categories of pathology test should be completed. When there is little urgency, faster turnaround should not be pursued at the expense of quality or efficiency.	Pathology departments with local clinicians and commissioning bodies.
2.	Promulgate national guidelines to support local target-setting.	Professional bodies.
3.	Set local standards for the availability and scheduling of phlebotomy services in trusts.	Trust managers in consultation with clinicians.
4.	Routinely monitor performance against targets and standards and make the results available to referring clinicians.	Pathology departments or managers.
5.	Use turnaround targets to support decisions on the number of hours per week for which full laboratory services need to be provided on each site and on the feasibility of establishing joint services to meet urgent needs outside normal laboratory hours.	Trusts, pathology departments and networks, in discussion with commissioning bodies.
	Ensure that demand is appropriate	
6.	Investigate the reasons for geographical differences in the number of tests requested and carried out in relation to the number of A&E attendances and the population served by the trust.	Nationally and locally by commissioning bodies.
7.	Work with requesting clinicians to improve their understanding of pathology services and the appropriateness of tests to specific clinical situations so as to help reduce the amount of activity that is of little or no clinical value.	Pathology departments.
8.	Give people who use services more feedback on the quality and completeness of requests.	Pathology departments.
9.	Establish a clear point of first contact in the pathology department for people who use services.	Pathology departments.
10.	Continue to reduce the number of tests that are repeated unnecessarily.	Pathology departments.
11.	Use patients' NHS numbers on all requests as a common identifier in the laboratory and improve electronic access to previous test results to facilitate elimination of duplicated tests.	Requesting clinicians, trusts, NHS National Programme for IT.

	Recommendation	Who should do this?
	Rationalise services	
12.	Agree a standard way to count pathology activity (tests and requests) and establish a robust measure of workload.	A national initiative through professional bodies.
13.	Establish the fixed and marginal costs of tests as a prerequisite to agreeing tariffs for tests requested by GPs and devolving budgets to clinical directorates within trusts.	Pathology departments, trusts and commissioning bodies, informed by results of national pathology review pilots.
14.	Consider the impact of all decisions on major service developments on the workload and expenditure of pathology.	Trusts and commissioning bodies, in consultation with pathology networks.
15.	Use such service developments as an opportunity to expand joint working among trusts across pathology networks	
16.	Do not duplicate specialist services unnecessarily by providing them in all trusts.	Trusts, pathology departments and networks, in discussion with commissioning bodies.
17.	Rationalise the provision of non-urgent pathology services for GPs. Greater specialisation of laboratories would promote efficiency through: • rationalisation of transport of samples to the laboratory • greater automation of sample handling • elimination of out-of-hours working in those laboratories that perform only non-urgent tests • better use of scarce specialist skills and experience elsewhere; a higher proportion of work in these laboratories could be performed by junior staff • other economies of scale through more cost-effective use of high capacity analysers	Pathology networks, commissioning bodies and trusts.

	Recommendation	Who should do this?
	Modernise services	
18.	Establish priorities for bringing all members of pathology networks up to common agreed standards of infrastructure and allocate any development funds accordingly, taking account of any opportunities for further joint working.	Pathology networks.
19.	Ensure the timely implementation of procedural and technological changes that have received national funding, such as use of liquid-based cytology.	Commissioning bodies.
	Develop point-of-care testing	
20.	Expand the provision of near-patient testing in clinics and in the community wherever this would improve the patient's experience and quality of care.	Commissioning bodies and trusts
21.	Ensure that systems to ensure the quality of near-patient testing services are sound and that relevant test results are collated to prevent inappropriate duplication and provide a ready source of epidemiological data.	Commissioning bodies and trusts, with pathology departments.
22.	When near-patient testing is set up, fund the provision of advice on establishing a high quality service that delivers best value for money.	Commissioning bodies and trusts.
	Improve efficiency	
23.	Ensure that departments whose unit costs or productivity figures differ widely from the norm can justify these differences and are providing good value for money.	Commissioning bodies and trusts, informed by cost and activity data analyses undertaken as part of current national pathology review pilots.
24.	Continue to review the mix of skills to ascertain whether there is further scope for extension of roles and use of laboratory assistants.	Pathology departments, building on national workforce pilots.
25.	Invest in further automation of sample handling where appropriate.	Trusts, at the instigation of pathology departments, with support from the Department of Health's national service improvement programme.

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