Effect of staff attitudes on quality in clinical microbiology services

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Accepted: 21 February 2002

ABSTRACT

Technical quality of the work of clinical pathology laboratories is monitored regularly by both internal and external sources. Among the factors that might affect quality, laboratory staff attitudes are rarely considered. In this study, the psychological concepts of 'job satisfaction' and 'climate' are measured among microbiology biomedical scientists in the United Kingdom. A self-report questionnaire was developed and distributed (between November 1998 and February 1999) to biomedical scientists in 161 microbiology laboratories throughout the UK. From 2415 questionnaires distributed, 931 replies were received – a response rate of 39%. A separate set of questions covering customer service and participation in internal and external quality assurance schemes was sent to laboratory managers. Biomedical scientists reported lower job satisfaction than did medical technologists in a previous study in the USA. Perception of climate was influenced by several demographic factors, the most important of which being the size of the laboratory. Optimal number of staff in a department was found to be less than 30. Aggregation of climate scores from members of the same department showed that a positive laboratory climate was important for good performance in internal and external measures of technical quality. For the best service, laboratory climate must be supported by a staff perception that the department is committed to enhancing quality – a climate for laboratory quality.

KEY WORDS: Climate. Job satisfaction. Service quality. Quality assurance.

Introduction

Government ministers are continually exercised by the many issues that surround the quality of patient care.[1] This is driven by the expectations of patients that they should receive good treatment and by healthcare professionals that they should be supported to deliver it. Recently, the UK government introduced the statutory duty of clinical governance on healthcare professionals.[1] Through this, the chief executive of an NHS trust has ultimate responsibility for monitoring professional performance, resource use, risk management, and patients' satisfaction with the service provided.[2] Clinical pathology is an integral part of patient care and it is important for a laboratory to ensure that the service it provides is of the highest standard.

There are two interconnected aspects to the provision of a high-quality pathology service. First, the evaluation of the quality of the scientific and technical work.[3,4] In order to achieve this, laboratories undertake a series of measures that include quality control,[5,6] quality assurance,[7-10] quality assessment,[5] monitoring of equipment,[3] and auditing of procedures.[3,11,12] Departments also are subject to external scrutiny through NEQAS[4] and Clinical Pathology Accreditation UK Ltd. (CPA) accreditation.[13] Second is service quality, a concept developed in retailing, which was devised to help companies understand and respond to customers' needs.[14] However, it is also relevant to healthcare because the clinical staff in one department of a hospital who use the services of another can be thought of as 'customers'.[15]

Usually, service users take technical accuracy for granted,[16] particularly when the laboratory has been accredited by CPA.[17] Perceptions of the laboratory service are likely to be coloured by specimen turnaround time,[18] the clarity of reports and the attitude of laboratory staff.[19] Studies by pathology laboratory staff in the UK have applied the idea of service quality to the local situation with good effect,[16,20,21] and feedback from users is a component of the CPA evaluation process for accreditation.

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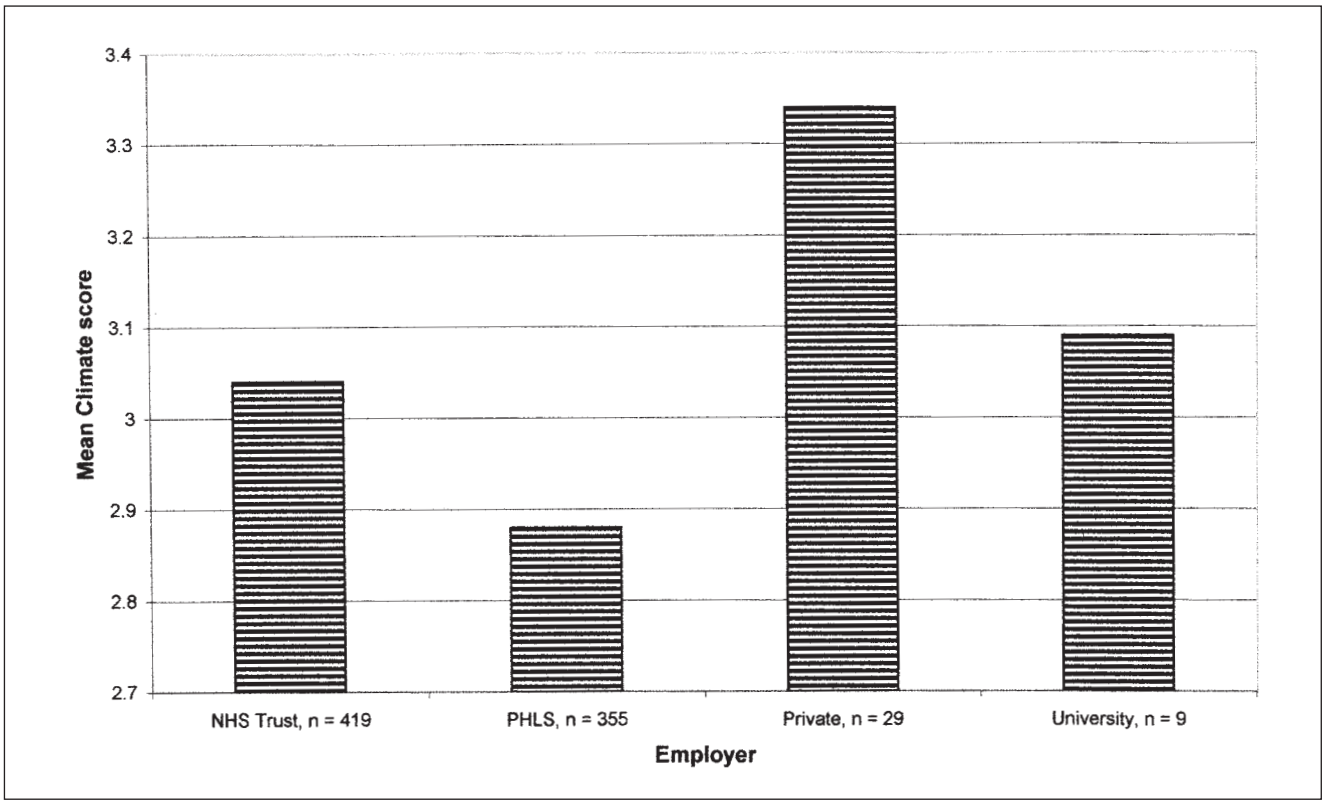
Although some authors have mentioned the issue of staff morale in the context of internal audit exercises[22] or quality control programmes,[23] the effect on laboratory personnel of participating in these schemes has not been considered seriously. It is recognised in business that responding to customers' expectations of service quality can conflict with meeting productivity targets,[24] and a balance must be achieved. In pathology, this could mean deciding how much investment in equipment and staff is required to meet users' demands, and whether or not it is justifiable.[21]

O'Connor[15] suggested that attention to the needs of laboratory employees is a prerequisite for high service quality. Increasingly, staff are expected to respond to users' perceptions of the laboratory service and meet their requirements – if necessary, by changing their working practices. At the same time, departments are expected to perform well in quality assurance and accreditation schemes, the criteria and deadlines for which are usually set by external

Fig. 1. Mean climate score by employer.



bodies. Although these two are not necessarily in conflict, they compete for time and attention within the laboratory.

This study aims to provide a fuller understanding of how the attitudes of staff towards their job, employer and colleagues contribute to a laboratory's overall performance. Two perceptions from occupational psychology are selected for investigation in individuals, namely 'job satisfaction' and 'climate'.

Job satisfaction is the extent to which a job fulfils a person's expectations and satisfies their need from employment.[25] According to Furnham,[26] there are three variables that most affect a person's job satisfaction: personality, the characteristics of the job, and the way in which these interact (called 'person-job-fit').

Climate is the 'shared perceptions of employees concerning the practices, procedures, and kinds of behaviours that get rewarded and supported in a particular setting'.[27] Study of climate in a particular workplace attempts to describe how people perceive their working environment, how those perceptions might have developed, and whether or not they affect performance at work. Climate is measured both in individuals, to test the relationship with other variables such as job satisfaction,[26] and among all staff within particular departments to gauge the prevailing 'atmosphere'.[28]

Both approaches were used in this study, the aims of which may be summarised as to:

1 assess job satisfaction and climate among staff in clinical pathology laboratories in the UK (to minimise the effect of variety in required tasks among different staff groups, only biomedical scientists were included in this investigation, and for logistical reasons only one pathology discipline – microbiology – was selected);

2 collate the criteria used to assess standards in clinical microbiology laboratories and develop measures of 'quality' in clinical microbiology services; and,

3 determine which of the workplace attitudes among biomedical scientists measured in aim 1 are important in predicting the measures of quality in aim 2.

Materials and methods

The principal method of data collection was a national survey of biomedical scientists using a self-completed postal questionnaire. This was designed after preliminary interviews with 20 practising biomedical scientists, representing all grades, and refined through two pilot studies.

Questionnaire design

The final version of the questionnaire included sets of questions to assess the following attitudes:

Job satisfaction: Respondents were asked to rate their satisfaction with 15 stated aspects of their job, on a scale of 1 (dissatisfied) to 4 (satisfied). From this, a total score for job satisfaction was calculated out of a possible 60. This model had been evaluated through testing on medical laboratory technologists in the USA.[29]

Climate: Respondents were asked to react to 60 statements about their perceptions of the atmosphere within their department, the management style, their relationships with colleagues, and how well the systems for monitoring equipment and ordering consumables operated. A well-

Fig. 2. Mean climate score by type of laboratory.

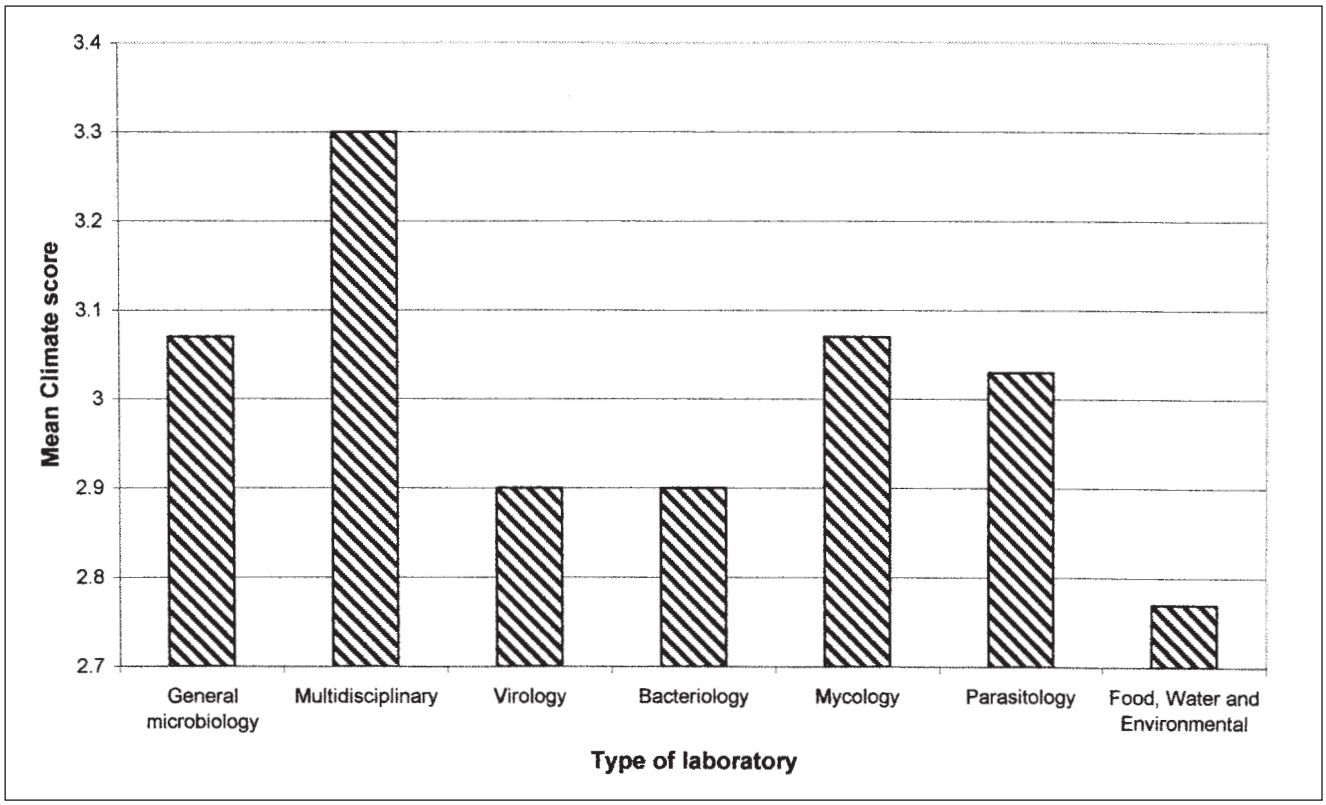


Table 1. Age group, grade and gender distribution of questionnaire respondents

Age group	Trainee		BMS 1		BMS 2		BMS 3		BMS 4	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<21	2	3	-	-	-	-	-	-	-	-
22-29	7	24	29	88	1	3	-	-	-	-
30-39	3	-	49	99	45	48	14	16	6	2
40-49	2	3	24	83	54	51	53	14	21	2
50-59	-	-	9	35	12	23	31	4	22	4
>60	-	-	-	-	1	-	1	-	4	-
Totals	14	30	111	305	113	125	99	34	53	8

10 respondents did not state their age; 10 respondents did not state their grade; 19 respondents did not state their gender.

established model[30] was chosen, which used a response scale of 1 (strongly disagree [with statement]) to 5 (strongly agree [with statement]). Mean score was calculated, so the maximum possible was 5.

Individual's perception of the standards of their own work ('Qualself'): Five statements designed to measure a person's approach to their own work (e.g. 'When considering how well I do my job, I am my own strongest critic'; 'I usually check my own work thoroughly'). These required a response on a scale of 1 (strongly disagree) to 5 (strongly agree). Once again, the mean score was calculated.

Individual's perception of the quality of the work in their current laboratory ('Quallab'): Ten statements about the commitment of staff to enhancing quality (e.g. 'The senior managers [i.e. head BMS, consultant] in the department are committed to quality assurance'; 'There are regular departmental meetings to discuss issues, including quality and standards, in which all staff participate'). Responses to these were also given on a scale of 1(strongly disagree) to 5 (strongly agree), with the mean taken.

At the end of the questionnaire, respondents were also asked to provide basic demographic data.

A separate set of questions was devised to assess each laboratory's quality, by monitoring scientific and technical performance (internal and external quality assurance and accreditation) and service quality (feedback from users). These factual questions required a 'yes', 'no' or 'don't know' response, and the maximum possible score was 9

Fig. 3. Mean climate score by number of staff.

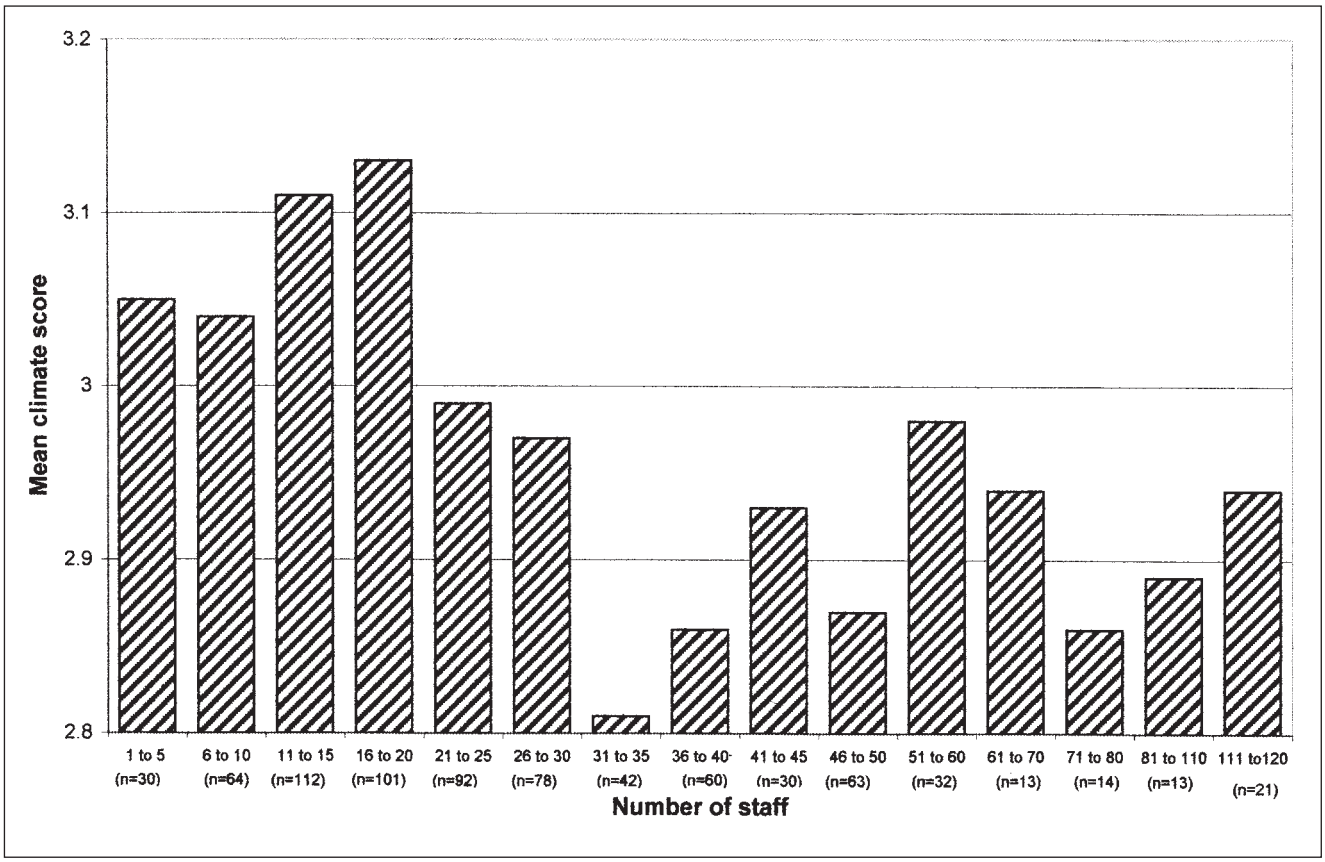


Table 2. Mean scores for psychological variables

	Respondents (No)	Mean score	SD
Job satisfaction	737	37.31	7.09
Climate	814	2.98	0.50
Qualself	879	3.86	0.47
Quallab	854	3.23	0.69

SD: standard deviation

('Labscore'). This was sent to the head biomedical scientist of each participating laboratory.

Included on this sheet were questions about the number of staff in the laboratory and whether or not the department had been involved in a merger of trusts and/or laboratories. The Qualself, Quallab and Labscore measures were all developed with the help of a panel of experts in quality assurance from the Quality Assurance Laboratory of the PHLS Central Public Health Laboratory.

Questionnaire distribution

Managers of all laboratories offering a clinical microbiology service in the UK were contacted, the study was explained and they were asked whether or not they would agree to their department's participation. Where permission was granted, questionnaires were sent for distribution to individuals via laboratory managers. Each participant received a questionnaire for self-completion, accompanied by a covering letter and a Freepost reply envelope. In total, 2415 questionnaires were distributed (between November 1998 and February 1999) to biomedical scientists in 161 laboratories. Recipients included staff in microbiology sections of multidisciplinary laboratories, general microbiology departments, bacteriology, virology, mycology and parasitology laboratories within teaching hospitals, and in all sections of public health laboratories.

Results

By March 1999, 931 replies had been received from biomedical scientists in 143 laboratories – a response rate of 39%. Of the replies received, 914 were suitable for further analysis, and this was carried out using the Statistical Package for Social Sciences (SPSS).

Age, grade and gender distribution of the study group are summarised in Table 1. Comparison of the age and gender profiles of the study group with employment data published by the Department of Health[31] and information about membership provided by the Institute of Biomedical Science showed no significant difference in populations (goodness of fit χ^2, $P>0.5$). This indicated that the questionnaire respondents were representative of the biomedical scientist population in the UK.

Of the 914 suitable responses received, 487 were from NHS trust employees, 385 came from the PHLS (including 35 bacteriology, 34 virology and 18 food, water and environmental microbiology laboratories), 33 were from private laboratories, and nine from university departments. Information was received from 84 general microbiology

Table 3. Correlations (r) between key demographic and psychological variables

	Gender	Age group	Grade	Job satisfaction	Climate	Qualself
Age group	-0.195**	-				
Grade	-0.393**	0.487**	-			
Job satisfaction	0.006	-0.025	0.148**	-		
Climate	-0.090*	0.083*	0.235**	0.684**	-	
Qualself	0.058	0.077*	0.152**	0.144**	0.227**	-
Quallab	-0.050	0.024	0.176**	0.647**	0.823**	0.219**

* $P < 0.05$
** $P < 0.01$

departments and 21 multidisciplinary laboratories offering a microbiology service. Four departments specialising in parasitology and two in mycology also responded.

The overall mean scores for job satisfaction, climate, Quallab and Qualself for all respondents are shown in Table 2. Correlations between these psychological factors and important demographic variables are given in Table 3. The effects of employer, type of laboratory and size of laboratory on climate score are illustrated in Figures 1 to 3, respectively.

To investigate the relationship between climate within a laboratory, staff members' perception of standards (Quallab) and performance in quality measures (Labscore), questionnaires from individuals working in the same department were grouped together (using a confidential code). Where replies were received from at least half of the total number of biomedical scientists, the scores for climate and Quallab were aggregated to give an overall mean for each. For this analysis, sections within PHLS laboratories were taken as separate departments. Of these, 12 satisfied the criteria for aggregation of results, together with 29 non-PHLS laboratories.

Relationships between overall laboratory climate and laboratory Quallab and Labscore were investigated through correlation analysis. Figure 4 illustrates how these three factors interacted. The positive correlation between laboratory Quallab and Labscore was slightly stronger than between laboratory climate and Quallab. This indicated that the technical quality of the work was likely to be high when staff felt that the laboratory climate was helpful and supportive. However, the positive effect was greater when staff perceived that there was a strong commitment to enhanced quality within the department (Quallab).

Discussion

This study demonstrated clear relationships between staff perceptions of the workplace and the quality of service in clinical microbiology laboratories. The findings reported here are likely to be true for staff in other pathology specialties, as the age, grade and gender patterns for the participants in this survey proved to be representative of biomedical scientists in the UK.

Mean job satisfaction for all respondents was positive; however, the score of 37.31 compares unfavourably with the mean of 46.0 scored by medical laboratory technologists in the USA, using the same scale.[29] The reasons for this discrepancy were not explored but qualitative data collected for this study[32] revealed that biomedical scientists regarded poor pay, lack of recognition, and an inadequate career structure as the main reasons for not feeling valued.

Job satisfaction was an important direct determinant of quality, through the significant positive effect on a respondent's attitude towards the quality of their own work and the standards in the laboratory. The strong correlation between job satisfaction and climate, which has been reported in previous studies,[33-35] suggests a more important indirect relationship with quality.[36]

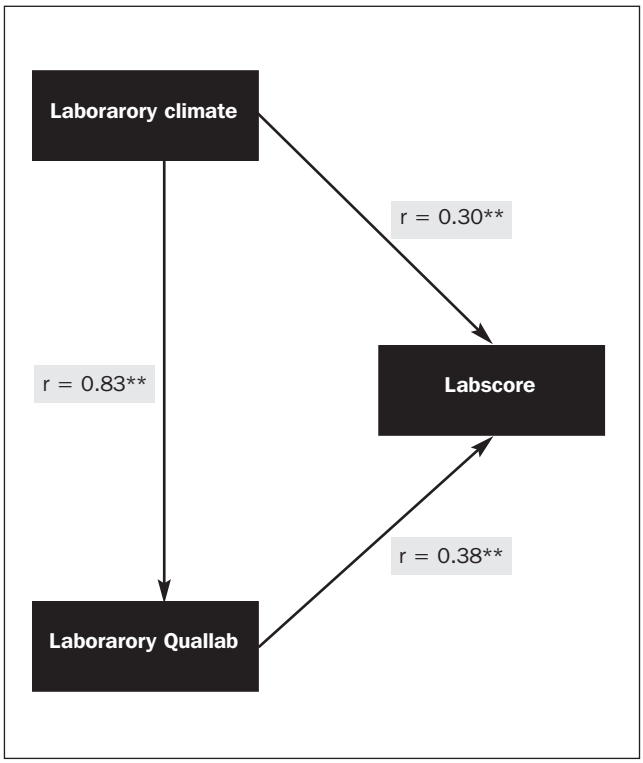
Taking results at the individual level, it is clear that a biomedical scientist who experiences a supportive climate, a pleasant atmosphere and good teamwork within the laboratory also has a positive attitude to their own work and that of the department. Of particular note is the correlation coefficient, which indicates that over 80% of the variation in Quallab is due to climate (Table 3).

Breaking down climate scores by demographic variable indicates that the factors most likely to enhance climate score are gender (male), increasing age and grade, and working in a small, multidisciplinary laboratory in a private hospital. The worst climate was experienced by younger females, employed at BMS grade 1, in the food, water and environmental section of a large PHLS laboratory. The number of staff in the department was the single most important determinant of climate and the results suggest that the optimal number of staff in a microbiology department (including medical and support staff) is less than 30 (Figure 3).

This finding has implications for the arrangement of staff and management of pathology laboratories. In recent years, the trend has been towards larger departments, through mergers of NHS trust and public health laboratories. However, this study showed that staff experience a better climate when part of a relatively small department. It may not be possible to reverse this change, but small workgroups within larger departments may help.

The key role of climate in determining the quality of a laboratory's work was underlined by a more detailed analysis, using aggregated scores. Grouping scores from people who work together is an accepted approach in climate research.[27,37-39] The results of the present study indicate that a department's performance in internal and external measures of technical quality (Labscore) will be good (Figure 4) when laboratory staff feel supported by managers and have robust relationships with colleagues (laboratory climate). This supports the findings of a study into the connection between academics' perception of

Fig. 4. Correlations (r) between laboratory climate, laboratory Quallab and Labscore for the 41 selected departments (**$P<0.01$).



departmental climate and score in the research assessment exercise in UK universities.[38] The results presented here show that the relationship was stronger when biomedical scientists perceived that their laboratory was dedicated to enhancing quality (laboratory Quallab).

A long-running study of bank staff concluded that the best service is provided when there is a generally positive climate underpinning an active drive towards good customer service[27] – labelled 'a climate for service'. By analogy, for pathology laboratories, it appears that it is important to have a constructive laboratory climate in place, accompanied by a commitment to laboratory quality, in order to achieve the highest quality. Thus, departments that performed best can be described as having 'a climate for laboratory quality'.[40]

This study of pathology staff in the UK was the first to investigate the influence of psychological factors on a department's performance. The results demonstrate to laboratory managers the importance of adopting a management style that engenders a positive climate. Where laboratory personnel experience a positive, supportive climate, technical quality in the department will be high. Furthermore, staff that are confident in the standards within the department will be able to provide a better service to the users.

These findings have important implications both for patient care and recruitment and retention in the biomedical science profession. □

The authors would like to thank all the laboratory managers who agreed to allow their staff to participate in this study and all the biomedical scientists who completed a questionnaire. SJP was supported by a bursary from the School of Biomolecular Sciences, Liverpool John Moores University.

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