MANAGING FOR QUALITY IN CLINICAL MICROBIOLOGY SERVICES

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Dedication

For my parents

" Now *here*, you see, it takes all the running you can do to stay in the same place. If you want to get somewhere else, you must run at least *twice* as fast as that!"

the Red Queen
in *Through the Looking Glass* by Lewis Carroll.

CONTENTS

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AIMS OF THE STUDY

This study sought to investigate the relationship between the workplace experiences of 'job satisfaction', 'commitment' and 'climate' for biomedical scientists in the United Kingdom and 'service quality' in clinical microbiology laboratories. To the best of the researcher's knowledge there are no previous reports on this subject cited in the literature. The primary aims of the study were therefore as follows:

1) To assess the inter-relationships between 'job satisfaction', 'organisational commitment', 'professional commitment' and 'climate' among biomedical scientists in clinical microbiology laboratories in the United Kingdom. The purpose of this was to provide base line data and to allow comparisons between the experiences of UK biomedical scientists, their equivalents in other countries and other groups of workers.

2) To collate the criteria currently used to assess standards in clinical microbiology laboratories and develop measures of technical quality in clinical microbiology services. The technical aspects of quality control and quality assurance were emphasised because this is the area where biomedical scientists have most influence.

3) To determine the relative importance of 'job satisfaction', 'organisational commitment', 'professional commitment' and 'climate' within the workplace in predicting technical quality in clinical microbiology services.

4) To describe the relationship between the attitudes of staff in clinical microbiology laboratories towards the quality of their work and the perceptions of users about the microbiology service provision.

ABSTRACT

The technical quality of the work performed in clinical microbiology laboratories is regularly monitored, by external and internal schemes. Among the factors which might affect quality, attitudes of the laboratory staff are rarely considered.

In this study, three concepts recognised by occupational psychologists as being important in the work place, Job Satisfaction, Commitment and Climate, were measured among microbiology biomedical scientists (BMSs) in the United Kingdom.

A self-report questionnaire was developed through preliminary interviews and two pilot studies. The perceptions of Job Satisfaction, Commitment (to both Profession and Organisation) and Climate were measured using established models from the occupational psychology literature. Three scales were devised specifically during this study to assess an individual BMS's perceptions of the standard of their own performance, the attitudes of their colleagues towards their work and the quality within their laboratory. A fourth measure was developed which collated all the ways that technical quality in clinical microbiology laboratories is currently measured in the UK into one scale.

A total of 2415 questionnaires were posted to BMSs employed in National Health Service, Public Health Laboratory Service, Privately funded and University laboratories between November 1998 and February 1999. By March 1999, 931 replies had been received, a response rate of 39%.

BMSs reported lower Job Satisfaction than Medical Laboratory Technologists (the equivalent profession) in the United States. The results supported Meyer and Allen's (1991) three-component model of commitment and showed that BMSs experienced Professional Commitment more strongly than Organisational Commitment. An eight dimension model of Climate was developed, for clinical microbiology staff, from Newman's (1977) Perceived Work Environment scale. BMSs' perceptions of Individual Climate were affected by a number of demographic factors, but the most important was the size of the laboratory. The optimal number of people in a clinical

microbiology department for positive Individual Climate was found to be less than 30.

Affective Commitment to the Profession was the component of Commitment which most strongly influenced technical quality, through its positive relationship with an individual BMS's performance at work. Through aggregation of Climate scores for selected laboratories, it was shown that Laboratory Climate correlated positively with technical quality. From BMSs' perceptions of their laboratory's quality, a scale to assess 'A Climate for Laboratory Quality' was developed. There was a strong positive relationship between 'A Climate for Laboratory Quality' and a department's score on the measure of technical quality.

Interviews with staff in four clinical microbiology laboratories supported the questionnaire findings with respect to Laboratory Climate. Qualitative data collected from a representative group of users of each of the four microbiology services showed that users' main concern was rapid turnaround time for results. Comments also highlighted the need for more effective communication between laboratory staff their colleagues working directly with patients.

CHAPTER 1: INTRODUCTION

1.1 We don't have any laboratories in this hospital, do we? *

If a child was rushed onto the set of 'Casualty', the popular television hospital drama series, with suspected meningitis, the causative agent would be identified and the appropriate treatment initiated within half an hour, thus saving the patient's life. All this would have been done without acknowledgement of the crucial, expert contribution of the biomedical scientist in the microbiology laboratory. Similarly, a host of television medics solve diagnostic problems and save lives apparently without recourse to any section of the pathology department of their local hospital. Yet in May 2000, the Accident and Emergency department of Llandudno General Hospital was forced to refuse patients after 5pm indefinitely, when one of the three biomedical scientists who ran the 'out of hours' laboratory service resigned and could not be replaced (IBMS, 2000).

The average member of the general public, who is not enlightened by familial relationship or close friendship with a biomedical scientist, will probably be unaware that the profession exists. Indeed, biomedical scientists use the phrase "backroom boys of the National Health Service" (see Section 3.2.6) to describe themselves. While publicity about clinical laboratories is sometimes good (for example involvement in screening blood for transfusion after major incidents), it often portrays the service in a bad light (particularly highlighting the shortcomings of the cytoscreening service). The role of the biomedical scientists in the laboratory is rarely acknowledged, nor is their status as professionals, although it is illustrated by the fact that the only person with the courage and integrity to draw outside attention to the problems in Cytology at the Kent and Canterbury Hospital was a grade 2 biomedical scientist.

In a recent survey of laboratory managers, the Institute of Biomedical Science found that 88% of all laboratories in NHS Trusts were understaffed (Anon, 2000a). Over half of the Trusts which had vacancies for biomedical scientists in 1999 reported being unable to fill all of them and only 21% of resignations were attributable to normal career progression (Anon, 2000a).

* Comment by 'League of Friends' helper in large District General Hospital to researcher in 1990

Twenty percent of survey respondents considered it particularly difficult to recruit staff in microbiology (including virology), which was worse than all other disciplines except histology/cytology.

What role do clinical pathology laboratories play in patient care? Who are biomedical scientists? If the members of this profession are not valued, does it really matter (Pitt, 1999) and what are the implications for the quality of healthcare provision in the United Kingdom? These issues have never been seriously explored. This study seeks to examine them scientifically from the biomedical scientists' point of view.

1.2 Historical perspective

The idea that diseases might be attributable to something that could be 'caught from the atmosphere' has been recognised since ancient times. Malaria, for example, is described in Chinese, Sumerian, Greek and Roman writing from as long ago as 2700 BC (Humphreys, 1997). Names for the disease such as 'swamp fever' and 'Roman fever' reflected the recognised danger of contracting malaria through living near marshlands, particularly around the city of Ancient Rome. Hippocrates is said to have attributed the drinking of stagnant water to catching the disease, while others suggested an association with 'miasmas' arising from the swamps. The illness was commonly known as 'ague' in Europe from the Middle Ages until the 16th century, when the term 'malaria', from the Italian for 'bad air' was coined. (Humphreys, 1997). It would be another 200 years before the infectious agent, the protozoan parasite *Plasmodium* spp., would be identified and the connection with marshlands recognised as the breeding ground for the mosquito vector, *Anopheles* spp.. However, the understanding that malaria was an 'infectious' disease allowed people to avoid risk where possible, by living in drier areas. This insight into epidemiology allowed an English country doctor, Edward Jenner to deduce that infection with Cowpox, protected dairy workers from the lethal and dreaded Smallpox. In 1798, Jenner published the account of his successful attempt to protect a small boy, James Phipps, against Smallpox with material from a Cowpox lesion. (Crosby, 1997) The work was controversial at the time and would now be considered unethical. However, Jenner's procedure, which came to be known as 'vaccination' (from the Latin *vacca* meaning 'cow') is widely used, albeit in a modified form, today. More insight into epidemiology treatment and prevention came with the identification of the agents of infections.

The nature of the causative agents of these diseases could not be investigated before the invention of the microscope, in the 17th Century. The observations of pioneers in this field, such as Robert Hooke in England and the Dutch cloth merchant Antoine van Leeuwenhoek marked the beginning of the science now called 'microbiology'. The latter meticulously documented his findings and famously described seeing "little animalcules", in rainwater and dental scrapings, in letters to the Royal Society during the 1670s (Davis *et al.*, 1980).

Some scientists speculated that these animalcules must have 'parents' in the same way as other life forms. However, many eminent scientists and doctors, while accepting van Leeuwehoek's findings, remained convinced that these creatures arrived in samples through 'spontaneous generation' (Pelczar *et al.*, 1993). The debate continued for 200 years, until Louis Pasteur provided conclusively, to the satisfaction of the scientific community, that organisms did not grow in sterile medium in a sealed flask. After Pasteur presented his findings at the Sorbonne in 1864, the idea that illnesses could be caused by infectious organisms (the 'germ theory of disease') was able to blossom. Earlier epidemiological evidence had suggested that this might be the case. For example, in London in 1854, a public health, doctor John Snow, had traced the source of a cholera outbreak to a water pump contaminated with sewage and contained the illness by closing the pump (Davis *et al.*, 1980).

The combination of the concept of 'germs' with the science of microscopy allowed many microorganisms to be successfully identified in the late 19th Century. Pasteur himself demonstrated that the disease blighting the silkworm industry at the time was caused by a parasitic protozoan (*Nosema spp*). Meanwhile, in Germany, Robert Koch identified the first pathogenic bacterium, *Bacillus anthracis* and showed that it could be taken from an animal suffering from anthrax and cause the same illness in another (Davis *et al.*, 1980).

At the same time as bacteria were being discovered in laboratories in Europe, many expatriates were attempting to identify the causes of the devastating tropical infections that they encountered. For example, a French army surgeon working in Algeria, called Laveran, first described the malaria parasite in 1880. After extensive examination of blood from infected people, he recognised the pathogen in the erythrocytes. By 1891, the Russian scientist Romanowsky had developed a stain that enhanced the identification of the protozoa of *Plasmodium* spp., which cause malaria (Gilles and Warrell, 1993).

Throughout the 20th Century, more pathogenic bacteria and parasites were isolated and characterised, using the basic techniques of light microscopy. However, that left many diseases where the causative agent had not been identified. It was recognised that there were organisms smaller than bacteria, which could pass through conventional filters. These were called 'filterable viruses' (from the Latin 'virus' meaning poison). One had been discovered by another Russian, Ivanovsky in 1892, which he named 'tobacco mosaic virus'. The first human disease that was shown to be associated with a 'virus' that evaded filtration was Yellow Fever, in 1900 (Davis *et al.*, 1980). The true importance of viruses as pathogens was not understood until the 1950s with the advent of the electron microscope and tissue culture. For example in a book about 'microbes' intended for the layperson, the following statement was confidently made:

> "In a highly civilised country, situated in a temperate zone, such as England, the Bacteria are probably more important incitants of human disease than the Ultramicroscopic Viruses, although these are responsible for many serious infections of man".
>
> (Drew, 1943, p. ix)

Since then virologists have developed diagnostic tests for and vaccines against organisms causing 'well-known' infections, such as mumps, measles and German measles, as well as identified 'new' viruses such as Ebola and Human Immunodeficiency Virus.

The science of medical microbiology has now led to the identification of many human pathogens. These include microorganisms (i.e. organisms that cannot be fully identified with the naked eye), which are broadly classified into five categories, namely viruses, bacteria, fungi, algae and protozoa, as well as parasitic nematodes and helminths.

Microbiological analysis of clinical specimens initially involved direct microscopy and culture of bacteria and some fungi on simple agar-based media. However, research techniques have continually been adapted for diagnostic work. This led to the introduction of cell culture and electron microscopy for the routine identification of viruses and parasites during the 1960s and 70s. Serological tests also became available, which helped diagnosis of infectious where the causative organism could not easily be cultured. More recently, the invention of radio- and enzyme- immunoassays made the screening of large numbers of sera for the presence of particular antibodies possible. These tests lend themselves easily to commercial kit format and can be performed by a competent scientist with minimal training in microbiology.

Technologies to enable more steps in the process of immunoassay to be performed by a machine are continually being developed. Similarly, through the exploitation of advances in molecular biology during the 1980s and 1990s, techniques such as polymerase chain reaction are becoming part of the routine diagnostic repertoire (Stokes *et al.,* 1993).

1.3 History of Biomedical Science as a profession

By the turn of the 20th century, medical laboratory tests were becoming specific, sensitive and reliable. Their potential for enhancing patient management was recognised. Although there were still scientists and doctors researching in isolation, there was a demand for diagnostic services for non-specialist practitioners. To cope with the workload, the medically qualified pathologists employed 'laboratory assistants'. Despite the scientific training and technical skills required to be a laboratory assistant, they were considered to be 'unskilled workers' by hospital administrators and were often paid less than other unskilled staff, who were protected by trade unions (Farr, 1982).

By 1911, "the situation had become more difficult as increasingly high standards of skill and reliability were demanded of laboratory staffs, with no corresponding increase in status or wage" (Farr, 1982, p.3). In order to improve the position, a laboratory assistant working in Liverpool called Albert Norman founded an organisation for assistants working in pathology and bacteriology laboratories. Norman sought advice and support from medical colleagues in the Pathological Society of Great Britain and Ireland and always believed that the two organisations should cooperate closely (Farr, 1982). The professional body called the Pathological and Bacteriological Laboratory Assistants Association (PBLAA) was founded in 1912. Full members were required to have completed a minimum of three years' laboratory training and to pay an annual subscription of 5 shillings (Farr, 1982). The PBLAA organised scientific as well as social meetings and began the 'Laboratory Journal' as a forum for members to contribute research articles (Farr, 1982).

During the First World War, PBLAA members were often conscripted to the front line rather than to work in field hospitals, because they had no formal professional qualifications. This situation was addressed after the war, when written and practical examinations were introduced for laboratory assistants in 1921. The status of laboratory assistants and consequent financial rewards were significantly improved, since "the introduction of a qualification in

medical laboratory work was above all else that which raised a barely recognised manual trade into the beginnings of a scientific profession" (Farr, 1982, p. 22).

Scientific and technical developments led to the emergence of the separate pathology disciplines of haematology and biochemistry. In 1943, the PBLAA changed its name to the Institute of Medical Laboratory Technology (IMLT), to reflect this and its members were known as 'medical laboratory technicians' (MLTs). However, by the 1970s, 'technician' was not considered to adequately reflect the high levels of training and qualification required to do the job. Members of the profession were involved in research and development as well as routine diagnostic work and they wanted a title which acknowledged the scientific nature of their work. The IMLT was re-named the Institute of Medical Laboratory Sciences (IMLS) in 1974 and the new professional designation was Medical Laboratory Scientific Officer (MLSO). Similarly, the IMLS assumed its current name of the Institute of Biomedical Science (IBMS) in 1994, allowing the introduction of 'Biomedical Scientist' (BMS) as the professional title. Professional status was consolidated by the statutory requirement that MLTs be registered under the 1960 Council for Professions Supplementary to Medicine Act (CPSM) before practicing. In 1999, there were 21,000 state registered BMSs in the UK. (Council for Professions Supplementary to Medicine, 2000)

In 1937, the professional examination comprised two stages, Part I and Part II. An MLT who passed Part I was eligible to become an 'Associate' of the IMLT, while the attainment of Part II was necessary to be a 'Member' and was a prerequisite for employment in senior posts (Farr, 1982). A more senior designation of 'Fellow' was also introduced. The membership and examination systems have subsequently been altered several times. Since the early 1980s the number of junior staff entering the profession who were graduates had been steadily increasing, until in 1995 it became a graduate entry profession in line with others in healthcare, such as physiotherapists and occupational therapists. The 'Student' membership therefore now includes not only junior staff undergoing training within the laboratory, but university undergraduates. Fellowship of the IBMS, which could previously only be achieved by passing the Institute's own examination, is now possible through an acceptable M.Sc. (IBMS, 1997). The majority of IBMS members work in diagnostic laboratories in the public sector, although some are employed by private pathology companies and others are engaged in academic research.

The first record of a female laboratory assistant dates from 1936 (Farr, 1982). Department of Health data showed that in 1950, 7% of qualified laboratory staff were women, compared to 35% of those in training. The number of females entering the profession steadily increased, so that by 1966, they accounted for 30% of qualified MLTs and 70% of trainees (Farr, 1982, p.130). This trend continued and in 1998, 61% of BMSs employed by the NHS were women (Department of Health, 1998a), although still mostly in junior grades (see Sections 3.1 and 5.2).

Relationships between laboratory scientists and medically qualified pathologists have been mixed as the two professions have developed. At first, they were very cordial, but as academic training became more rigorous, each group felt that their respective roles and status within the laboratory were not valued (Farr, 1982). Although medical microbiologists accept that "the standard of training of medical laboratory scientists is now very high" (Stokes *et al.*, 1993, p.9), whether their professional relationships with BMSs are based on mutual respect, depends on the individual circumstances.

Many BMSs certainly consider that other healthcare professionals are not aware of their role in patient care (see Sections 3.2.6 and 5.4), but this is not a new idea. For example, in a book about public health written for medical staff soon after the inception of the NHS, the benefit of the laboratory to aid diagnosis of communicable diseases was discussed. The author also provided a list of professionals described as 'partners in health services'. Under the heading 'medical auxiliaries', all the professions currently registered with the Council for Professions Supplementary to Medicine (CPSM) were included except laboratory scientists (Thomas, 1949)!

Therefore, BMSs in the UK are qualified to at least graduate level, have breadth and depth of knowledge of their chosen discipline and are certified as competent by a government body. Pathology laboratories provide a continuous service to the hospital and community health services through 'out of hours' cover or increasingly a 'shift system'. This is only possible through the conscientious and dedicated work of BMSs. However, this fact is rarely recognised outside of the health service.

1.4 The role of the clinical laboratory in patient care

Pathology, within the UK healthcare system, has been defined as "a clinical service which carries out investigations on specimens from patients as an aid to the diagnosis, management and treatment of disease and provides specialist interpretation and advice. (Staff) are also involved in population screening for disease.....(and) contribute to advances in the study of disease and its diagnosis and have a role in maintenance of standards of care in the health service generally" (Audit Commission, 1991).

This study considered the part of pathology dealing with clinical microbiology, which was taken to include all laboratories providing a diagnostic service for publicly funded or private hospitals and general practitioners in the disciplines of bacteriology, virology, parasitology, mycology or a combination of all these.

Laboratory support for clinical diagnosis has evolved over the last 100 years, from an interesting adjunct to medicine, to a vital part of patient care and management. The work of clinical microbiology laboratories in the UK has three main foci:

i) Identification of infectious pathogens in patients who present with symptoms, in hospitals or the community. For example, detection of *Cryptosporidium parvum* in faeces from a patient presenting with diarrhoea and a history of consuming water potentially contaminated with the parasite.

ii) Recommendation of efficacious antimicrobial treatments and monitoring of these therapies. For example, testing serum from patients being treated with the antibiotic Gentamicin, to ensure that therapeutic levels are maintained without reaching a toxic dose.

iii) Screening of populations that may be at risk from a particular infection or to determine the prevalence of a given disease. For example, examining of cervical and penile swabs from asymptomatic patients for the presence of *Chlamydia trachomatis.*

(Anon, 1997).

A typical department is headed by a medically qualified or scientific 'director' with the support of a Grade 3 or 4 BMS. The laboratory is then subdivided into 'sections' each headed

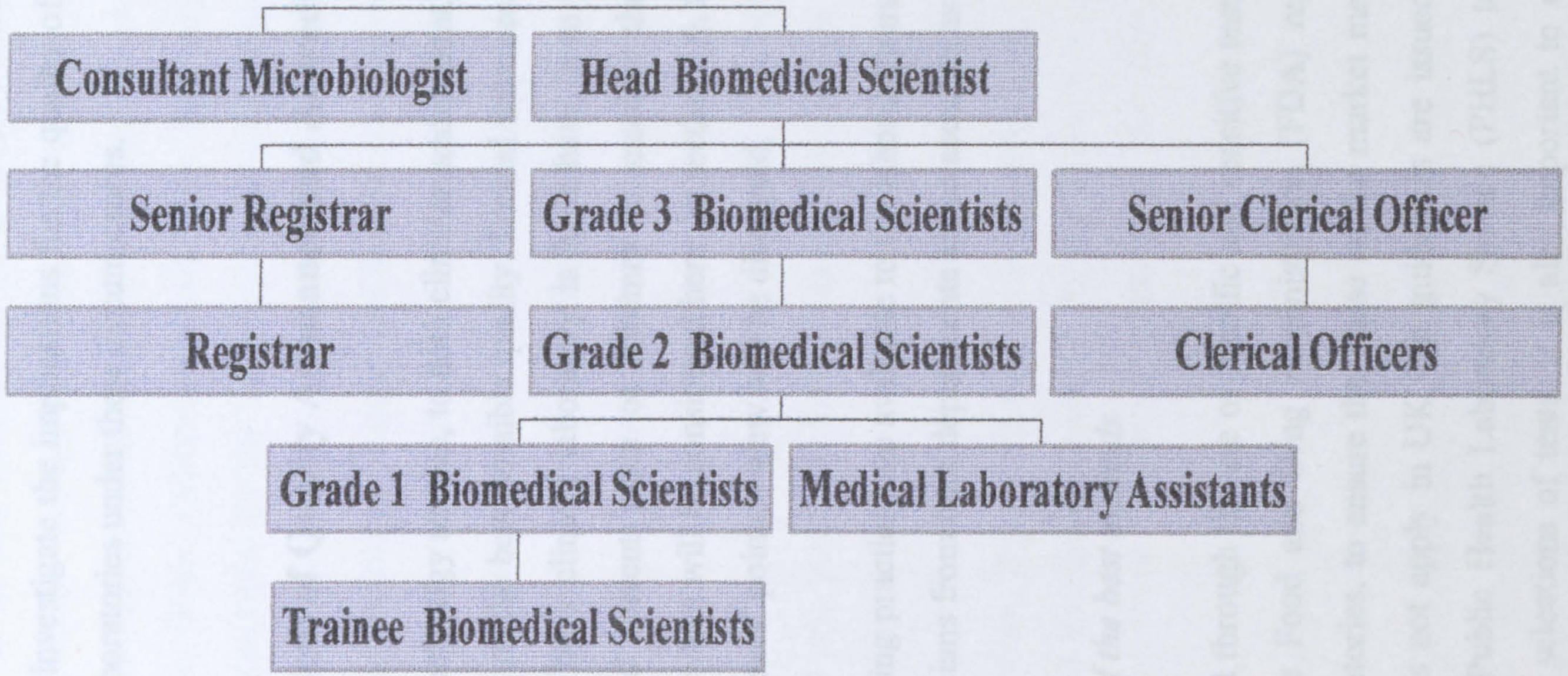
by a senior biomedical scientist responsible for its day-to-day running (Audit Commission, 1991). The director has theoretical responsibility for the work of the biomedical scientists and is ultimately answerable for any mistakes in results issued by his/her laboratory. Since the changes in the NHS (Department of Health, 1989) and the introduction of the concept of 'horizontal management', the clinical director and the head biomedical scientist would be seen as equals each contributing different strengths to the management of the department. The medical staff in the department have the roles of ensuring that the tests performed on each specimen are relevant to the clinical situation, interpretation of the results and interfacing with clinical colleagues (Royal College of Pathologists, 1999). Figure 1.1 sets out the staffing levels and management hierarchy of a typical clinical microbiology department.

The majority of staff are BMSs, who are qualified to at least graduate level and undergo postgraduate training (see Section 1.3). Many of the routine tasks in clinical laboratories have been automated, which can lead to low job satisfaction in highly motivated scientists. However, a good understanding of microbiology is necessary to select appropriate tests and interpret results. The extent to which each BMS has autonomy to use their scientific training depends largely on their relationship with the medical microbiologists. Increasingly, in the public sector the emphasis has been on centralising pathology services, leading to greater routine workloads for BMSs, leaving less time for research and development.

The Public Health Laboratory Service (PHLS) has the remit for epidemiology and surveillance, which is coordinated by the Central Public Health Laboratory (CPHL) in London. The regional Public Health Laboratories (PHLs), throughout England and Wales, collect specimens and information to support this monitoring service. They also provide a clinical microbiology service to their local health authority and examine food and water samples for environmental health departments (PHLS, 1998). This study was particularly concerned with PHLS BMS staff who were involved in the local clinical and environmental microbiology services and who therefore had equivalent jobs to BMSs working in NHS Trust or private hospital laboratories.

The number of clinical laboratories in the private sector is small in the UK. In private hospitals, the laboratory would have few staff and provide a limited range of tests. Recently, commercial companies have undertaken to run the pathology services for NHS Trusts, although this is still unusual in this country. BMSs from both types of private sector laboratory participated in this study.

Figure 1.1: Staff in a Clinical Microbiology Department



Therefore BMSs providing clinical microbiology services in the UK are employed by the private and public sectors, the PHLS and the NHS. For all their managers, the challenge in recent years has been to recruit and retain highly qualified and motivated staff, who are competent to take the required responsibility for patient care. BMSs have not been offered the rewards frequently available to scientists in industry or other healthcare professionals. This study sought to investigate the implications for the quality of the work performed in clinical microbiology laboratories under these circumstances.

1.5 Development of Quality Assurance and Accreditation schemes

The value of a pathology service, to both clinician and patient, is greatly reduced if the results provided are not of the best possible quality. Formal schemes for ensuring that the quality of results reported by a clinical laboratory is high have been in place since the 1930s. The development and current place of schemes to monitor the scientific quality of clinical microbiology services will be considered here. In section 1.6, the perceptions of services from the laboratory 'users' point of view will be discussed.

Several interlinking practices are available to the laboratory manager to make sure that results reported to clinicians from their departments are as accurate as possible:

1.5.1 Selection of the best methods

This is addressed through the use of specific and sensitive tests that give reproducible results. In the USA, the Food and Drug Administration (FDA) regulate the sale of test kits to diagnostic laboratories, to ensure that those on the market meet certain criteria of reliability. This system does not apply in UK, but guidelines are issued by the Department of Health (DoH) and the Public Health Laboratory Service (PHLS) to help managers of pathology services in their selections of tests. It is also important to ensure that the correct type of specimen is used in the assay and the result is clinically appropriate. Clinical laboratories implement internal control procedures and participate in external schemes, to monitor these aspects of the quality of their work. The definitions of these procedures adopted here are as follows:

1.5.2 Quality Control (QC)

These are the specific technical procedures carried out in the laboratory to achieve reliable and credible results (Snell and Hawkins, 1992). QC in clinical laboratories was first introduced in disciplines such as clinical chemistry in the 1950s (Kilshaw, 1987), where assays required controls for calibration. Bartlett (1990) cites the work of Levey and Jennings, who used statistical methods developed in industry, to monitor the work in their clinical chemistry laboratory in the 1950s. Calibration curves were necessary to interpret the test readings against known standards. By the late 60s, microbiology laboratories had begun to regularly monitor the performance of their equipment and reagents. As serological tests were introduced into diagnostic microbiology (complement fixation tests, haemagglutination inhibition assays, gel diffusion tests and later immunoassay tests) it was clearly necessary to include positive and negative controls each time the test was run. Commercially available serology test kits now include positive, negative and sometimes borderline controls. Many laboratories also include their own 'in house' controls regularly (For example, Gray *et al.,* 1995b).

QC is defined as 'control of working practices, technical procedures, equipment and materials' (Snell and Hawkins, 1992). Clearly, this implies that all stages of processing a specimen (collection, labelling, transport to the laboratory, analysis, interpretation result, production of report form) should be monitored as well as the scientific quality of the microbiological work. Equipment such as water baths, centrifuges and incubators should be checked daily and maintained regularly. Protocols and written procedures should be in place for all these stages, which together constitute 'good laboratory practice' (Snell, 1991).

1.5.3 Quality Assurance (QA)

This is the process whereby the quality of laboratory reports and of microbiological practice is guaranteed within defined limits (Snell and Hurley, 1993). Until the early 1990s, assessment of quality within clinical laboratories tended to concentrate on the technical aspects of specimen processing (Peddecord *et al.*, 1996). The recent process of Quality Assurance is designed to ensure that the final report issued by the laboratory contains technically correct information, relevant to the named patient, in a legible and easily interpretable form. This is done by internal checks (Gray *et al.,* 1995a) and also by using information and controls of known standard from recognised reference centres, such as the PHLS, FDA or World Health

Organisation (WHO) (Snell and Hawkins, 1992). Snell and Hawkins (1992) cite the example of the Human Immunodeficiency virus (HIV) tests used in the UK: kits are evaluated by the PHLS and information about their sensitivity, specificity and reliability are published; control sera are also available to any laboratory on request (Snell and Hawkins, 1992). Therefore, in theory, all laboratories in the UK performing HIV tests should be operating to nationally defined standards and users of the service should expect no less. Recently, to further improve scientific and technical standards, laboratories have begun to introduce internal quality assurance (IQA) schemes, as advocated by Kilshaw (1991). This involves the blind re-introduction of previously tested samples into the routine system, under the control of a Quality Control officer (Constantine *et al.*, 1993; Gray *et al.*, 1995a).

As the concept of 'medical audit' has become established in the clinical laboratory setting (Farrington, 1992, Anon, 1997), several reports have highlighted how this approach can enhance the quality of service provided (For example, Mifsud and Shafi, 1995; Appleton *et al.*, 1998).

1.5.4 Quality Assessment

This is the challenge of the quality control procedures by specimens of known (but undisclosed) content from an external source (Snell and Hawkins, 1992). During the late 60s and early 70s, national schemes for assessment of laboratory technical competence began to be introduced. In the United Kingdom, the first National External Quality Assessment Scheme (NEQAS) was implemented for Clinical Chemistry in 1969 (Kilshaw, 1986). The Microbiology scheme started with the *Neisseria* programme (Snell, *et al.*, 1982) and was subsequently extended to all areas of clinical microbiology - i.e. bacteriology and virology (Snell and Hawkins, 1992), antibiotic sensitivity (Snell *et al.*, 1982) parasitology (Hawthorne *et al.*, 1992) and mycology (Perry *et al.*, 1989).

The NEQAS scheme is operated through the Quality Assurance Laboratory (QAL) at the CPHL, which sends unknown specimens to participating laboratories. It is intended that External Quality Assessment samples should be treated in exactly the same way as any other routine clinical specimens, although it is widely recognized that extra effort is often put into testing them and results are checked by more senior staff than usual (Snell and Hawkins, 1992). The laboratories usually have 3-4 weeks to perform the tests they consider necessary

and send the results to the Quality Assurance Laboratory at the CPHL. On the basis of the accuracy of their results, each laboratory is given a score. This is compared with the maximum possible score and the scores from all the participating laboratories. This information is sent out to each laboratory along with the intended results. Also provided is the laboratory's cumulative total score on EQA tests for that set of specimens (for example HIV antibody testing) over the previous 6-12 months. This is compared with the national average, given as "the number of standard errors the individual's result is above or below the average score" (Quality Assurance Laboratory, 1998a, p.4). This is a means of identifying poor performers. It is possible to obtain further aliquots of any samples where there is a discrepancy between the obtained and intended results, so that the particular problem can be identified and corrected as required (Snell and Hawkins, 1992).

In order to maintain confidentiality, problems are monitored by an independent NEQAS committee (Kilshaw, 1991). Members visit individual laboratories that are consistently under performing and highlight general problems with examining particular types of specimen. For example, those identified in parasitology were attributed to lack of opportunities for training and updating for biomedical scientists (Hawthorne *et al.*, 1992). This led to the introduction, in 1993, of the NEQAS–associated Parasitology Teaching Scheme, which is seeking to remedy this (Kettelhut *et al.*, 1998).

Similar systems are in operation in other European countries (Snell and Hawkins, 1992), USA (Bartlett *et al.*, 1994), Australia and Canada (Snell and Hawkins, 1992). While the value of a national quality assurance scheme is now well recognized, the running costs are prohibitive in some situations. In this case it is possible to participate in an existing scheme. In 1997, laboratories from 40 other countries were reported as using the UK NEQAS scheme (Quality Assurance Laboratory, 1998b). This includes laboratories in small Western European countries such as Denmark and Eire, laboratories in Eastern Europe, the Middle East, Africa and the Far East as well as one microbiology laboratory in each of the USA and Canada (Quality Assurance Laboratory, 1998b).

These issues of quality are also beginning to be addressed in developing healthcare systems in 'resource poor' countries (Ojwang, 1996), as illustrated by the fact that laboratories in several African and Asian countries use the UK NEQAS scheme (Quality Assurance Laboratory, 1998b).

1.5.5 CPA Accreditation

In 1992, a voluntary external audit scheme for clinical laboratories was introduced in the United Kingdom. It was set up by Royal College of Pathologists in 1992 and modelled on similar systems already in existence in the USA and Australia (Clinical Pathology Accreditation, 1996). The National Health Service reforms of the early 1990s changed the emphasis of health care provision towards a market economy. This forced laboratories to compete in the market place, and there was some concern that unscrupulous private or public laboratories might offer a substandard service but at a competitive price (Lilleyman, 1990). Also, it was felt that officially verifying that a given laboratory performed to a predetermined standard would provide useful information for service purchasers (Clinical Pathology Accreditation, 1996). By the early 1990s, well-established systems for accreditation of clinical laboratories existed in several countries including Canada, the USA and Australia and New Zealand. These were used as the models for the British system, which was piloted in 21 laboratories in 1989 for 12 months (Lilleyman, 1990). Many participants in the pilot study considered it likely to have lasting benefits for their laboratory and were supportive of setting up a national scheme (Lilleyman, 1991a). This was achieved by setting up a company called Clinical Pathology Accreditation (CPA [UK] Ltd) (Lilleyman, 1991b).

Accreditation is achieved when a laboratory fulfils a set of standards which are assessed in six main categories: A: organisation and administration, B: staffing and direction, C: facililties and equipment, D: policies and protocols, E: Staff development and education, F: evaluation. There must be clear, written procedures for all aspects of the work (Standard Operating Procedures, 'SOPs') and they must be available for all members of staff to read. A completed application book is submitted for examination by the CPA when the local laboratory managers consider that they have reached the required standard for accreditation. This is followed up by a visit from a team of inspectors who are themselves senior practising biomedical scientists, clinical scientists and pathologists. If the standards are judged to be met at the time of the inspection, then full accreditation is granted; if there are some aspects of the laboratory considered to be unsatisfactory, then conditional accreditation may be awarded, subject to a satisfactory follow up visit 12 months later. In the rare cases where there are major problems, reapplication is required after the difficulties have been addressed (Clinical Pathology Accreditation, 1996). Although this UK scheme is currently voluntary and applying for accreditation is a major source of stress, it is popular, because it seeks to provide information

about standards. The user of the laboratory can then feel confident about the service provided by an accredited laboratory (Harvey *et al.*, 1995).

1.6 Concept of a pathology service

The main reason for schemes assuring the quality of laboratory results is to ensure that the patient receives an accurate diagnosis in good time for appropriate management to be implemented by the clinician (Kilshaw, 1991). Therefore the perceptions of the doctors, nurses and midwives who use the laboratory services are an important source of feedback. Users of the service usually take the technical accuracy of the results for granted (Pedler and Bint, 1991), particularly when the laboratory has been accredited by the CPA (Harvey *et al.*, 1995). Their perceptions of the laboratory service are likely to be coloured by the turnaround time for specimens (Hilborne *et al.*, 1989), the clarity of the reports and the attitude of laboratory staff (Peddecord *et al.*, 1996).

In the late 1970s, microbiologists started to consider that the reports accompanying results might be written more clearly for non-microbiological colleagues (Ackerman e*t al.*, 1979). By sending a set of 'typical microbiology results' to doctors in a large teaching hospital in New South Wales, these workers found that results were often misinterpreted or jargon misunderstood. Subsequently, they sent a set of laboratory results to other clinical microbiologists in Australia, asking them for comments (Ackerman *et al.*, 1980). Among the 96 replies, there was a wide variation in the interpretation of the data and in the style of report writing. Ackerman and colleagues concluded that microbiology laboratories were concentrating on laboratory work rather than their style of communication with their users. They recommended that microbiologists should provide clear conclusions drawn from the results and suggested that by doing so, the laboratory would play a more effective role in patient care (Ackerman *et al.*, 1980).

In the UK and other countries, recent healthcare reforms have changed the emphasis of service provision in favour of the 'user' or 'customer'. The structure of the NHS was changed in the 1990s after the publication of the White Paper 'Working for Patients' (Department of Health, 1989) and the introduction of Healthcare Trusts. Departments within Trusts were required to realistically account for the cost of the work that they did in terms of time and expenditure. These new arrangements also gave departmental managers more control over their budgets

and allowed departments to purchase services from the provider that seemed to offer the best value, even when they were part of another Trust. Therefore a Genitourinary Clinic in one Hospital Trust could purchase their microbiology services from the laboratory in another. This encouraged laboratories to analyse their practices in terms of 'customer service' and to seriously consider the requirements of colleagues on the wards and in clinics who had direct contact with patients. Thus concepts of quality, relating to service and communication, which had been developed in business, were introduced into clinical pathology.

One idea was that of 'Total Quality Management' (TQM), which suggests that aiming for the best quality should be part of every stage of the manufacturing process or service provision (Mason, 1996). TQM takes the approach that "concentrated management action can improve the quality of an organisation's services and products at very competitive cost levels, while still satisfying customer needs and increasing market share" McKenna (1994, p.374). Employees should be encouraged to be highly involved and motivated to work to the highest quality (McKenna, 1994). Using these ideas, the focus of decisions about quality issues in pathology laboratories was changed to address customer needs, by directly consulting them (Caruana and Rizzo, 1995; Mason, 1996), which was a significant change in emphasis for pathology laboratories. Prior to this, it had been recognised that laboratory tests should be appropriate to the diagnostic problem and communicated in time to be clinically relevant (Kilshaw, 1987). However, decisions about the service were usually taken internally, sometimes after informal consultation with medical and nursing colleagues who had more immediate patient contact (Caruana and Rizzo, 1995).

The concept of 'Service Quality' (Parasuraman *et al.*, 1988, Schneider, 1990) has also been adapted from industry and applied to pathology services (O'Connor, 1989; Caruana and Rizzo, 1995; Mason, 1996). According to Parasuraman *et al.* (1988), Service Quality is an assessment by the customer of the extent to which the service meets their perceptions and expectations. These authors devised a scale, 'SERVQUAL', to measure customers' attitudes towards a particular firm's service. They suggested that there are five dimensions to perceived quality of service:

i) "Tangibles: Physical facilities, equipment and appearance of personnel

ii) Reliability: Ability to perform the promised service dependably and accurately

iii) Responsiveness: Willingness to help customers and provide prompt service

iv) Assurance: Knowledge and courtesy of employees and their ability to inspire trust and confidence

v) Empathy: Caring, individualized attention the firm provides its customers" (Parasuraman *et al.*, 1988).

Schneider (1990) used the SERVQUAL scale in the development of measures of 'A Climate for Service' (see 1.10), which illustrates that Service Quality is affected by staff attitudes and how well they are facilitated to provide a good service. O'Connor (1989) used Parasuraman *et al.*'s (1988) study as the basis of a discussion of Service Quality in the context of clinical pathology in the USA. He suggested that users of the laboratory consider that they are buying information and are most concerned with how the service is being provided, rather than the technical competence of the staff. He encouraged laboratory managers to canvas and respond to users' expectations, as he anticipated that customer perception of quality would define success in future (O'Connor, 1989).

In the USA, the majority of hospitals and clinical laboratories are privately funded, while most healthcare in the UK is delivered through the NHS. However, O'Connor's (1989) comments proved to be relevant for pathology in the UK. To address the issue of Service quality, staff in UK pathology departments have conducted surveys to investigate the problems that the users encounter. For example, Boyde *et al.* (1997) reported a study which focused on the experiences of general practitioners in London using a hospital biochemistry service. They found that the main complaint was with turnaround times for particular results. Further investigation revealed that the logistics of collecting specimens from clinics and health centres and delivery of results were the sources of the delays. Although specimen collection is an integral part of the pathology service, it is not usually under the direct control of the laboratory manager. The study highlighted the discrepancy between the laboratory's definition of turnaround times, which was "the time between specimen receipt in the laboratory and the reporting of the result" (Boyde *et al.*, 1997, p.286) and the general practitioners' reckoning of the time, which started when the specimen had been taken from the patient.

Pedler and Bint (1991) sent a questionnaire to hospital doctors and general practitioners using their microbiology service in a major teaching hospital in Newcastle. This exercise highlighted problems such as the time taken for written reports to reach the ward or GP surgery being considered unacceptably long. The amount of time spent by medical microbiologists on the wards was also seen as too little by over a third of users, while the doctors themselves thought they spent adequate time with patients, (Pedler and Bint, 1991). This illustrates differences between the laboratory and user perception.

Workers in a hospital microbiology laboratory in Dundee used the number and type of telephone requests for results as a proxy marker of the efficiency of their reporting system (Phillips *et al.*, 1992). This revealed that clinicians' expectations of turnaround times for results of urine and blood cultures were not always realistic. Also, the laboratory perception that negative results were not as significant as positive was highlighted. Some changes were proposed, such as providing a handbook for clinicians with more information about specimen processing and issuing interim reports of negative results in certain cases (Phillips *et al.*, 1992).

Morgan (1995) conducted a survey of users of the microbiology service of a district general hospital in Exeter. It was considered to be a worthwhile exercise because areas where lack of communication caused shortfalls between customer expectation and actual provision were highlighted. The profile of the laboratory was also raised (Morgan, 1995). A major problem was discovered with the specimen collection service. Collection points and times were constantly changing and one rural heath centre was only visited once per week. This service was not under the control of the laboratory and the laboratory staff had not been aware of these difficulties (Morgan, 1995). Most users were satisfied with the service provided by the medical microbiologists; however, some gained the impression that the MLSO staff were 'surly' or 'hostile' by their telephone manner, particularly when 'on-call'. Despite this, the feedback from the survey was considered "wonderfully positive" overall (Morgan, 1996) and to have boosted staff morale. A similar finding after a user survey exercise was reported by Lee and Holliman (1996). None of the authors describe how this was assessed; it must therefore be concluded that it is a subjective impression gained by laboratory directors about their staff.

1.7 Consideration of individual's attitudes to the workplace experience

Clearly, the quality of services provided by clinical pathology departments is an issue of constant concern for biomedical scientists (BMSs). The performance of laboratory staff in terms of the quality of the work produced by both the individual and the department can be measured objectively. This is regularly done through quality assurance and accreditation schemes and user surveys, as described in Sections 1.5 and 1.6. However, the effect on biomedical scientists of participating in these schemes has not been seriously considered. Mifsud and Shafi (1995) reported a subjective impression of improved staff morale as a result

of internal audit exercises. In a lengthy article about quality control, Bartlett *et al.* (1994), devoted one paragraph to reporting the introduction of a 'commendation scheme' for staff. The idea was that colleagues should recognise and acknowledge good work and attitudes in each other. This was considered a useful balance to the monitoring of performances to ensure the highest technical standards, which only highlighted staff's faults and failures. The scheme was apparently enthusiastically received for a few years, but then declined, apparently due to lack of commitment by senior staff (Bartlett *et al.*, 1994).

It is recognised in business that responding to customers' expectations of service quality can conflict with meeting productivity targets (Wright, 1998) and that a balance must be achieved. For the pathology laboratory this could mean deciding how much investment in terms of equipment and staff would be required to meet users' demands and whether this is justifiable (Boyde *et al.*, 1997). O'Connor (1989) suggested that attention to the needs of laboratory employees is a prerequisite for high service quality. BMSs are increasingly expected to respond to users' perceptions of the laboratory service and meet their requirements, by changing their working practices if necessary. 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 bodies. Although these two foci are not necessarily in conflict, they compete for time and attention within the laboratory.

The effects on BMSs of striving to fulfil these responsibilities is a neglected area, which this study sought to address. It is important for two reasons:

i) In a situation where the laboratory is struggling to achieve good service quality and high quality assurance scores, BMSs are likely to feel pressured to work harder. This stress could lead to increases in technical errors and poorer responses to users' requests. Also, these difficulties may encourage BMSs to seek alternative employment and staff resignations would exacerbate the problem.

ii) Despite all the checks and balances in place, even in laboratories that meet the criteria for high 'quality', errors do occur. BMSs are currently concerned that overwork and understaffing could increase the frequency of errors. While many mistakes are minor and discovered before results reach the clinician, a significant minority have potentially devastating consequences for the patient and financial implications for the healthcare provider.

This study aimed to provide a fuller understanding of how the attitudes of BMSs towards their job, employer and colleagues contribute to the laboratory's overall performance. Three perceptions from occupational psychology were investigated in individual BMSs. These were 'job satisfaction', 'commitment' and 'climate', which will be introduced in Sections 1.8 to 1.10 respectively.

1.8 Job satisfaction

Job satisfaction is the extent to which a job fulfils a person's expectations and satisfies their needs from employment (McKenna, 1994). Whether employees enjoy their job or not and how this affects their motivation at work has been the subject of much research. There may be adverse consequences on the well-being of a person who spends many years doing a job that does not fulfil them (Warr, 1996), which could also affect their performance at work.

1.8.1 Introduction

According to Furnham (1997), the three variables that are likely to affect a person's job satisfaction are their personality, the characteristics of the job and the way in which these interact (called 'person-job-fit'):

i) Personality: An employees' personality will determine such aspects of behaviour as ability to make decisions, reaction to stress and how hard they work, which are likely to affect Job Satisfaction. For example, a person who does not respond well to pressure would not perform effectively in a highly stressful workplace, while another employee might thrive in that environment. A third person may be able to ignore their surroundings and work steadily regardless of the level of stress they are placed under. These differences are clearly important for the lives of the individuals themselves and for their managers at work. There a variety of research perspectives to understanding personality, but is it beyond the scope of this thesis to discuss them in detail. For a review of psychological theories of personality with particular reference to occupational psychology, see McKenna (1994). To understand the differences between people attitudes and behaviours, many researchers have devised schemes to 'type' their personalities. The most widely-

used models are based on the work of Eysenck, who described people as being either 'introvert' or 'extrovert' and to some extent either 'neurotic' or 'psychotic' (McKenna, 1994). This has been subsequently developed into the 'big five' theory of factors which describe personality. These factors are the degree to which someone is extrovert, neurotic, open to experience, conscientious and agreeable. (Robertson, 1996). Personality tests based on this theory are routinely used in assessing prospective employees' suitability to a particular job or organisation (Robertson, 1996). The aim is to appoint the appropriate person to a job in order that they will be happy and fulfilled in their work and thus be productive.

ii) Job characteristics: The nature of the tasks that a person is required to perform at work is likely to be important in determining their Job Satisfaction. For example, the level of skill required, the amount of variety and the workload could be important in whether they feel fulfilled (Furnham, 1997). Clearly this would depend on the person's expectation from their job. If a person was seeking stimulation and validation as a person from their employment, they probably would not consider themselves satisfied in a job that involved repetition of routine tasks. However, another person, who wished simply to leave work on time and be paid adequately, might be happy with that situation. The potential benefit to employers of understanding how the balance of required tasks can affect Job Satisfaction, have lead researchers to attempt to describe the 'characteristics' of particular jobs. For example, Hackman and Oldham (1975), suggested that there are five 'core' dimensions of a job, which are 'Skill variety' (the extent to which different skills and talents are required to do the work), 'Task identity' (the degree to which an individual feels that they have a complete task, with an obvious outcome), 'Task significance' (the perceived importance of the work within the organisation and/or to the wider community), 'Autonomy' (the amount of independence the employee feels they have to plan their own work) and 'Feedback' (the information that an individual receives about their performance both from observing themselves how well they complete their tasks and from the assessment of supervisors). They proposed a model to explain how these dimensions interact to create three 'critical psychological states' for an individual. These are:

a) 'Experienced meaningfulness in the work', which is "the degree to which the employee experiences the job as one which is generally meaningful, valuable and worthwhile" (Hackman and Oldham, 1975, p.162). This is determined by the skill variety, task identity and task significance.

b) 'Experienced responsibility for work outcomes', which is " the degree to which the employee feels personally accountable and responsible for the results of the work he or she does" (Hackman and Oldham, 1975, p.162). This is affected by autonomy.

c) 'Knowledge of the actual results of the work activities'. This is " the degree to which the employee knows and understands, on a continuous basis, how effectively he or she is performing the job" and it is influenced by feedback.

The model suggests that the right balance of the 'core job dimensions' will achieve the ideal 'critical psychological state' for an individual. This in turn will lead to the desirable outcomes of strong internal motivation, high quality of performance, positive Job Satisfaction, low levels of absenteeism and decreased likelihood to seek alternative employment (Hackman and Oldham, 1975). They tested their model by devising a measure called the 'Job Diagnostic Survey', which they stated was intended to "be of use both in the diagnosis of jobs prior to their re-design and in research and evaluation activities aimed at assessing the effects of re-designed jobs on the people who do them" (Hackman and Oldham, p. 159). The usefulness of the Job Diagnostic Survey for 'redesigning' jobs, to give workers more meaning in their tasks, which should enhance their motivation, has been questioned (e.g. McKenna, 1994, Furnham, 1997). It is not always possible to redesign someone's job to suit their needs and some people do not want more responsibility and purpose from their employment (Furnham, 1997). However, Hackman and Oldham's (1975) model has become widely accepted as an effective measure of Job Satisfaction (McKenna, 1994) and has formed the basis of subsequent job satisfaction scales, including the one used in this study (Blau and Lunz, 1998).

iii) Person-job fit. When a person's job suits their interests and temperament, they are more likely to experience job satisfaction and therefore work well and stay in that post. Holland (1985) has categorised personality according to character traits which he considers are likely to make particular people suited to certain careers. His theory suggests that there are 6 main personality types, called Realistic,

Investigative, Artistic, Social, Enterprising or Conventional. It is also possible to describe 6 general types of workplace environment, similarly labelled Realistic, Investigative, Artistic, Social, Enterprising or Conventional (Holland, 1985). People tend to seek environments that will allow them to express themselves as people and to develop their talents and skills. For example, an Investigative type of person is someone with a " preference for activities that entail the observational, symbolic, systematic and creative investigation of physical, biological and cultural phenomena (in order to understand and control such phenomena) and to an aversion to persuasive, social and repetitive activities" (Holland, 1985, p.22). This type of person will be attracted to a workplace which is an Investigative environment, that is a place "characterized by the dominance of environmental demands and opportunities that entail the observation and symbolic, systematic, creative investigation of physical, biological or cultural phenomena and by a population dominated by Investigative types" (Holland, 1985, p.44). An individual will have a dominant type and a tendency towards two subtypes, such as Investigative – Enterprising – Artistic. Holland (1985) has categorised careers according to his 6 groups (for example, Investigative careers are scientific and technical) with subgroups to suit all the possible permutations. When a person chooses a job which suits their personality type, they are more likely to grow and develop as an individual and perform well at work. This is an illustration of person-job fit. In a study of the value of Holland's theory to managers involved in interviewing prospective candidates for jobs, 'medical technologist' was used as an example of Investigative type (Dunn *et al.*, 1995).

Therefore, BMSs are more likely to experience high job satisfaction if their personality predisposes them to be interested in scientific investigation, not squeamish about dealing with clinical specimens and capable of working under pressure, particularly when dealing with urgent test requests. Their laboratory manager can enhance job satisfaction by encouraging the perception that their work is an important contribution to patient care, by delegating sufficient responsibility and giving constructive feedback. When the BMS's personality is suited to their job and they feel that they fit into the laboratory environment, they would be expected to find fulfilment in their work and be motivated to perform well.

1.8.2 Consequences of positive Job Satisfaction

Although there have been many studies to investigate how job satisfaction affects performance at work, the evidence for a direct relationship is reported to be weak (Dipoye *et al.,* 1994; McKenna, 1994; Furnham, 1997). This may be partly due to the lack of consensus in the literature regarding the best model and measurement scale for Job Satisfaction (see Section 1.8.3). Also, Job Satisfaction may not affect performance directly, but may interact with another variable, such as Commitment (see Section 1.9) or Climate (see Section 1.10). Another possible outcome of staff experiencing high job satisfaction is that they are less likely to look for another job (i.e. low employee turnover) (McKenna, 1994; Furnham, 1997). This is intuitively obvious, but again it would be too simplistic to suggest that an employer could minimise turnover by improving job satisfaction in isolation of other factors. A person might feel fulfilled but have skills that are in demand and be offered better career prospects or higher salary by another employer. Also other psychological factors, such as commitment might be more important determinants of turnover. For example, in a study of medical laboratory technologists' (MLT) intent to leave their profession, Blau and Lunz (1998) found that commitment to one's career was a stronger deterrent to changing profession than Job Satisfaction. A third expected consequence of high job satisfaction is low absenteeism. That is, when a person enjoys their job, they would take less time off for trivial (or feigned) illnesses. However, this is not always the case, although the opposite (i.e. the lower the job satisfaction, the greater the absenteeism) is reported to be true (McKenna, 1994).

In this study, job satisfaction was assessed in BMSs for three main reasons:

i) To quantify the levels of job satisfaction in BMSs in order to compare them with those reported from other workers.
ii) To assess the effect of Job Satisfaction on performance in terms of quality of work
iii) To investigate the relationships between Job Satisfaction and the two other perceptions of commitment and climate.

1.8.3 Selection of Job Satisfaction measurement scale

The criteria used to assess whether subjects are satisfied with their job depends on the research context and what the survey designers require from the results. Some authors require detailed

answers about the issues that the researchers themselves perceive to be important in defining satisfaction with one's job. A widely cited example of this is the Job Descriptive Index, published in 1969 by Smith and colleagues in Chicago (Hatfield *et al.*, 1985). This explores many aspects of the workplace experience, but comprises 72 items which makes it impractical for most studies. Others researchers leave the interpretation of 'Job Satisfaction' to their questionnaire respondents and use a single item, such as: "Considering everything, how satisfied are you with your job?" (Gunter and Furnham, 1996).

The scale used in this study to assess job satisfaction among BMSs is one of a number that have been developed from Hackman and Oldham's (1975), Job Diagnostic Survey (see Section 1.8.1). It was chosen for three main reasons:

1. Hackman and Oldhams' (1975) model is respected and was considered to account for the important aspects of Job Satisfaction among graduate professionals such as BMSs.
2. It had been adapted by Professor Gary Blau of Temple University, Phildelphia (pers. comm.) into a simple and direct form. Respondents were asked to comment on their satisfaction with 15 unambiguous issues, which had immediate relevance to BMSs.
3. It had previously been used in a study of Medical Laboratory technologists (MLTs), the equivalent profession in the USA (Blau and Lunz, 1998), which therefore allowed direct comparisons to be made with British BMSs.

Job satisfaction has been consistently shown to be significantly related to 'commitment' to the organization (see Section 1.9) in many groups of workers (Mathieu and Zajac, 1990) and specifically in nurses (Bateman and Strasser, 1984; Curry *et al.*, 1986; Knoop, 1995). However, whether job satisfaction promotes the development of commitment or the causal order is the reverse remains unclear (Mathieu and Zajac, 1990; Martin and Bennet, 1996). It has also been found that workers have higher job satisfaction in situations where they experience a positive (organisational) 'climate' (see Section 1.10) (Joyce and Slocum, 1990; Smither, 1994). Another question which was explored here is whether people who made a deliberate career choice to be a BMS are more satisfied with their work, as Holland's (1985) theory (see Section 1.8.1) suggests that they would.

1.9 Commitment

Commitment to the organization has emerged as an important concept in Occupational Psychology during the last 30 years (e.g. Mathieu and Zajac, 1990, Meyer and Allen, 1997). Organisations seek to engender attitudes of loyalty and trustworthiness among employees. In the United Kingdom, this has become harder in recent years, since there is no longer guaranteed job security, even in the public sector (Coopey and Hartley, 1991, Iles, *et al.*, 1990).

1.9.1 Introduction

Although several different models and measurement scales have been described for Organizational Commitment (OC), they are all considered to share the common idea of " a bond or linking of the individual to the organization" (Mathieu and Zajac, 1990, p.171).

Attempts have been made to define and thus understand commitment since the 1960s. 'Employee commitment' to an organization is considered to have developed from the idea of 'loyalty' to an employer (Mowday *et al.*, 1982) and can be described as "a worker's identification with and involvement in a particular organization" (Dipoye, *et al.*, 1994, p.171). OC includes the idea of 'exchange', whereby the individual comes to the organization with needs, desires and skills and the employer uses his/her talent and satisfies some needs. The extent to which this occurs is thought to influence the level of commitment (Mowday *et al.*, 1982).

Since OC refers to the employees' general attitude towards the organization, it is thought to be more stable than job satisfaction as it is not likely to be influenced by small daily events at work (Mowday *et al.* 1979; Dipoye *et al.*, 1994). Mowday and colleagues suggested that while strong links are desirable for the organization, too close an identification could be detrimental to the individual (for example by working too hard and neglecting other aspects of life, if the company closed or was found to be operating in an unacceptable (eg illegal) way it would be much harder to deal with) (Mowday *et al.*, 1982).

1.9.2 Development of the concept of commitment

Mowday and colleagues, summarising the research at the time noted that there was no single accepted definition of commitment and offered the following overview of (OC) as:

"the relative strength of an individual's identification with and involvement in a particular organization. Conceptually, it can be characterised by at least three factors:

a) strong belief in and acceptance of the organization's goals and values;

b) willingness to exert considerable effort on behalf of the organization;

c) a strong desire to maintain membership in the organization"

(Mowday *et al.*, 1982, p. 27).

These workers distinguished between 'behavioural' and 'attitudinal' commitment, but considered that the latter was most important and in fact synonymous with OC. They developed a scale to measure it, the Organizational Commitment Questionnaire (Mowday *et al.*, 1979), which has been widely used (See, for example, Mathieu and Zajac, 1990 for a review). Their conceptualisation of OC also influenced other researchers and a British version of the scale was constructed by Cook and Wall (1980).

Although Mowday *et al.*'s conceptualisation of commitment is still widely accepted, the appropriateness of the Organizational Commitment Questionnaire has recently been challenged in two fundamental areas, which are discussed in Sections 1.9.3 and 1.9.4 below.

1 9.3 Components of Commitment

It has become clear that 'attitudinal commitment' is not a single psychological concept. Meyer and Allen (1991) used their experience in OC research to propose a three-component model of Commitment:

a) Affective commitment (AC): the psychological attachment to an organization which causes individuals to continue working there because they want to (Meyer and Allen, 1991). This seems to be affected by experiences early on in one's employment with the organization and the management style. This idea of 'bonding' clearly links in with the commitment described by Mowday and

colleagues (Mowday *et al.*, 1982). Subsequent studies have confirmed that the attitude measured by the Organizational Commitment Questionnaire is strongly related to AC to the Organization (e.g. Dunham *et al.*, 1994; Hacket *et al.*, 1994) and that both scales are likely to be measuring the same concept (Allen and Meyer, 1996).

b) Continuance commitment (CC): the situation in which the individual perceives the costs involved in leaving the organization to be too great to leave (Meyer and Allen, 1991). These costs include financial, social, requirement for retraining and lack of available alternatives. This concept has developed from the 'side bet' theory of commitment proposed by Becker (1960). He suggested that a person who becomes committed to a certain goal (e.g. career progression), can behave in apparently inconsistent ways (e.g. doing tasks that they do not like if asked to do so by their manager). In this case, the person has calculated that the long-term benefits from complying with the managers' request outweigh the short-term inconvenience (Becker, 1960). Meyer and Allen (1991) extended this to include staying with a company where one feels unfulfilled, for the sake of the friendships or because leaving would reduce the value of the pension scheme one has paid into for 20 years. There is some dispute about whether CC actually has two dimensions, as reported by McGee and Ford (1987). These researchers proposed separating the scale into 'CC: low perceived alternatives' and 'CC: high personal sacrifice'. Other workers have found that the two dimensions are strongly related (e.g. Meyer and Allen, 1997) or that the original single dimension is still the best description of CC (e.g. Suliman and Iles, 2000).

c) Normative commitment (NC): the situation in which an individual stays with a given organization because they feel they ought to (Meyer and Allen, 1991). This type of commitment may arise from the nature of the organization (e.g. public service), the investment in training that has been put in to the individual, or the perception of the organization's commitment to the employee that the individual feels they ought to repay through their work. The idea of commitment as being due to "internalized normative pressures to act in a way that meets organizational goals and interests" was proposed by Wiener (1982 p. 421). A strong sense of moral obligation to stay with an organisation has been found to reduce the likelihood of an employee to contemplate leaving their organisation (Jaros, 1997).

An individual's 'commitment' is likely to be a combination of these three aspects, each being related to different antecedents and influencing particular outcomes (Allen and Meyer, 1990). For example, AC has been shown to lead to low absenteeism (Meyer and Allen, 1997, Mathieu and Zajac, 1990), while CC may be related to poorer performance (Meyer *et al.*, 1989).

This model has been supported both through testing (e.g. Shore and Wayne, 1993; Hackett *et al.*, 1994; Irving *et al.*, 1997) and conceptually by, for example, Benkoff (1997), who suggests that the Mowday *et al.'s* (1982) model is too one-dimensional, while purporting to describe at least three factors. She considers that the OCQ measures 'a sense of belonging and satisfaction without capturing the motivational dimension' (Benkhoff, 1997) and advocates abandonment of this model, in favour of Meyer and Allen's, despite the former's contribution to advancing the theory of commitment.

1.9 4 Foci of commitment

Consideration of the daily experience of most employees shows that the idea of being committed to 'the organisation' is likely to be "oversimplistic" (Coopey and Hartley, 1991). Most people have a psychological relationship with several layers of the organization - i.e. work groups, departments, and sections as well as with senior managers and the chief executive (Reichers, 1985; Becker *et al.*, 1996). Indeed their attitude towards the organization is likely to be more strongly influenced by immediate colleagues and line managers than the top administrators and loyalties may conflict (Iles, *et al.*, 1996; Reichers, 1986).

Similarly, commitment within the workplace could be to paid employment *per se* (Iles. *et al.*, 1990), co-workers (Becker, 1992), career (e.g. Blau, 1985) unions (e.g. Tetrick *et al.*, 1989) or occupation /profession (e.g. Morrow and Wirth, 1989).

Any of these bonds may be stronger and take precedence over any attachment to the organization (Reichers, 1986; Iles, *et al.*, 1990). Thus, 'high flyers' may be prepared to move between several employers for the sake of gaining promotion. Meyer and Allen have extended their model of commitment to include this and developed analogous scales to measure AC, CC and NC to one's profession (Meyer *et al.*, 1993). Although this focus of commitment has

been less thoroughly researched, its importance is increasingly recognised (Wallace, 1993; Irving *et al.*, 1997). It is thought that professional commitment is often more strongly felt by employees with specialist training and qualifications than commitment to an employing organisation (Wallace, 1993). This is partly attributable to changes in work patterns that mean that employees can no longer expect to have a 'job for life' with a single employer. Meyer *et al.* (1993) adopted the term 'Occupational Commitment' for their measure of commitment to a profession, as they consider it applicable to other workers who might not consider themselves to be professionals. Their terminology was followed by Irving *et al.* (1997), when they tested this version of the three-component model. However, in this study, the label 'Professional Commitment' was used, since biomedical science is a recognised profession in the UK. This also allowed the use of clearer abbreviations for the two sets of Commitment scales (see Section 2.2.2). Mowday *et al.* (1982) suggested that OC did not preclude commitment to other aspects of life, such as family, a union or political party - indeed these may be of interest to employers because of any potential effect on behaviour at work (Meyer and Allen, 1997).

1.9.5 Commitment among healthcare workers

Organisational commitment has shown to be related to organisational effectiveness (Mathieu and Zajac, 1990; Meyer and Allen, 1997; Boshoff and Mels, 2000). Therefore strong commitment is clearly important and desirable in health care workers, in order to provide the best service for patients. Recent changes in the healthcare service in the United Kingdom have led to mergers of hospital Trusts, often resulting in staff redundancies. The loss of valued colleagues and an increasing workload can cause resentment among the staff who remain. Insufficient resources, particularly in the public sector, mean that pay and conditions are often perceived by staff as poor compared with that experienced by similarly qualified professionals in other jobs. It would clearly be advantageous to health service managers to understand how to engender commitment among demoralised staff and how to prevent enthusiastic and committed employees from seeking alternative jobs or changing careers.

Various studies of commitment have been undertaken in the hospital context in recent years. For example, Bateman and Strasser (1984), studied factors leading to feelings of commitment to their hospital among nurses and found that commitment led to job satisfaction. Curry *et al.* (1986), could not replicate these findings among a similar group of nurses, instead they found experiences of commitment and job satisfaction to be independent of each other. More

recently, Mathieu and Zajac (1990) used meta-analysis to combine results from a large number of studies concerning job satisfaction and commitment reported in the literature. They concluded that an increase in job satisfaction lead to an increase in commitment and *vice versa,* so this is clearly an area where more research is needed. Brewer and Lok (1995) examined how management style influenced commitment among Australian nurses. They showed that when nurses perceived their middle managers to be open and trustworthy, they experienced a higher level of organizational commitment (Brewer and Lok, 1995). Knoop has shown that job satisfaction and commitment for nurses are related and also that pride in the hospital is a significant predictor of commitment. (Knoop, 1995). Dutta Roy and Ghose (1997), looked at the relationship between the hospital environment and organizational commitment among doctors and nurses in India. They concluded that commitment among nurses was influenced by 'internal' environmental factors such as the goals, processes, strengths and limitations of the organization. Doctors, however, being managers seemed to be more aware of 'external' factors like the attitudes of customers, changes in disease patterns and advances in technology and commitment to a hospital was influenced by its responses to these (Dutta Roy and Ghose, 1997).

Similarly, commitment has been assessed in other health professionals, such as physiotherapists (e.g. Stith *et al.,* 1998), pharmacists (e.g. Kong, 1995) and NHS managers (e.g. Iles *et al.*, 1996). However, the scientific staff in the laboratories (BMSs) have rarely been considered for occupational psychology studies. This is partly due to the nature of the work, which tends to confine the BMSs to the laboratory bench, giving them limited patient contact and a low profile within the hospital community. They are therefore rarely asked to participate in studies organised by nurses or other colleagues. As biological scientists, most BMSs would not have the relevant social science skills to conduct such a study - nor the time to acquire them! However, they are an interesting and unusual group within the health service who have been overlooked.

Pathology departments have been severely affected by the changes in the National Health Service during the last 10 years and may have become easy targets for financial cuts. Many staff have experienced painful mergers and lost valued colleagues through redundancies - while the demands on the service steadily increase. BMSs are highly qualified professionals, who gain higher degrees as a normal part of their professional training. Their pay is considerably lower than their peers in private companies and often compares poorly with that of other healthcare professionals (see Section 5.3). Intuitively, commitment in this group

would be expected to be complex and multi-layered. For example, a BMS might feel AC to the employing NHS Trust and/or the NHS as a whole; due to the centralisation of pathology services, a lack of alternative employers in the locality might lead to high CC, while NC to the organisation might come from a belief in public service. At the same time, he/she might feel a bonding to the profession and affinity for BMS colleagues, CC because of the specialist training and NC due to a feeling of obligation to use the professional training to benefit patients.

1.9.6 Selection of Commitment measurement scale

Meyer and Allen's (1991) three 3-component model of commitment (see Section 1.9.3) has been tested extensively and is widely accepted by occupational psychologists. Since the nature of relationships between hospitals and employees has changed dramatically in the UK in the past 10 years, it was important to assess organisational commitment in BMSs. Professional commitment was also considered likely to be strongly felt among this group of workers with specialised training and qualification. Although there is no previous data to compare the results of this study with, the finding could indicate which focus of commitment was more important to BMSs and whether each had a different effect on the quality of an individual's or laboratory's work. Therefore the scales to assess the three components of affective, continuance and normative commitment to both the organisational and profession developed by Meyer *et al.* (1993) were selected.

1.10 Climate

Climate has been defined as " the shared perceptions of employees concerning the practices, procedures, and kinds of behaviours that get rewarded and supported in a particular setting" (Schneider *et al.*, 1998, p. 151). Study of climate in a particular workplace attempts to describe how people perceive their working environment, how those perceptions might have developed and whether they affect performance at work.

1.10.1 Development of the concept of climate

Academic research into 'climate' began over 60 years ago, with the studies of Lewin *et al.* (1939). They reported observations of how different leadership styles 'created' types of social group behaviour among 10-year old boys in after-school clubs. Although the boys, their parents and teachers were interviewed during the experiments, value judgements about the interactions in these groups were made from the observations of the researchers. There was an underlying assumption that the leadership of the group was the only important variable in determining group interaction and an individual boy's attitude was not relevant.

This work was later extended to the world of adults in the workplace. For example, Litwin and Stringer (1968) were interested in how motivation theory influenced behaviour in organisations. They experimented with a number of simulated 'organisations', where the leadership style of the 'president' was different in each case. The researchers developed a scale to assess attitudes of the 'workers' to the various styles and, from this, proposed the concept of 'organisational climate' as "a set of measurable properties of the work environment, perceived directly or indirectly by the people who live and work in this environment and assumed to influence their motivation and behaviour" (Litwin and Stringer, 1968, p.35). This definition does take individual perceptions into account, but assumes that they are passive responders to their workplace conditions. Investigations into how climates form in organisations revealed that the explanation is more complicated.

1.10.2 Formation of climate

There are four main strands in the literature concerning the way in which climates form within organisations. They reflect the development of the concept of climate and are classified by Moran and Volkwein (1992) as:

i) The structural approach: Staff are exposed to common practices and procedures within their organisation, which causes them to have similar perceptions. These perceptions form the climate of their organisation.

This theory is proposed by, for example, Payne and Pugh (1976), who argue that the important factors in determining climate are the conditions within the organisation (e.g. size, centralised

decision-making, levels of hierarchy, formal rules). Individuals are aware of these structures, learn to operate within the constraints and align their perceptions to fit in with them. This then becomes the 'climate' of the organisation. The problem with this approach is that since 'climate' is about perceptions, then each person will have a unique view of practices and events. As Moran and Volkwein (1992) point out, there is a subjective element to individual perceptions. Also, research has shown that groups of staff within a given organisation can form different climates. For example, Drexler (1977) assessed climate in several departments within each of three organisations and found some evidence for variation in climate among different groups of staff in the same company. Similarly, a study of how climate develops, followed staff in a newly-opened hotel for five months (Jackofsky and Slocum, 1988). It was found that groups of workers formed into four 'clusters' each experiencing distinct climates.

ii) The perceptual approach: Each individual staff member responds to situations within the workplace in a way that makes sense to them. Each person's perception forms their own psychological climate.

This view is advocated by workers such as James and Jones (1974), who emphasise the role of the individual's experience of the organisation in the formation of climate. When approaching climate from the individual level, the distinction between 'psychological' climate and 'organisational' climate must be clear. Schneider and Reichers (1983, p.21) offer the following definitions " psychological climates are the meanings an individual attaches to a work context, while organisational climates are the summated, averaged meanings that people attach to a particular feature of the setting". These authors state that to describe the climate in a workplace, the set of individual perceptions can be aggregated. A criticism of this perspective is that as climate measurement attempts to assess perceptions which are shared, it presupposes that everyone in the organisation will interpret and respond to events in a similar way. One way of allowing for this is the selection-attraction-attrition (SAA) theory postulated by Schneider and Reichers (1983). This suggests that since people tend to be attracted to jobs that suit their personalities and interests, and managers try to appoint staff who have attitudes that will conform to the organisation's goals, people who do not 'fit in' tend to leave. Therefore staff members have similar perceptions of climate because they have been selected out to be similar people. The perceptual approach places climate at an internal level within each person. It does not allow for the influence that colleagues can have on each other's view of a particular situation at work. For example, a more senior staff member or someone with a stronger personality can cause an individual to re-evaluate occurrences (in either a positive or

a negative way). Neither does it account for the empirical finding that groups of staff in an organisation (e.g. departments) form 'clusters' who experience different climates (e.g. Jackofsky and Slocum, 1988).

iii) The interactive approach: Individuals in the workplace environment interact with each other to respond to a given situation. Climate is thus a dynamic perception, which develops from the group's responses to organisational practices and events.

This theory was developed from the first two approaches to climate, to address the problems outlined in Sections 1.10.2(i) and 1.10.2(ii) above, by Schneider and Reichers (1983). These researchers contend that the structures and procedures within an organisation do not form climate *per se,* but the way people respond to them does. The unique perception of each individual within a work group is accepted to form part of the reaction, which creates the climate. This theory allows staff in different departments to experience climate differently, since people interact most closely with their immediate colleagues to interpret particular events or practices and each group will be distinct (Schneider and Reichers, 1983). This work draws on theory of 'newcomer socialisation', whereby new staff rely on communication with colleagues to familiarise themselves with the organisational structure and policies and how they are expected to behave. The dynamic nature of interactions means that as individuals join the work team, they can influence the way climate develops. This idea is supported by the work of O' Driscoll and Evans (1988), who investigated climates in psychiatric wards and found that communication was the key to the ways staff and patients perceived the atmosphere on the ward. Ashforth (1985) endorsed the idea that "the interactionist approach to the aetiology of climates suggests that they are socially constructed". He proposed some extensions of the model, to consider:

a) the place of the workgroup in the context of the whole organisation;
b) an individual's desire to be accepted in the group;
c) the influence of organisational 'culture' (see Section 1.10.2.[iv]);
d) the imposition of particular norms ('symbols') by managers;
e) the role of the physical arrangement of the workplace.

Since an individual's experience of climate must be a unique perception, that is nevertheless influenced to some extent by the limitations of the organisational structure and views of colleagues, Schneider and Reichers' (1983) description of how climate develops does seem to

explain workplace experience. The relevance of this 'interactionist approach' is supported by the fact that it has allowed academics to move research forward (see paragraph 3). However, Moran and Volkwein (1992) feel that it fails to acknowledge the role of organisational culture in underpinning the development of climates, as explained below.

iv) The cultural approach: Climate develops from the interactions of groups of colleagues in an organisation. The staff share a common set of (sub-conscious) values and assumptions, which is the organisation's 'culture'. This affects their perceptions of practices and events and thus influences climate.

The concepts of organisational 'climate' and organisational 'culture' have grown from separate academic traditions, but the terms are sometimes used indiscriminately. Ashforth (1985) suggests that in research terms "the culture concept may have literally consumed the climate concept". Organisational climate comes from occupational psychology and concerns shared perceptions of events in the workplace. It is usually measured using quantitative methods, like tick-box questionnaires, which allow large numbers of subjects to be assessed. Organisational culture is studied by social anthropologists, notably Schein (Furnham, 1997) and Hofstede (1998). It is defined as " learned responses to the group problems of survival and internal integration. These responses are subconscious, taken for granted and shared by members of the social unit" (Reichers and Schneider, 1990). Researchers in this field favour qualitative approaches such as interviews and observations, which probe deeply but are time-consuming. Reichers and Schneider, (1990) state that they agree with other researchers, such as Schein, that "culture exists at a higher level of abstraction than climate and climate is a manifestation of culture". The 'culture' of an organisation is a description of the beliefs and values which underpin the organisational structure. Climate is effectively a sub-set of organisational culture. For example, if part of the culture was that the contribution of all staff was important, this would lead to a loose, flexible management structure where individuals would have a chance to apply and extend their talents outside of rigid job descriptions. This would be reflected in a 'climate' with an open and responsive management style, where staff are consulted in decision-making (where appropriate) and know that they will be supported at work.

Moran and Volkwein (1992) contend that to understand more fully how climates form in organisations, the influence of organisational culture should be addressed. They suggest that from a manager's point of view, climate could be manipulated in the short term (for example,

to aid adjustments in the company, there could be entail explicit and deliberate changes in the way managers communicate with staff) but for lasting change in perceptions, the culture must be considered.

The interplay between the two concepts is a current academic issue, but it is clear that insight into 'culture' involves describing underlying beliefs about the organisation, while understanding of 'climate' can be gained from measuring perceptions of individuals (Pettigrew, 1990). Climate is an aspect of culture for which occupational psychology research tools have been developed. Reichers and Schneider (1990), argue that information gathered about climate can be used to makes inferences about and increase understanding of culture.

1.10.3 Current Climate research issues

According to Dastmalchian *et al.* (1989), research into organisational climate has been focussed in two directions:

a) Assessing 'causal variables'- the factors affecting the formation of an organisation's climate which could be changed by the management, such as policies, decisions and leadership style (Payne and Pugh, 1976). This led to descriptions of how organisational climates might form, as outlined above.

b) Investigating relationships with 'end-result variables'- the factors which might influence or be influenced by climate. Researchers into the effect of climate initially viewed it as a dependent variable and found relationships with independent variables such as job satisfaction and performance (Payne and Pugh, 1976, Dastmalchian *et al.*, 1989).

More recently, the idea of climate as an 'intervening' or 'moderating' concept has emerged (Dastmalchian *et al.*, 1989, West *et al.*, 1998). This puts climate as linking 'cause' (organisational structures and staff perceptions that form climate) and 'effect' (attitudes of staff such as job satisfaction). It implies that changes to practices and procedures at organisational level (for example, through Human Resource Management (HRM)) can alter measurable outcomes, such as job satisfaction and performance (Furnham, 1997). The concept of climate as a moderating influence seems to be helpful. The 'culture' of an organisation

indicates the way things are done, while 'climate' is a measure of how individuals perceive and describe their workplace experience (Verbeke *et al.*, 1998). Climate is considered to be a manifestation of culture and would also be hypothesised to predict an 'end–result' such as service quality.

Schneider (1990) suggests that the most effective way for researchers to address this is to focus on one area that an organisation can be described as having "a climate for". Schneider and colleagues have studied 'a climate for service' in banks in USA (Schneider, 1990; Schneider, *et al.*, 1992; Schneider *et al.*, 1998). They have investigated the extent to which bank staff feel that service is important within their organisation and how this affects their attitudes towards customers. The idea has been extended to other foci, such as climate for safety (Zohar, 2000), justice (Cropanzano and Greenberg, 1997), industrial relations (Dastmalchian *et al.* 1989) research excellence (West *et al.*, 1998) and diversity (Hicks-Clark and Iles, 2000).

The long-term influence of this 'climate for something' can then be measured over a period of time ('longitudinal studies'), such as those reported by Schneider *et al.*, (1998) and West *et al.* (1998). Schneider and colleagues (Schneider, 1990; Schneider *et al.*, 1992; Schneider *et al.*, 1998) developed scales for measuring the 'climate for service' experienced by bank staff and used aggregated scores (see [iii] below) to describe the climate in 126 branches of the bank. They tested the relationship between the employees' attitudes to good service in 1990 and 1992 and customer perceptions of the service in their branch of the bank in 1990, 1992 and 1993 (Schneider *et al.*, 1998). They found that for customers to report a high level of service, the staff in that particular branch must first be confident in their manager, colleagues and the administration system within the bank, which the researchers called 'foundation issues' of climate. Where this support was in place, it was then possible for 'a climate for service' to develop within that branch of the bank, which customers perceived during their interactions with staff. Their data allowed them to explore this effect over a period of three years and they showed that the 'foundation issues' of climate were necessary for the bank employees to experience 'a climate for service' in 1990. This in turn predicted a high score for customer perceptions of quality of service in 1993 (Schneider *et al.*, 1998). However, after testing their model using their 1990 staff data with both the 1990 and then 1992 customer results, they concluded that the same relationships were true with shorter time lags than three years. There was also some evidence that customers' expectations could influence employees' perceptions of climate The authors suggest that "once an organization develops and achieves some

consistency in its relationships with customers, reciprocal relationships will persist and the issue of defining how long it takes these effects to emerge becomes moot" (Schneider *et al.*, 1998, p.161). West *et al.* (1998) studied climate the effect of departmental climate on effectiveness in British university departments. They collected data from academic staff employed in 46 university departments in 1992 and 1994 and related aggregated climate scores to the department's ratings in the Research Assessment Exercise (RAE) in 1989 and 1992. The study design enabled these researchers to investigate the effect of the RAE rating in 1989 on departmental climate in 1992 and how scores on these two measures changed over time. They concluded that research effectiveness within university departments, measured as the RAE rating, seemed to predict climate rather than *vice versa* (West *et al.*, 1998). Studies such as these suggest that climate operates in the middle of 'organisational structures' and 'outcomes' and seem to support the 'moderator' idea.

According to Furnham (1997), researchers identify four types of climate within organisations:

i) The climate experienced by individual staff members, labelled 'psychological climate'. The need to take into account that each person's perceptions are unique was recognised early in climate research, by authors such as James and Jones (1974) and Payne and Pugh (1976). Individual climate scores can be used to describe the climate generally experienced by particular group of workers and to investigate relationships with other variables such as job satisfaction (e.g. Lawler *et al.*, 1974; Furnham, 1997). They are also regularly used in development of new scales (e.g Kozlowski and Hults, 1987; Anderson and West, 1998), prior to their application to groups of employees as described below.

ii) The overall climate within the organisation, which is the 'organisational climate' (Furnham, 1997). This is the level at which climate is most often described, although the distinction between the prevailing climate throughout the whole organisation and its culture is not clear, as described in Section 10.2.4. The measurement of organisational climate clearly requires the aggregation of psychological climate scores from a representative sample of individual employees. There is some debate among researchers about how many staff (e.g. 90% as opposed to two thirds) should agree on a particular perception before it can be used to define the organisation's climate (Furnham, 1997). However, other authors (e.g. Payne and Pugh, 1976, Payne, 1990) consider that it does not make sense to attempt to describe climate for the whole organisation unless the

experiment has been carefully designed to do this. They argue that, since most studies measure climate in small groups of staff, it is more useful to acknowledge that and discuss for example 'departmental' or 'workgroup' climate (Payne, 1990).

iii) The average of the climate levels reported by staff in a particular group, such as a team or department, termed 'aggregated climate'. It is generally considered to be acceptable to aggregate the climate scores of individuals provided that they are part of a meaningful group (Payne, 1990; Schneider, 1990) and the grouping is statistically valid (James *et al.,* 1984; Payne, 1990). The aggregated climate describes the overall perceptions of people who work together in a unit of the organisation's structure, such as colleagues in one branch of a bank (Schneider *et al.,* 1998) or academics in one department of a university (West *et al.,* 1998). This is a useful way of organising data when the research question involves the influence of climate on an outcome such as departmental performance (e.g. Schneider *et al.,* 1998, West *et al.,* 1998).

iv) The perceptions of staff who have a similar view of the organisation's climate, formed into clusters, called 'collective climates'. These groups of people may cross departmental boundaries and have been observed to occur without deliberate intervention from managers or human resources personnel (e.g. Jackofsky and Slocum, 1988). The usefulness of results from clusters of people, who think similarly but work in different parts of an organisation, in terms of understanding climate has been questioned by Payne and colleagues (e.g. Payne, 1990; Patterson *et al.,* 1996), as discussed in Section 5.6. However, other researchers consider this approach to be valid (e.g. Furnham, 1997), particularly when there are frequent interactions between staff in diverse departments, which could allow them to influence each other's perceptions (Jackofsky and Slocum, 1990).

The focus of this study was the perceptions of Biomedical Scientists (BMSs) in clinical microbiology departments. Climate experienced by these workers was assessed as part of a wider investigation into factors affecting quality of the microbiology service. The aim was to compare climates between comparable laboratories in a large number of different hospitals. Thus, the results of this work were used to investigate the psychological climate of individual BMSs and the aggregated climate within particular laboratories. Climate was not studied in any other staff groups or departments, so the possibility of the formation of collective climates within hospitals was not addressed and organisational climate within each institution was not

assessed. Similarly, investigation of the culture of the NHS, PHLS or private healthcare organisations was beyond the remit of this work.

Schneider and Reichers' (1983) model of climate as a dynamic interaction between individuals in a work group was taken as the most appropriate for this study. BMSs work in the enclosed atmosphere of one laboratory, so their interactions would be expected to be the strongest influence on climate. Many occupational psychology researchers currently accept the efficacy of this concept, particularly when considering aggregated climates (Furnham, 1997; West *et al.,* 1998; Hicks-Clark and Iles, 2000).

1.10.4 Selection of climate measurement scale

There seems to be no clear consensus in the literature regarding which measure of organisational climate to use and many scales are developed from various sources for specific projects. This seems to depend on the specific management problem under investigation. For example, Dastmalchian *et al.*, (1989) used the literature to develop a measure of 'industrial relations climate' *de novo*. Schneider and colleagues (Schneider *et al.* 1992, Schneider *et al.*, 1998) collected climate items from various authors, then wrote and refined their measure of 'service climate' in banks in conjunction with participating organisations. Hicks-Clark and Iles (2000) extended an existing model of 'perceived climate for diversity' for their study. Similarly diverse methods have been used among healthcare workers. Examples include a study in the United States of nurses' experience of climate in neonatal intensive care units, used the 'Organisational Climate Description Questionnaire' (Duxbury *et al.*, 1982). The authors refer to organisational climate although in fact they only considered one staff group (nurses) in a single department of each hospital in the study. O'Driscoll and Evans, (1988) included the recognised 'Ward Atmosphere' and 'Work Environment' Scales in a questionnaire administered to staff and patients in three psychiatric units in New Zealand. The departments were in different hospitals, but the authors combined all the responses to make general conclusions about climate. An exploration of experiences of sexual harassment and gender insensitivity in Stanford Medical School used the existing 'Classroom Environment Scale'. This was modified and new items developed (Bergen *et al.*, 1996).

There is no precedent for assessment of climate among the biomedical scientists (BMSs). A scale was required which could provide an objective description of their perceptions.

Newman's (1977) model of 'Perceived Work Environment' (PWE) was chosen for this study because the items were clear and concise and grouped into 11 factors. In addition to factors assessing management style and relationships between staff, there are items specifically addressing the suitability of equipment, the availability of consumables and training of employees, which are all particularly pertinent to the hospital microbiology laboratory setting. The author states its intended use for "diagnosing existing work environments" (Newman, 1977 p.533), by which he means describing the climate and detecting areas that could be improved. Since there has been no published data regarding the perception of climate among BMSs in the UK, the applicability of the PWE to provide such a description was considered important. BMSs have limited contact with other staff or patients during their work. They would therefore be expected to experience the interactions that form climate within their department, rather than at the organisational level. The PWE has been used to map the development of distinct climates among different groups of workers in a single organisation (Jackofsky and Slocum, 1988), so was considered suitable for investigation of one specific department. These researchers support Schneider and Reicher's (1983) 'interactionist approach' to the formation of climate, so the PWE is compatible with this theory.

1.11 Approaches to research in Occupational Psychology

Microbiological research is usually conducted to extend the limit of factual knowledge about a particular disease or pathogen. The available information will be collated to form theories that explain any observations about the illness or organism. In many cases, there are undisputed 'facts', for example that the Rubella virus causes German measles and congenital abnormalities, which have been proven to the satisfaction of the scientific community. There are also areas of uncertainty, such as the mechanism of pathogenesis of Rubella virus *in utero* and the prevalence of the virus in developing countries. If a researcher wanted to investigate either of these, they would use widely accepted techniques such as virus isolation, using the most viable cell line, polymerase chain reaction with the most appropriate primers or serological reagents in the best available enzyme immunoassay (EIA) kit. It is not in doubt that the best way of conducting a prevalence study for Rubella is to test a population for IgG antibodies and that the enzyme immunoassay is the most reliable, reproducible, sensitive and safe way of screening large numbers of sera.

By contrast, in occupational psychology, the 'facts' to be investigated and explained are more subjective. There are theoretical models to describe observations such as "people who enjoy their job perform more efficiently", but there are often several, depending on the perspective of the researcher and the nature of the workers and occupation studied. There is a plethora of psychometric scales for assessing Job Satisfaction, which includes the Job Diagnostic Survey (Hackman and Oldham, 1975), the Job Descriptive Index (Hatfield *et al.*, 1985) and use of a single item such as "Considering everything, how satisfied are you with your job?" (Gunter and Furnham, 1996). Similarly, there is no single accepted measure of assessing whether a person works 'efficiently', since the definition would depend on the situation. People's attitudes are not tangible, reproducible certainties and can change quite dramatically due to their own observations or others' influence. Therefore it is acceptable for two occupational psychologists to choose, or devise, different scales to measure job satisfaction, provided that each is appropriate to the study group and is shown to be statistically reliable.

There are two main approaches to data collection in social sciences, quantitative and qualitative. Quantitative methods involve either 'laboratory' experiments (where subjects are asked respond to stimuli in a controlled, isolated environment) or questionnaire surveys (where people are asked to respond to questions on scales which yield numerical data). Qualitative techniques entail interviewing subjects, which allows deeper exploration of feelings and attitudes towards the topic under investigation. Interviews can be 'open' in which the interviewer and subject talk for several hours around an issue, or 'semi-structured', where there is a set of questions designed to stimulate discussion by the interviewee. The advantage of qualitative methods is that the subjects can voice concerns and interests that the researcher had not considered. The disadvantage is that conducting interviews and analysing the transcripts is very time-consuming and each researcher can only physically visit small numbers of people. This means that the results are descriptions of the attitudes of a select group of people, which cannot easily be extrapolated.

Although some social scientists collect all their information through interviews, occupational psychologists tend to use questionnaire surveys as their main research tool. These allow large numbers of people to be questioned anonymously and simultaneously, to provide data that can be analysed statistically, from which general conclusions can be drawn. However, semi-structured interviews are often used as part of the preliminary work and can be useful to clarify points arising from analysis of the questionnaire data. In this study, the principal

method of data collection was a quantitative questionnaire survey. This was supported by qualitative information gathered through questionnaires and semi-structured interviews.

1.12 Aims of the present study

The aims of the study can be specifically stated as:

1) To assess job satisfaction, organisational and professional commitment and climate among biomedical scientists in clinical microbiology laboratories in the United Kingdom.

2) To collate the criteria used to assess standards in clinical microbiology laboratories and develop measures of technical quality in clinical microbiology services.

3) To determine the relative importance of job satisfaction, organisational commitment, professional commitment and climate within the workplace in predicting technical quality in clinical microbiology services.

4) To describe any relationship between the attitudes of staff in clinical microbiology laboratories towards the quality of their work and the perceptions of users about the microbiology service provision.

These aims can be formulated into a series of questions:

i) What is the level of Job Satisfaction among BMSs?
ii) Which BMSs are most likely to experience high Job Satisfaction?
iii) Do BMSs experience Commitment more strongly to their Organisation or their Profession?
iv) Which BMSs are most likely to experience high Commitment?
v) What are the important elements in workplace Climate for BMSs?
vi) Which BMSs are most likely to experience a positive Climate?
vii) What is 'quality' in clinical microbiology services?
viii) Which of the workplace attitudes among microbiology BMSs most strongly affect the quality of the service provided and how?
ix) How can this knowledge be used to improve quality of clinical microbiology services in the future?

CHAPTER 2: METHODS

This chapter will consider the techniques chosen for this study from those available relating to social and management science. The way the national survey was organised, the design of the questionnaire and the choice of occupational psychology models will be justified. The role of follow-up interviews and the procedure used in this study will be discussed. The methods employed to analyse the data will also be explained.

2.1 Research methods employed in this study

In this study, models from Occupational Psychology were applied to obtain a description of the perceptions of staff in clinical microbiology laboratories and to investigate ways of enhancing technical quality of the work in these departments.

The principal method of data collection was a national survey of BMSs using a postal questionnaire. This quantitative method was chosen in order to collect sufficient data from this group of workers to make general conclusions about the perceptions of BMSs in the UK towards their work, colleagues and employers. This was supported by qualitative investigations, using semi-structured, individual interviews, both during questionnaire design and subsequently to explore some of the issues arising from the questionnaire results.

2.2 Questionnaire design

2.2.1 Preliminary and Pilot studies

Development of the questionnaire began with preliminary interviews of 20 practicing BMSs in the Bacteriology and Virology departments of a Merseyside teaching hospital during three consecutive days in March 1998. These interviews were 'semi structured' (see Section 1.11). Examples of the questions were:

" What do you think of the quality of the work done in your department?" and

" Do you enjoy your work? Why?"

The purpose of these 'exploratory interviews' (Oppenheim, 1992) was to establish the issues that BMSs considered important when considering 'quality', to investigate how they described satisfaction with their work and their attitudes towards their workplace and career. They were also used to check that terminology such as 'quality assurance' was understood and applied consistently by staff of all grades. All the BMS involved were volunteers and, with their permission, the interviews were tape-recorded. Representatives of all possible grades from Laboratory manager to Trainee BMS took part. The questions used and summaries of the interviews are given in Appendix A.

The first version of the questionnaire was then written, using the psychometric scales described in sections 2.2.2 and 2.2.3. It comprised four sections, each containing a series of statements ('items'), such as "I am proud to be a biomedical scientist". The respondents were asked to indicate their feelings about each statement along a scale ranging from 'strongly disagree' to 'strongly agree' and to tick the appropriate box. This type of 'tick–box' response scale is called a 'Likert scale' (Oppenheim, 1992). Some of the statements were phrased in a negative way, for example "New staff have problems because they do not get enough training" and therefore scored on the Likert scale in reverse. These were included as 'controls' to check that the respondent was thinking about each item, rather than simply ticking all the boxes in a vertical line or at random. A pilot study was necessary to establish that the items in the questionnaire were clear and unambiguous and the response methods were suitable (Oppenheim, 1992). The respondents were also invited to make any comments about the questionnaire or the study, while reiterating the guarantee of anonymity. The booklet (shown in Appendix B1) was distributed, via their laboratory managers, to 50 BMSs working in four microbiology laboratories on Merseyside during April 1998. Replies were received from 35 subjects, again representing all grades of BMSs. As well as testing the layout and content of the questionnaire, this pilot study demonstrated that sending batches of questionnaire booklets to laboratory managers to give out to their staff was feasible and that Liverpool John Moores University's 'Freepost' system was a reliable means of returning completed booklets.

After analysis of the replies, some alterations were made to the content of the questionnaire (see 2.2.2 and 2.2.3) and a second pilot study was conducted among 50 BMSs in two Biochemistry departments on Merseyside during September 1998. (The use of Biochemistry BMSs was considered acceptable as the purpose was only to test the reliability of the new scales). The second pilot questionnaire is shown in Appendix B2. 31 replies were received and

the reliability of the scales was confirmed, allowing development of the final version of the questionnaire.

2.2.2 Selection of the Occupational Psychology scales

Job satisfaction

Initially, the model of the 'Job Perception Scale' (Hatfield *et al.*, 1985) was chosen as it had been used with satisfactory results on nurses and teachers in Canada (Knoop; 1994, Knoop, 1995). Members of both these professions are trained to at least degree level and most work in the public sector, as is the case for BMSs. Items from this formed part of the first pilot questionnaire that was sent to a group of 50 practicing BMSs in April 1998. The Alpha value for the scale was 0.79, which is above the cut-off for statistical reliability of 0.7 (Nunnally, 1978). For explanation of the 'Alpha value' see section 2.4(ii). However, after the first pilot study had been conducted, a paper was published which included assessment of Job Satisfaction and Career Commitment (see 'Commitment', below) among Medical Laboratory Technologists in US, which is the equivalent professional group to BMSs in the UK (Blau and Lunz, 1998). Therefore, the initial scale was substituted for one developed by Professor Gary Blau of Temple University, Philadelphia, USA (pers. comm.) from the work of Hackman and Oldham (1975). This was included in the second pilot study, which was conducted in September 1998 with a different group of 50 BMSs. Subjects responded well to the Blau 'Job Satisfaction' scale and the Alpha improved slightly to 0.83. It was therefore chosen for the final questionnaire. It is a 15-item scale, which asks subjects to assess how satisfied they feel with various facets of their work (see Appendix B2). The wording of the items was unaltered, since all the terms used were also applicable to BMSs in the UK.

Commitment

Meyer and Allen's (1991) three-component model of commitment was used in this study, as discussed in Section 1.9. BMSs were expected to experience a mixture of commitments in their workplace, including those to the employing organisation and the biomedical science profession. Therefore, the set of scales to measure aspects of both of these commitments, published by Meyer *et al.*, (1993), which they had tested on nurses, was selected.

There were three scales designed to assess Organisational Commitment:

i) Affective Commitment to the Organisation (AC-Org)
ii) Continuance Commitment to the Organisation (CC-Org)
iii) Normative Commitment to the Organisation (NC-Org)

and an analogous set of three scales to measure Occupational Commitment. Meyer and Allen (1991) prefer the term 'occupation' since it allows people who are not members of a recognised professional group to be included in studies of Commitment. In this investigation, the study group were members of a profession and to avoid confusion with Organisational Commitment, the phrase 'Professional Commitment' was used, with the abbreviation 'Prof', thus:

iv) Affective Commitment to the Profession (AC-Prof)
v) Continuance Commitment to the Profession (CC-Prof)
vi) Normative Commitment to the Profession (NC-Prof)

In the first pilot study, the 7-point Likert response format used by Meyer *et al.* (1993) was followed and the items were used as published, except where it was necessary to use terms more appropriate to British biomedical scientists. Thus, 'nurse' was changed to 'biomedical scientist' and 'nursing profession' to 'biomedical science profession'. 'Hospital Trust' was substituted for 'organisation' and the phrase 'at the moment' was used instead of 'right now'. Responses to these 6 scales were satisfactory, with Alpha values between 0.82 and 0.89.

Three new items, covering attitudes towards the profession, which had emerged from the interviews, were added:
"If asked, I would advise an intelligent young person to consider other professions (medicine, pharmacy, scientific civil service, industrial science), where the salary and promotion prospects are better."

"If asked, I would recommend the profession to an interested young person"

"I cannot see myself working as a biomedical scientist until I retire"
(these were items 27, 32 & 39 in first pilot questionnaire, see Appendix, B1).

Communication with Professor Gary Blau following the first pilot study (see 'Job Satisfaction' above) led to a decision to include his 'Career Commitment' scale, to allow comparison between BMSs and Medical Laboratory Technologists in the United States. This comprised 5 items with a 4-point response scale and the statements were similar to the three 'new' commitment items included in the first pilot questionnaire. Therefore, the established scale was substituted for the researcher's items in the second pilot questionnaire (see Appendix B2). Results indicated that the Career Commitment scale was suitable (Alpha=0.81) and it was therefore included in the final questionnaire.

Climate

The 60-item Perceived Work Environment scale, developed by Newman (1977), was chosen for this study (see Section 1.10.4). This comprises eleven categories ('dimensions'), all of which seemed likely to be appropriate to staff in pathology laboratories, which are defined as:

1. " Supervisory style - The extent to which the supervisor is open, supportive, considerate.
2. Task characteristics - The extent to which the jobs/tasks are characterised by variety, challenge, worthwhile accomplishment, etc.
3. Performance – reward relationships - The extent to which rewards such as promotion and salary increases are based on performance rather than on other considerations such as favouritism.
4. Co-worker relations - The extent to which co-workers are trusting, supporting, friendly, cooperative.
5. Employee work motivation - The extent to which employees show concern for the quality of their work, try to get ahead, are involved in their work, etc.
6. Equipment and arrangement of equipment and people - The extent to which the equipment and arrangement of people and equipment allow for efficient and effective work operations.
7. Employee competence - The extent to which employees have the proper background, training and 'know-how' to do what is expected of them.
8. Decision-making policy - The extent to which employees take part in decisions that affect their work situation.
9. Work space - The extent to which employees have adequate work space and freedom to move about.
10. Pressure to produce - The extent to which there are pressures to produce.
11. Job responsibility / importance - The extent to which employees see responsibility as part of their job and the work as necessary to the successful operation of the organization."

(Newman, 1977, pp. 523-524)

A copy of the items was obtained from Dr Ellen Jackofsky of Southern Methodist University, Texas, USA. They were used as published, but re-worded where necessary and put in the context of the laboratory (rather than the hospital). So 'co-workers' was replaced with 'colleagues' and 'company' with 'laboratory'. The response to the items was on a 5-point Likert scale, as recommended by the author and used by (e.g. Jackofsky and Slocum, 1988). Despite its length, the results of the first pilot study showed the scale to be reliable with an Alpha value of 0.95. It was decided to include all 60 items in the final questionnaire, with a view to performing factor analysis on the collected data to refine the scale.

2.2.3 Development of the quality scales

It is clear from the introduction that a high quality microbiological service would combine the highest scientific and professional standards with the ability to respond to customer requirements. Instruments to assess all aspects of quality were developed for this study and they will be discussed in this section.

It was expected that a measure of technical quality of work would be found that could be adapted to the clinical laboratory setting. After an extensive search of the literature and consultations with senior staff at the Quality Assurance Laboratory (QAL) of the Central Public Health Laboratory (CPHL), Colindale, and the Institute of Quality Assurance, London, it was apparent that no suitable scale existed. It was therefore necessary to devise one for the purposes of this study.

From the preliminary interviews (see Section 2.2.1), a common set of criteria used by BMSs to judge quality in the laboratory emerged. These were:

i) Participation in and high scoring on the National External Quality Assurance Scheme.
ii) Implementation of Internal Quality Assurance procedures
iii) Standard of training of junior and new staff
iv) Conscientiousness of individual biomedical scientists
v) Openness and willingness of individuals to learn

Experience suggested that occurrence of a major safety error would indicate poor standards of work. Since perceptions of the users also important indicators of the quality of the service, a question about customer satisfaction was also included. It was considered that a question about the subject's most recent appraisal might be a useful way of asking for their supervisor's assessment of performance without compromising individual confidentiality. It was therefore necessary to assess the general attitude towards appraisal.

From these ideas, a set of 7 items assessing the individual's perceptions of their laboratory's quality and their own work. The response format was a 5-point Likert scale, which has recently been shown to acceptable in self-assessment of levels of performance (Maurer and Pierce, 1998).

Six additional items were written for this study that asked about participation in external quality assessment, internal quality assurance and accreditation schemes, and whether major incidents or customer complaints had occurred in the recent past. These were in the form of questions requiring a 'yes', 'no' or 'don't know' answer and were intended to give an indication of the comparative standard of the work within the laboratory without being too intrusive.

All 13 items were included in the first pilot study questionnaire (see Appendix B1), which highlighted several shortcomings:

1. BMSs from the same laboratory gave different answers to the same factual questions. This was unexpected, although it illustrates the effect of perceptions on attitudes.

2. Four respondents to the questionnaire had never had an appraisal and one person did not answer the question. Most subjects (15/24) reported an unfavourable attitude towards appraisal. It was therefore considered that such questions would not be useful in this context and they were omitted from subsequent versions of the scale.

3. The Alpha value for the Likert-style questions about quality was 0.4. It was not clear whether this was due to the low number of subjects or inherent weakness in the scale.

After further consultation with staff the QAL, the items were considered by a panel of experts. These were the QAL Director, the Quality Manager of the CPHL and two BMS 3s from the

QAL. The panel made some suggestions about how to improve some of the items, for example by using the term 'Internal Quality Assessment' instead of 'Internal Quality Control'. Also, they felt that inclusion of items assessing the staff's perceptions of their senior managers' attitudes to quality assurance and safety would strengthen the scale. Items in the climate scale addressed some of the issues raised by the panel, such as 'staff participation in decision-making' and 'encouragement to take responsibility' so new items were not written for them.

The revised quality scales therefore comprised:

i) 5 items regarding the individual's attitude to their own work. This included items about checking work thoroughly and the nature of feedback from supervisors. Although many studies ask the supervisors to assess subjects directly, it was felt that this might appear to compromise confidentiality (thus reducing response rates) and also would be very difficult to arrange in a large postal survey.

ii) 5 items assessing an individual's perception of quality and standards in their current laboratory.

iii) 8 'factual' questions as described above requiring a 'yes', 'no' or 'don't know' reply. To avoid confusion, it was decided to put these questions on a separate sheet to be answered by the Laboratory Manager only.

The revised versions of these 'quality scales' were included in the second pilot questionnaire. Subjects responded well to them and the Alpha for the 10 'perception' items, as a scale, was 0.61, although it was expected that two separate scales would emerge from analysis of the main questionnaire data.

The quality scales which appeared in the final version of the questionnaire were:

<u>1. Individual's attitude towards their own work:</u>

i) When considering how well I do my job, I am my own strongest critic.

ii) I usually check my own work thoroughly.

iii) I usually get positive feedback from my supervisor about my work.

iv) If a colleague points out a mistake that I have made, I take the criticism personally. (This item was reverse scored)

v) I try to keep myself up to date in my discipline, by discussions with colleagues, attending scientific meetings and reading journals whenever possible.

These items were scored on a 5-point Likert-type response format, from 1=strongly disagree to 5=strongly agree

2. Individual's perception of the quality and standards in their laboratory:

i) I would say that the standards of staff training in my department is low. (This item was reverse scored).

ii) There are sufficient well motivated and experienced biomedical scientists in my department to keep the quality of the work high.

iii) The senior managers (i.e. head BMS, consultant) in our department are committed to quality assurance.

iv) When technical problems occur in our laboratory, senior managers are not always aware of them. (This item was reverse scored).

v) There are regular departmental meetings to discuss issues including quality and standards in which all staff working on the bench participate.

These items were scored on a 5-point Likert-type response format, from 1=strongly disagree to 5=strongly agree

3. Laboratory manager's factual assessment of the laboratory's work:

i) Does your department take part in National External Quality Assurance Scheme (NEQAS)?

ii) How would you say your laboratory has scored on NEQAS tests in the last five years?

iii) Do you have Internal Quality Assurance schemes operating in your department?

iv) Are the results of IQA made available to all biomedical scientists and medical staff in the department?

v) Is the quality system in operation in your department audited?

vi) Did any serious incidents, mistakes or breaches of safety occur in your lab during the last five years?

vii) Did you have any customer complaints about standards, turnaround times or usefulness of the results provided by your laboratory in the last year?

viii) Is your department currently CPA accredited?

These items were scored on a three point scale of 'yes', 'no' or 'don't know'.

2.2.4 The final questionnaire

The final questionnaire contained 4 sections:

Section A: 18 items from the Meyer and Allen three-component Organizational Commitment scale and 18 items from the Meyer and Allen three-component Occupational Commitment scale, randomly assorted. The 7-point response system was used, as reported by these authors (Meyer *et al.*, 1993). Alterations had been made to the terminology of some items, as described on page 49 above. Although 'Hospital Trust' was used in the pilot study, the original term 'organization' was used in the final questionnaire.
For each component of commitment, the scale consisted of six items and the mean score was calculated as the sum from the six responses.

Section B: This contained the 15 items to assess job satisfaction, developed by Blau and Lunz, (1998) from Hackman and Oldham's (1975) model. The scale uses a four-point response and the total score was taken. The 5-item Career Commitment scale (Blau, 1985), which also used a four-point response format was also put in this section.

Section C: The 60 items of the scale Newman (1977) Perceived Working Environment measure. The response to the items was on a 5-point Likert scale, as recommended by the author and used by (e.g. Jackofsky and Slocum, 1988). The five items assessing individual quality and the five items looking at the respondent's view of their laboratory's quality were also included here, plus a single item asking about the public perception of clinical microbiology. All 71 items were randomly mixed together. At the end of section C, two 'free response' questions were included with space provided for respondents to answer in their own words:

a) "Please state whether you feel valued as a professional biomedical scientist and how you come to this conclusion"
b) "Can you think of any ways in which this can be improved?"

Section D: This contained questions to obtain demographic data about the respondent:
gender, age group, grade, employing institution, tenure with that employer, experience of organisational merger, discipline within microbiology, number of staff in department, length of service as BMS, number of years in current grade, whether they consider that they became a BMS by deliberate career choice.

Copies of the final questionnaire and the separate question sheet can be found in the Appendix B3. The questionnaire was formatted by Mr Bryan Hiller, of University College, Chester to allow it to be read by an optical character reader. Copies were produced on a 'Risograph' (RISO Europe, London) and made into 10-page booklets.

A separate sheet was prepared to send to each Head BMS. This contained the questions concerning the "Laboratory manager's factual assessment of the laboratory's work", as described in Section 2.2.3.

2.3 Distribution of the final questionnaire

To protect the anonymity of individual respondents, it was decided to distribute questionnaires throughout the UK via microbiology laboratory managers. This had worked well in the pilot study, giving a response rate of 66%. In October 1998, letters were sent to all the laboratory managers to seek their cooperation with the project. In order to make the letters personal, names and addresses were obtained from four sources:

i) Binley's Directory of NHS Management, (Anon, 1998). This provided the name of the pathology manager or the consultant microbiologist for each NHS Trust in the UK.

ii) The Directory of Independent Hospitals and Health Services (Anon, 1996).

iii) Job Advertisements in the August, September and October 1998 editions of the 'Biomedical Scientist', the professional magazine for BMSs in the UK.

iv) Personal contacts

During October 1998, 175 letters were sent to National Health Service Hospital managers and 120 to private hospitals and laboratories throughout the United Kingdom. A reply slip and Freepost envelope for its return were enclosed with each one.

Reply slips continued to be received until the end of December 1998; 117 of them were from laboratories agreeing to participate in the study. Each participating laboratory was randomly allocated a 4-letter code, starting with AAAA. Each separate booklet was given a number; consecutively numbered booklets were sent to each laboratory, so that it would later be possible to group responses from colleagues during future analyses. During November and

December, 1319 questionnaires were posted to the laboratory managers for distribution. Each was sent with a covering letter (see Appendix B3), and a Freepost reply envelope.

Negotiations with the PHLS for permission to survey their staff were not successful until early December 1998. A similar exercise was subsequently conducted within the PHLS (England and Wales), using names and addresses obtained from the PHLS directory (PHLS, 1998). Questionnaires were sent to 1096 PHLS employees in 44 laboratories during January and February 1999.

The distribution of questionnaires to all subjects was made as closely as possible to a single time point and the intention was to provide a description of BMSs attitudes at that single time point. Thus, this was effectively a cross sectional survey (Oppenheim, 1992). For each batch of questionnaires, 6 weeks were allowed for returns. After the deadline had passed, a short letter was sent to each Laboratory manager, thanking them for their participation in the study and asking them to remind staff who had not already done so, to complete and return a questionnaire.

2.4 Statistical data analysis

The returned questionnaires were read in one of two ways:

1) In an optical character reader, that recognised crosses or ticks in the appropriate boxes. This work was done by Mr Bryan Hiller and results were received from him in a Statistical Package for the Social Sciences (SPSS) file.

2) By the researcher recording scores for each item into a Microsoft Excel file, which was than converted into SPSS format.

In each case, the accuracy of data transfer from questionnaire to computer file was verified by checking the results for particular items for each questionnaire and where necessary, whole sections (e.g. the Commitment section) for individual subjects.

The collected data was analysed using SPSS version 9 on the Liverpool John Moores University networked system. The data sets for each of the attitude measures were tested for approximation to the normal distribution, to determine whether parametric statistical tests

could be used for the analyses. In each case, a histogram was plotted with a normal curve superimposed and all the data sets appeared to approximate to normality. These diagrams and appropriate analyses are given in Appendix C, and confirm that the use of parametric tests for analysis of the questionnaire data is acceptable.

The following analyses were used:

i) Descriptive statistics: Demographic data was collated by number of respondents in particular categories (e.g. age, gender, grade); means scores (Mean) and standard deviations (SD) were calculated for the attitude and quality scales

ii) Cronbach's Alpha: This is a test of internal reliability of a set of questions (Cronbach, 1953), indicating that each subject responded in the same way to similar questions. The calculation of the Cronbach's Alpha (Alpha) value takes into account the average correlation among items and the number of items (Cramer, 1998). An Alpha of 0.7 or greater is considered to indicate acceptable statistical reliability (Nunnally, 1978).

iii) Correlations: Calculation of Pearson's Product Moment Correlation Coefficient (r). This describes the variance shared by two variables by comparing it with the overall variance of the two variables. Therefore r is a ratio and can be positive or negative. The closer its value is to +1 or -1, the stronger the relationship (Cramer, 1998). In this study simple relationships between two variables (not taking account of the possible influence of other factors) were investigated. These are called 'zero order correlations' (Cramer, 1998) and will be referred to here as 'correlations'. The relationship between two variables where the intervening ('moderating') influence of third factor was accounted for was also used. This is called partial correlation of the 'first order'. In the results presented here, this will be called 'partial correlation'.

iv) Unrelated t-test and One-Way Analysis of variance (ANOVA): These are used to compare two (t-Test) or more (ANOVA) means from unrelated samples. The between-group variance is divided by the within-group variance to give a ratio called the F value (Cramer, 1998).

v) 'Goodness of fit' Chi-squared (χ^2) test: This is used to compare the observed frequency of cases in a sample with the expected frequency in the study population. The χ^2 value is calculated and its statistical significance determined according to the 'degrees of freedom' in the result (the number of categories minus 1) (Bailey, 1995)

vi) Exploratory Factor Analysis (EFA): This procedure is used to group items in a set of questions in clusters ('factors') by testing for correlations. In this case, principal components analysis was used, with varimax rotation (which treats all items as independent in determining the grouping) (Cramer, 1998). This allowed factors that best suited the data to form. Where an item gave a correlation of less than 0.5 within a particular factor, it was considered not to be related to that factor and removed. Confirmatory Factor Analysis (CFA) was also used, where the number of factors can be pre-determined.

vii) Multiple Regression Analysis (MRA): This is used to test how much variance in one factor 'dependent' variable (y) is explained by a set of 'independent' variables (x). The squared multiple correlation for all factors (R^2) is calculated. R^2 represents the proportion of the total variation in the y factor that is explained by the equation; β is the coefficient of the x variable in the equation. Therefore, it is possible to write an equation in the form:

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \text{ etc}$$

x variables that do significantly influence y are called 'predictors'. The statistical significance of the equation is tested by an ANOVA (see 'iv' above) (Cramer, 1998).

viii) Within Group Interrater Reliability Test: The test provides an estimate of the closeness of the scores collected from a group of individuals, in order to justify aggregating the results (James *et al.*, 1984). It is based on the mean of the variances of the scores from all the items in a particular scale, labelled $\overline{s_{xj}^2}$. The estimate, r, of the Within Group reliability for a scale is labelled $r_{WG(J)}$, where J is the number of items in that scale. The other variable in the equation is the number of possible responses to each item, A, which is used to calculate the expected random error in the variance, σ_{EU}^2.

$$\sigma_{EU}^2 = (A^2 - 1)/12.$$

Knowing this result, $r_{WG(J)}$ can then be calculated:

$$r_{WG(J)} = \frac{J[1 - (\overline{s_{xj}^2} / \sigma_{EU}^2)]}{J[1 - (\overline{s_{xj}^2} / \sigma_{EU}^2)] + (\overline{s_{xj}^2} / \sigma_{EU}^2)}$$

(James *et al.*, 1984).

It is clear that the number of items in the scale is an important factor in the equation, since as the value of J increases, the effect of the ($\overline{s_{xj}}^2/\sigma_{EU}^2$) in the denominator is minimised. The calculation is only valid for values of A between 5 and 9 (James *et al.*, 1984). In this study, the $r_{WG(J)}$ was used to justify aggregating Climate scores, as advocated by West *et al.* (1998) and Schneider *et al.* (1998),

2.5 Analysis of qualitative data

The comments written by participants on the national survey were collated into three main categories. Within each of these, comments emerged which had been made by more than 5 respondents. Worksheets were set up in a Microsoft Excel file for each category, in order to record the frequently occurring comments made by each individual. In this way, the number of participants who made a particular remark could be calculated. A fourth worksheet was created in which unique observations were compiled, which is shown in Appendix D.

2.6 Confirmation study using the National External Quality Assurance Scheme (NEQAS).

To confirm the findings suggested by the questionnaire results of a positive correlation between Laboratory Climate and Laboratory Quality, a second national survey of Clinical Microbiology Laboratories was designed. The aim was to collect sufficient data to calculate aggregated Climate scores for a large number of departments and investigate the possible relationships with the score on the NEQAS scheme, which is an external measure of technical quality. A short questionnaire was prepared, comprising the refined versions of the Perceived Working Environment and QUALLAB scales, along with questions to collect demographic data (see Appendix B4). It was proposed that sets of these questionnaires would be sent to each department in the UK participating in the Microbiology, Virology and Parasitology NEQAS schemes. The timing of this would be simultaneous with the despatch of a set of EQA specimens. This would be achieved with the cooperation of staff at the Quality Assurance Laboratory of the Central Public Health Laboratory (QAL), which is responsible for organising the Microbiology NEQAS. As the number of staff in the Microbiology departments was variable, it was intended to send 30 questionnaires to each. For each laboratory, sets of booklets were to be labelled with the NEQAS code and sent, with a covering letter and

stamped addressed envelope, for distribution via the Laboratory Manager, as previously. The postage of the questionnaire booklets would be included in the package of unknown specimens and the responsibility for addressing and posting parcels would be taken by staff at the QAL, thus ensuring absolute anonymity. The cumulative NEQAS score (see Section 1.5.4) for each department would be disclosed to the researcher after the results of this batch of specimens had been processed. The information would be in the form of a numerical result, pertaining to a particular code, which would not compromise any confidentiality within the NEQAS scheme.

The overall Laboratory Climate and QUALLAB scores could be calculated for each department that returned questionnaires from 50% or more of their staff. Then relationships between these perceptions and performance in NEQAS could be investigated.

The design of this work was similar to that used by Lunz *et al.* (1987), who investigated the relationship between qualifications of laboratory staff and the departments' score in an external quality assurance scheme, in USA. Therefore, in January 2000, the Technical Services Manager of the Central Public Health Laboratory was contacted to discuss the feasibility of the project and arrange a meeting with the QAL manager.

2.7 Case studies

To supplement the results of the questionnaire data, a series of 'semi-structured' interviews with staff in selected laboratories were conducted. These use fairly broad questions to encourage the interviewee to discuss certain topics in depth (Oppenheim, 1992). There were two specific areas of interest:

i) The perceived Laboratory Climate within the microbiology laboratory.
ii) The attitude of the staff towards Laboratory Quality issues.

Managers of twenty-five laboratories that had participated in the questionnaire survey were contacted during March and April 2000, to explain the nature and purpose of the proposed interviews. From the seven replies that were received, it was possible to arrange visits to four departments. These were conducted during July and August 2000.

In each case, all the BMSs, laboratory assistants and medical staff, who were willing to take part in short interviews, were asked to explore issues relating to the climate in their workplace and their opinion of the quality of the work of their laboratory. Permission was sought on an individual basis to tape the discussion. In most cases it was granted, otherwise the researcher took notes during the interview. The questions are shown in Section 4.1 and transcripts of the interviews are given in Appendix E.

The opinions of some of the clinicians who used each service were also sought. At one hospital, interviews were arranged with two nurse managers. Due to the logistical difficulties of organising interviews with a representative group of hospital doctors, nurses, midwives and general practitioners in four towns, a postal questionnaire was also prepared. This was sent to a selection of users, who were recommended by the laboratory manager in each case and wherever possible contacted by telephone to request cooperation with the study.

This qualitative data was used to describe 4 case studies, which are presented in Chapter 4.

CHAPTER 3: QUESTIONNAIRE RESULTS

This chapter presents the results from the nationwide questionnaire survey of BMSs in clinical microbiology laboratories. Section 3.1 shows the demographic data from participating BMSs. Sections 3.2 - 3.4 give the results for Job Satisfaction, Commitment and Climate respectively, broken down according to these demographic groups. The relationships between these three occupational psychology factors are explored in Section 3.5. Results obtained from the quality scales are given in Section 3.6 and the interactions of Job Satisfaction, commitment and climate with quality measures are investigated in Section 3.7.

3.1 Demographic Data

Altogether, 2415 questionnaires were sent out and 931 replies were received from 143 laboratories, a response rate of 39%. Fourteen of the booklets were returned incomplete and 3 had been filled by inappropriate staff members, leaving 914 questionnaires with data suitable for further analysis.

Three hundred and ninety of the respondents were male and 505 were female (19 did not state their gender). The mean age group was 30-39, with a range of under 21 to over 60; all grades of BMS from trainee (new graduate) to BMS 4 (laboratory technical manager) were represented among the replies. The average length of time in employment as a BMS for this group was 18 years, with a range of less than a year to 42 years.

Age and gender profiles of the study group were compared with employment data published by the Department of Health (1998a) and information provided by the Institute of Biomedical Sciences about their membership in 1999 (IBMS pers. comm.), using the 'goodness of fit' chi-squared test (see Section 2.4). The whole set of calculations and their results are given in Appendix C2 and they show that the study group was representative of the BMS population in the UK. As an example, Table 3.1.1 shows comparison between the patterns of age groups

among Department of Health (DoH) employees and the questionnaire respondents, which indicates that the patterns were not significantly different. The majority of the participants in the study (95%) were employed by the NHS or PHLS and therefore would be included in DoH figures. The demographic information about the subjects is summarised in Tables 3.1.2 - 3.1.4.

Four hundred and eighty seven people were NHS Trust employees, 385 worked for the PHLS, 33 were employed in a private laboratory and 9 were part of a University department. Information was received from 84 general microbiology departments and 21 multidisciplinary laboratories offering a microbiology service. Including the sections within the PHLs, 35 Bacteriology, 34 Virology and 18 Food, Water and Environmental microbiology laboratories participated in the study. Four departments specialising in Parasitology and 2 in Mycology also responded.

The question: "Would you say that you became a biomedical scientist more by accident that deliberate career choice?" was included in the demographic information section (yes=1, no=2). From the 895 respondents who answered the question, 37% indicated they had deliberately chosen a career as a BMS, while the majority (63%) considered that they became a BMS more by accident.

Table 3.1.1: Comparison of age distribution of study group with that expected from DoH data

Age group	Numbers in study group	DoH published data	% distribution of DoH data	Expected DoH numbers [1]	χ^2
Up to 30	159	2470	19	174	1.293
Up to 40	288	4262	32	293	0.009
Up to 50	310	4151	31	283	2.576
Up to 60	141	1914	15	137	0.117
Over 60	6	185	1	9	1.000
Unknown	10	206	2	18	3.556
Total	914	13188	100	914	8.627*

[1] derived from % distribution among 914

* χ^2 at 5 degrees of freedom: $p>0.5$, therefore the two populations are not different

Table 3.1.2: Age group and gender distribution of questionnaire respondents.

Age group[1]	Total respondents	Male[2]	Female[2]
21 and under	5	2	3
22-29	152	37	115
30-39	283	117	166
40-49	308	154	154
50-59	140	74	66
60 and over	6	6	0
Total	894	390	504

[1] 10 people did not state their age; [2] 19 people did not state their gender.

Table 3.1.3: Grade and gender distribution of questionnaire respondents.

Grade[1]	Total respondents	Male[2]	Female[2]
Trainee	44	14	30
BMS 1	416	111	305
BMS 2	239	113	126
BMS 3	133	99	34
BMS 4	61	53	8
Total	893	390	503

[1] 10 people did not state their grade; [2] 19 people did not state their gender.

Table 3.1.4: Distribution of age groups within grades for questionnaire respondents

Age group[1]	Grade[2]				
	Trainee	BMS 1	BMS 2	BMS 3	BMS 4
21 and under	5	0	0	0	0
22-29	32	118	4	0	0
30-39	3	149	96	30	8
40-49	5	109	105	67	23
50-59	0	44	36	35	26
60 and over	0	0	1	1	4
Totals	45	420	242	133	61

[1] 10 people did not state their age; [2] 10 people did not state their grade.

3.2 Job Satisfaction

The mean Job Satisfaction score overall was 37.31, SD=7.09 (N=737), with a range from 16 to 57. The maximum possible score on this scale was 60. The Job Satisfaction score could not be calculated for 187 participants, since they declined to respond to at least one item. The Alpha value was 0.86, indicating a reliable scale (see Section 2.4). The breakdown of scores by gender, age and grade is shown in Tables 3.2.1 - 3.2.3. In each case, the means were compared statistically to determine whether there were any significant differences between the means reported by each group:

3.2.1 Effect of Gender on Job Satisfaction (see Table 3.2.1)

No significant difference was found between the mean Job Satisfaction scores for male and female respondents (t –test for equality of means: $t = -0.171$, $p > 0.8$ $df = 722, 655$)

3.2.2 Effect of Age Group on Job Satisfaction (see Table 3.2.2)

No significant difference was found between the mean Job Satisfaction scores among age groups, (One way ANOVA: $F_{5, 725} = 0.904$, $p>0.4$). The mean scores for male and female within each age group were not significantly different (t –test for equality of means $p > 0.2$ in all cases).

3.2.3 Effect of Grade on Job Satisfaction (see Table 3.2.3)

A significant difference was found between the mean Job Satisfaction scores among BMS grades (One way ANOVA, $F_{4, 727} = 12.44$, $p<0.01$). Trainees, BMS 3s and BMS 4s reported Job Satisfaction levels above the overall mean score (37.31) and also significantly higher than BMS 1s and BMS 2s. A significant difference between the male and female mean scores was found in one category, BMS 1 (t –test for equality of means: $t= -2.181$, $p<0.05$). The variation in Job Satisfaction for male and female BMS1s was explored further by calculating mean scores at each age group, as shown in Table 3.2.4. A gender difference in mean Job Satisfaction scores was not found for the other grades (t –test for equality of means $p>0.2$ in all cases).

3.2.4 Examination of items in the Job Satisfaction scale

The Job Satisfaction scale contained 15 items. Respondents who considered themselves 'very satisfied' with all these would score the maximum of 60; someone who was 'very dissatisfied' with all items would score the minimum of 15. To investigate whether any particular item weighted the total score, each of them was removed in turn, with the mean and Alpha re-calculated for the remaining 14 items, as given in Table 3.2.5. For example, when the results for item 1 are removed, the mean for the14-item scale is 34.62 (out of a possible 56) and the Alpha value is 0.85. The three items shown in bold (2,3 and 9) are those whose removal most improves the mean score. This indicates that respondents' scores for items 'Satisfaction with fringe benefits', ' Satisfaction with number of personal growth options' and 'Satisfaction with Salary' are lower overall than for the other items.

3.2.5 Relationship between Job Satisfaction and Deliberate Career Choice

The relationship between Job Satisfaction score and reporting 'deliberate career choice' (see Section 3.1) was investigated using correlation analysis. There was a significant positive correlation ($r = 0.133$, $p < 0.01$), suggesting that BMSs who had indicated that they had deliberately chosen their career were more likely to report high job satisfaction.

Table 3.2.1: Mean Job Satisfaction score by Gender

Gender	N[1]	Mean score	SD
Male	317	37.31	7.34
Female	407	37.40	6.84

[1] N = number of respondents

Table 3.2.2:Mean Job Satisfaction score by Age Group

Age group	N[1]	Total mean score (SD)	Mean score for males (SD)	Mean score for females (SD)
21 and under	3	36.67 (6.35)	33.0(-)	44.0 (-)
22-29	128	38.28 (6.90)	38.03 (7.46)	38.46 (6.71)
30-39	240	36.83 (7.21)	36.69 (7.77)	37.07 (6.75)
40-49	252	37.21 (7.22)	37.24 (7.59)	37.23 (6.88)
50-59	105	37.20 (6.86)	38.11 (5.90)	36.62 (7.26)
60 and over	3	41.33 (6.51)	41.33 (6.51)	-

[1] N = number of respondents

Table 3.2.3:Mean Job Satisfaction score by Grade

Grade	N[1]	Total mean score (SD)	Mean score for males (SD)	Mean score for females (SD)
Trainee	35	40.40 (7.46)	40.00 (8.36)	40.64 (7.07)
BMS1	344	36.36 (6.86)	35.02 (6.96)	36.86 (6.80)
BMS2	198	36.25 (7.04)	35.92 (7.12)	36.90 (6.65)
BMS3	109	39.03 (6.90)	38.60 (6.96)	40.25 (6.67)
BMS4	46	42.35 (5.76)	42.36(6.02)	42.29 (4.46)

[1] N = number of respondents

Table 3.2.4: Mean Job Satisfaction score by Age Group for BMS1 respondents only

	Total		Male		Female	
Age group	N[1]	Mean score (SD)	N[1]	Mean score (SD)	N[1]	Mean score (SD)
22-29	99	37.22 (6.40)	26	35.73 (6.06)	72	37.86 (6.46)
30-39	124	36.27 (6.85)	38	35.63 (7.64)	85	36.49 (6.52)
40-49	90	35.97 (7.27)	20	32.30 (6.95)	69	37.07 (7.09)
50-59	30	35.17 (7.23)	5	37.60 (4.04)	25	34.68 (7.68)
All ages	343	36.37 (6.87)	89	35.02 (6.96)	251	36.86 (6.80)

[1] N = number of respondents

Table 3.2.5: Results for Job Satisfaction scale when successive items are deleted

Item deleted: Satisfaction with:	**Re-calculated mean score**	**Re-calculated Alpha value**
1.Current level of job security	34.62	0.85
2.Fringe benefits	**35.66**	**0.85**
3.Number of personal growth options	**35.40**	**0.84**
4.Colleagues	34.31	0.85
5.The degree of respect and fair treatment from supervisor	34.58	0.84
6.The feeling of worthwhile accomplishment	34.78	0.84
7.The chance to get to know other people while at work	34.52	0.85
8.The amount of support and guidance from supervisor	34.79	0.84
9.Salary	**35.68**	**0.86**
10.Ability to contribute to the organization	34.91	0.84
11.The amount of independent thought and action can exercise	34.82	0.84
12.Future job security	34.91	0.85
13.The chance to help other people	34.41	0.85
14.The challenge in the job	34.73	0.84
15.Shift requirement	34.94	0.86

Note: The three items shown in bold (2,3 and 9) are those whose removal most improves the mean score

3.2.6 Results from the 'free response' section.*

The subjects were asked to respond, in their own words, to the following questions:

i) "Please describe whether you feel valued as a professional biomedical scientist and how you come to this conclusion"

ii) " Can you think of any ways in which this could be improved?"

Seven hundred and twenty four respondents (81%) made at least one observation. Comments that occurred frequently were collated into three categories:

a) 'Ways in which BMSs feel valued', labelled 'Valued'. Two hundred and sixty six respondents made a comment in this category. There were 10 frequently occurring comments.

b) 'Ways in which BMSs feel undervalued', labelled 'Not Valued'. Six hundred and seven respondents made a comment in this category. There were 20 frequently occurring comments.

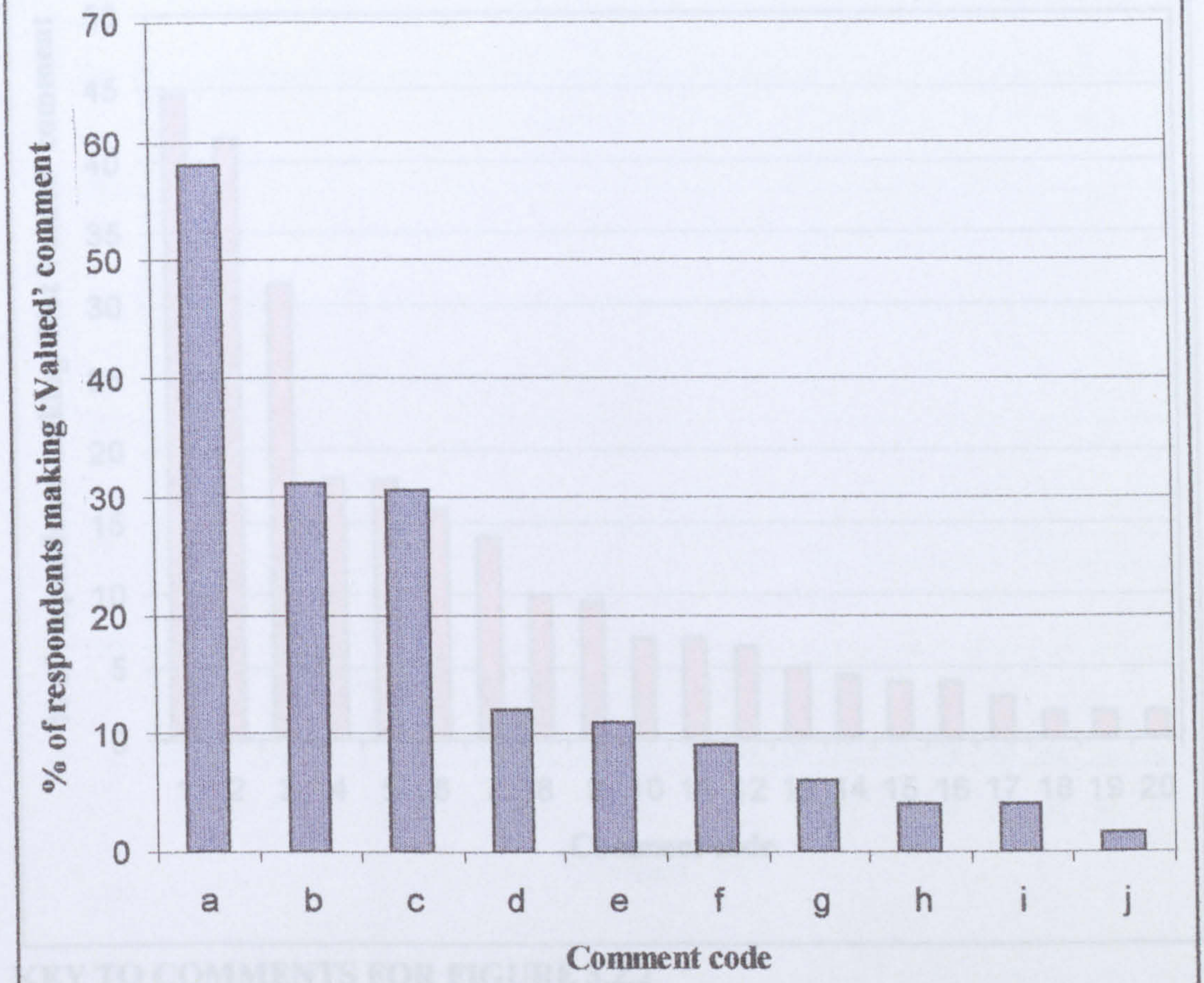
c) 'Improvements BMSs would like to see to help them feel valued', labelled 'Improvements'. Six hundred respondents made a comment in this category. There were 20 frequently occurring comments.

The number of times each particular comment occurred was converted into a percentage of the total number of people giving a comment in that category. For example, 266 respondents made an observation collated into the 'Valued' category and 59% of them that the support and esteem of their colleagues was an important factor in helping them to feel valued.

The results for 'Valued' are presented in Figure 3.2.1, for 'Not Valued' in Figure 3.2.2 and for 'Improvements' in Figure 3.2.3. Comments which could not be put into any of these groups were also noted and are given in full in Appendix D.

* Results presented here have been published as: Pitt (1999). "Are Biomedical Scientists Valued?", *Biomedical Scientist,* **43:** 900-902 (see Appendix F).

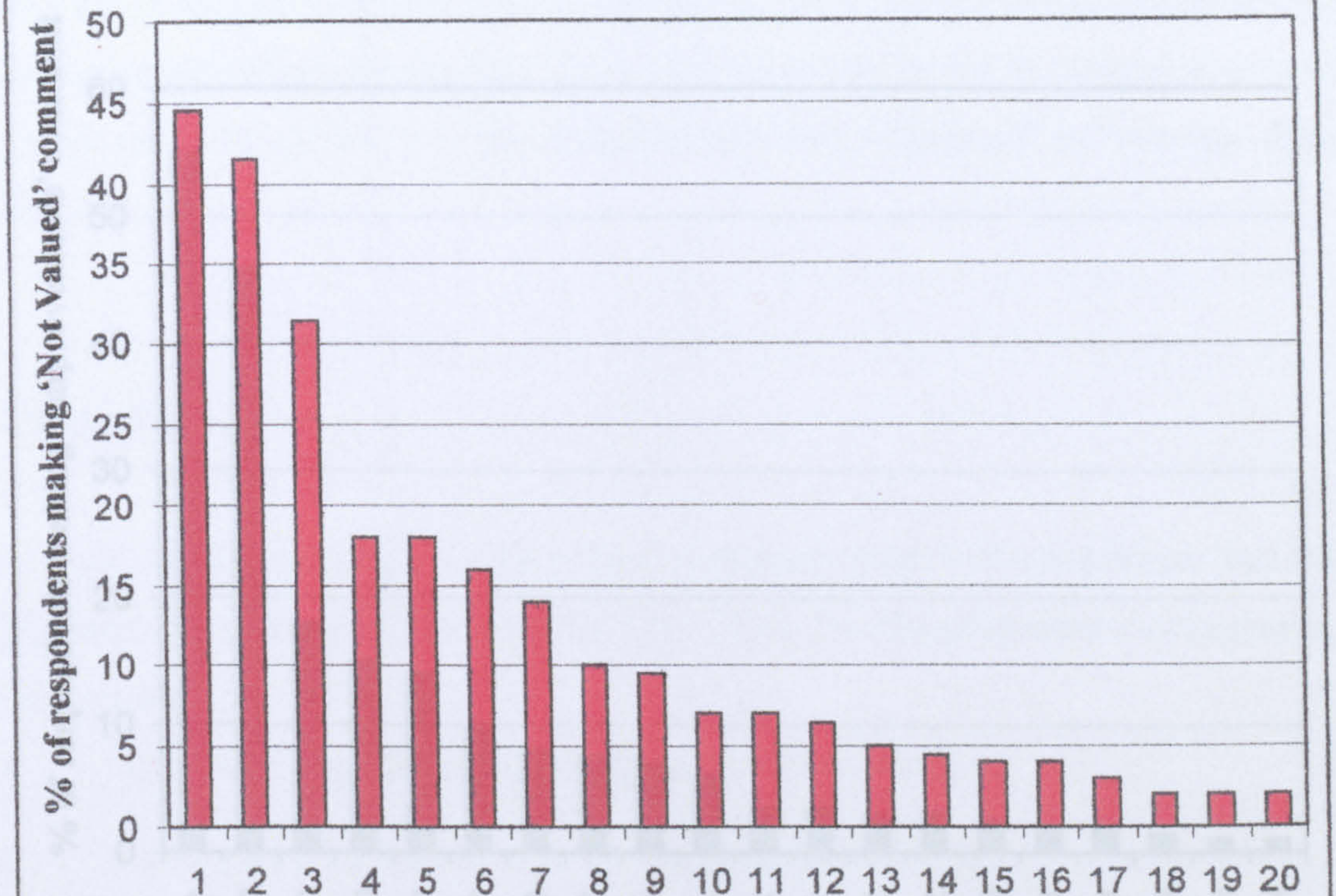
Figure 3.2.1: Ways in which biomedical scientists feel valued



KEY TO COMMENTS FOR FIGURE 3.2.1

a: I am valued by my colleagues and other members of the profession.
b: I am praised/appreciated by my manager.
c: I gain satisfaction, enjoyment and fulfilment from doing a useful and interesting job.
d: I receive positive feedback from users of the service.
e: I am given responsibility.
f: I am technically competent.
g: I am a professional, valued in a medical environment.
h: The work itself is valuable and recognition from outside not necessary.
i: I am a qualified professional.
j: The department has invested in my education and training.

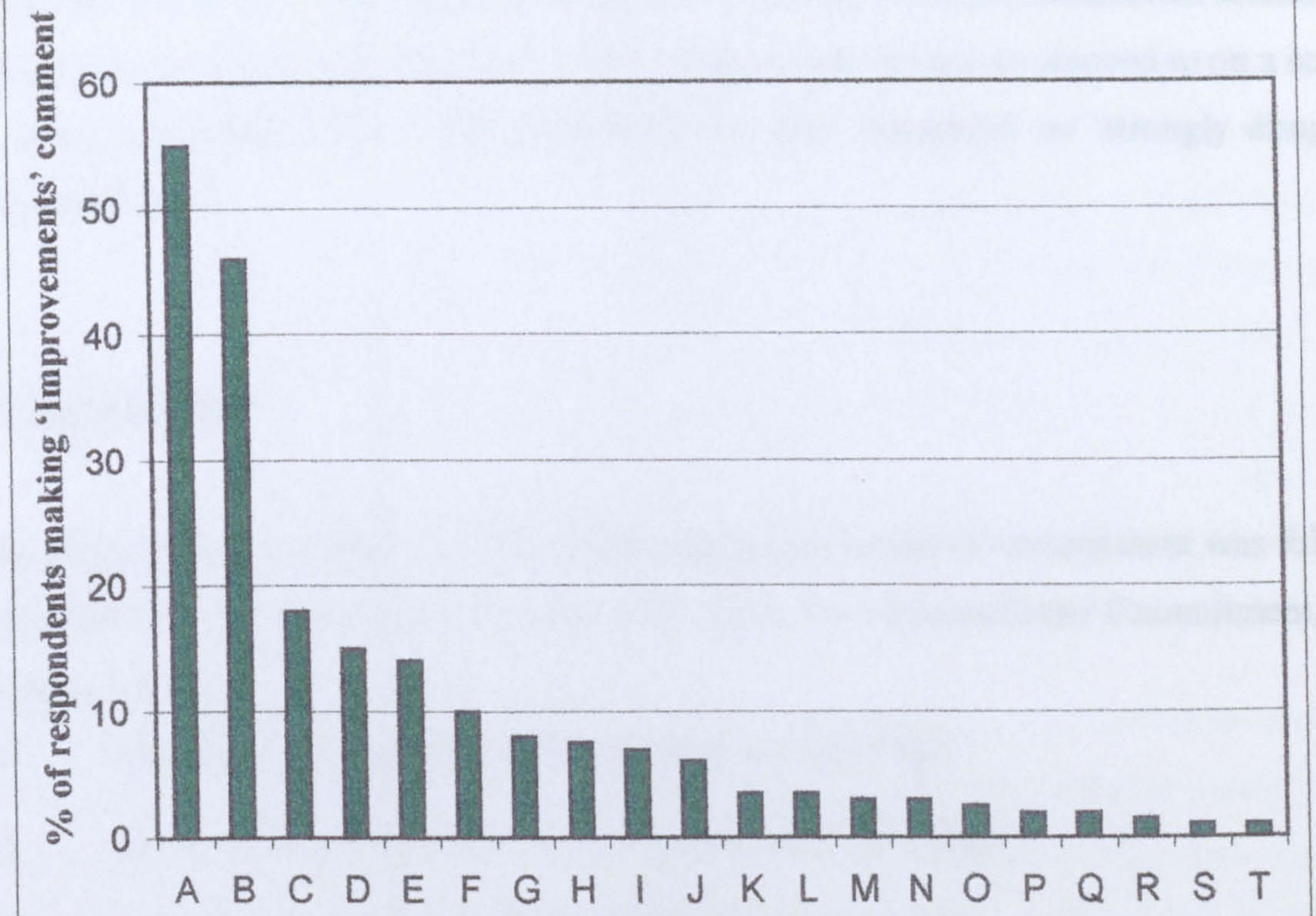
Figure 3.2.2: Ways in which biomedical scientists feel undervalued



KEY TO COMMENTS FOR FIGURE 3.2.2

1: General public do not know who BMSs are or what job they do.
2: Salary does not reflect the qualifications, training or responsibility of BMSs.
3: Other healthcare workers are not aware of BMS job and qualifications.
4: Not appreciated or supported by manager.
5: Pressure to save money, mainly through staff cuts, despite increased workload.
6: Too much routine work, not enough recognition.
7: Mergers and post freezing means career structure has been eroded.
8: Public think the only people working in hospitals are doctors and nurses.
9: Medical colleagues do not respect the skills and judgements of BMSs-but still blame them when things go wrong!
10: Not valued by Trust/PHLS.
11: Government does not acknowledge BMS as pay has fallen behind that of other comparable professions.
12: No time or staff cover to allow for training of juniors, reading, supervisory or administrative tasks.
13: No recognition for conscientious or extra work.
14: No funding or time for further training, higher qualifications, Continual Professional Development courses.
15: Automation has led to 'downskilling' and loss of expertise.
16: Job insecurity.
17: Opinions of staff 'on the bench' on matters affecting daily work not considered or taken seriously.
18: Medical profession has too much influence over daily running of Pathology laboratories.
19: Feel under pressure due to implementation of shift system without adequate resources.
20: We are the "backroom boys of the NHS".

Figure 3.2.3: Improvements biomedical scientists would like to see to help them feel valued



KEY TO COMMENTS FOR FIGURE 3.2.3

A: Better pay, to reflect the qualifications, training, skills and responsibility of BMS profession.
B: Higher profile with the general public.
C: Better laboratory management, more support and positive feedback from supervisors.
D: Coherent career structure, with improved chances of promotion.
E: Raising awareness of BMS and what the job entails among other healthcare workers.
F: Funding and opportunities for further education and training.
G: Institute of Biomedical Science should do more to publicise the work of its members.
H: More staff 'on the bench.'
I: Recognition from government and health service (particularly when discussing NHS on national media.
J: Performance related pay to reward extra effort and study (especially if a pay rise is not forthcoming).
K: Reduce role of clinicians in direct laboratory management; devolve power over technical and staff matters to the BMSs.
L: BMS's pay to be linked to other Public Sector professionals-urgent review of pay structure.
M: More decisions about tests, equipment etc to be made by staff 'on the bench'.
N: More responsibility (reflecting qualifications and ability).
O: Provide means to carry out job effectively.
P: Improve communication between Trust management and laboratory staff.
Q: Improve job security.
R: Increase capital investment in Pathology.
S: More autonomy for budgeting back to individual laboratories.

3.2.7 BMSs perceptions of awareness of general public

In addition to the comments discussed in Section 3.2.6, Section C of the questionnaire included the statement: "Patients are generally aware of the work that biomedical scientists do in microbiology/virology laboratories", which subjects were invited to respond to on a scale of 1-5. Most respondents (845 = 93%) indicated that they 'disagreed' or 'strongly disagreed' with this statement.

3.3 Commitment*

In this study, Meyer and Allen's (1991) three-component model of commitment was followed (as described in the Introduction, Section 1.9). Thus, for Organisational Commitment, there were three scales:

i) Affective Commitment to the Organisation (AC-Org)

ii) Continuance Commitment to the Organisation (CC-Org)

iii) Normative Commitment to the Organisation (NC-Org)

Similarly, for Professional Commitment, there were three scales:

iv) Affective Commitment to the Profession (AC-Prof)

v) Continuance Commitment to the Profession (CC-Prof)

vi) Normative Commitment to the Profession (NC-Prof)

Results from these scales are presented throughout this chapter using the above abbreviations.

A separate scale, to measure Career Commitment (CarComm) (Blau, 1985) was also included in the questionnaire, to allow comparison with the results obtained by Blau and Lunz (1998), which is discussed in Section 5.6.2. Due to the conceptual and statistical similarity between CarComm and AC-Prof (see 5.6.1), results for CarComm were not included in detailed analysis and are used in Sections 3.3.2 to 3.3.6 only.

* Results given here provided the basis of a refereed paper presented at the British Academy of Management Conference, September 2000: Pitt *et al* (2000). " Knowledge work, Commitment and Quality: professional and organisational commitment among biomedical scientists and its relationship to service quality" (see Appendix F)

3.3.1 Factor Analysis

To test the validity of the 3-component model, Exploratory Factor Analysis (EFA) using varimax rotation was performed on the 18 items in the Organisational Commitment scales. The results are shown in Table 3.3.1.a. This was repeated for the Professional Commitment items, as shown in Table 3.3.2. In each case, there was clear loading onto three factors, which corresponded to the AC, CC and NC scales. However, two Organisational Commitment items loaded onto two factors (Table 3.3.1.a). These items were removed and the factor analysis was repeated, as given in Table 3.3.1.b. Removal of these items produced 'cleaner scales', so in subsequent analysis, 5-item scales were used for AC-Org and NC-Org.

3.3.2 Overall mean scores for components of Commitment

The mean score for each of the Commitment scales was calculated. For the Meyer and Allen (1991) scales, this was the mean from 6 items (5 for AC-Org and NC-Org, see above) on a 7-point response scale. Thus, the maximum possible score is 7and a score of 4 or over represents a positive Commitment. Use of the mean allowed comparison among the 6 types of commitment and with published data (see Section 5.5.2). The overall mean scores and Alpha values for the commitment scales are shown in Table 3.3.3, which shows that the mean scores for the each of the Professional Commitment measures was higher than the corresponding measure of Organisational Commitment. For example, overall the mean for AC-Prof was 4.63, compared with 3.66 for AC-Org. BMSs reported greatest mean scores for the continuance components of Commitment (CC-Org mean = 4.61; for CC-Prof, mean = 4.64) (Table 3.3.3). For the CarComm scale, the total score from 5 items on a 4-point response scale was calculated, to allow comparison with published results (see Section 5.5.1).

The breakdown of scores by gender, age and grade is shown in, Tables 3.3.4 - 3.3.6. In each case, the means were compared statistically to determine whether there were any significant differences between the means reported by each group. The overall effects of each of these demographic variables on the components of Commitment were also investigated through correlations, which allowed comparison with published data.

3.3.3 Effect of Gender on components of Commitment (Table 3.3.4)

There were significant differences between the mean scores for male and female respondents for Continuance Commitment to the Organisation (t test for equality of means: t = 2.96, $p<0.01$) and Continuance Commitment to the Profession (t test for equality of means: t = 3.48, $p<0.01$). In each case, the male respondents reported higher overall Continuance Commitment. There were no significant differences between the mean scores for the other components of Commitment by gender. This was confirmed by the results of the correlation analysis, given in Table 3.3.7.a, which shows small, but statistically significant correlations between gender and CC-Org (r = -0.101, $p<0.01$) and CC-Prof (r = -0.118, $p< 0.01$). Gender was scored as male=1, female=2, therefore the negative coefficients indicate correlation with males.

3.3.4 Effect of Grade on components of Commitment (Table 3.3.5)

There were significant differences between the mean scores for all the components of Commitment among the Grades, with the BMS 4 group reporting the highest score in each case. Scores for AC-Org, CC-Org and CC-Prof increased steadily with age, although the effect for CC-Org is small, which is supported by the correlation shown in Table 3.3.7.a (for CC-Org, r = 0.082, $p<0.05$). A repeated pattern was observed for the NC-Org, AC-Prof and NC-Prof results. This was a score among Trainee BMSs, which decreased through the BMS1 and BMS2 categories, before increasing with grade to show the highest value in the BMS4 group (see Table 3.3.5). To allow comparison with published work (see Section 5.6.1), the mean score for CarComm among BMS1s in the age group 22-29 was specifically calculated. For this group, mean CarComm = 11.68 (SD = 3.03), N= 112.

3.3.5 Effect of Age Group on components of Commitment (Table 3.3.6)

The differences between mean scores for AC-Prof and CarComm were not statistically significant. For each component of Commitment, the highest mean score was reported by the BMS4s. Results shown in Table 3.3.6 for CC-Org and CC-Prof indicated increasing Commitment scores with higher grade, which were confirmed by correlations, shown in Table 3.3.7.a (for CC-Org, r = 0.228, $p<0.01$; for CC-Prof, r = 0.293, $p<0.01$). For the other types of

Commitment, AC-Org, NC-Org, AC-Prof and NC-Professional, a pattern emerged. The scores for the BMSs aged 21 and under decreased through the 22-29 and 30-39 categories, before increasing with age, to the show highest value in the 60 and over group (see Table 3.3.6). Small, but statistically significant, correlations showed that the overall trend was for increasing Commitment with age for AC-Org ($r = 0.091$, $p<0.05$) and NC-Prof ($r = 0.129$, $p<0.01$).

The possible influence of grade on the relationships between the components of Commitment and age group implied by the results of zero-order correlations were investigated. First order partial correlations were calculated for the 6 components of Organisational and Professional Commitment (Table 3.3.7.b). The results show that age group only truly correlates with CC-Org ($r = 0.223$, $p<0.01$) and CC-Prof ($r = 0.219$, $p<0.01$). The increases in mean scores for these two measures are the clearest in Table 3.3.6 and the ANOVA results most significant (for CC-Org, $F_{5,851} = 10.70$, $p<0.01$; for CC-Prof, $F_{5,855} = 16.61$, $p<0.01$).

3.3.6 Correlations between components of Commitment (Table 3.3.8)

Significant correlations were observed between the various components of Commitment, the most important of which are highlighted in bold. AC-Prof and Car Comm showed a strong correlation ($r = 0.720$, $p<0.01$), while significant relationships emerged between each component of Organisational Commitment and the corresponding Professional Commitment (for AC-Org and AC-Prof, $r = 0.607$, $p<0.01$; for CC-Org and CC-Prof, $r= 0.781$, $p<0.01$; for NC-Org and NC-Prof, $r = 0.826$, $p<0.01$). There were also significant correlations between AC-Org and NC-Org ($r = 0.670$, $p<0.01$) and AC-Prof and NC-Prof ($r = 0.563$, $p<0.01$).

3.3.7 Predictors of components of Commitment

To investigate which factors might predict each component of Organisational and Professional Commitment, MRA was used with all the demographic variables and Job Satisfaction as the independent variables in each case. CarComm was not included in this part of the analysis. The results are summarised in Table 3.3.9, which shows that statistically significant relationships were obtained to predict all 6 components of Commitment. The most important predictor of Affective and Normative Commitment to both the Organisation and Profession was Job Satisfaction. The main factor predicting both types of Continuance Commitment was the number of years employed as a BMS.

Table 3.3.1.a: Results of Exploratory Factor Analysis for Commitment to the Organisation items

	Significant correlation coefficients		
	Factor 1	Factor 2	Factor 3
Item			
I do not feel like part of the family at my organisation (R)[1]	0.790		
I do not feel emotionally attached to this organisation (R)[1]	0.657		
I would be happy to spend the rest of my career working for this organisation	0.612		
I do not feel a strong sense of belonging to my organisation (R)[1]	0.782		
This organisation has a great deal of personal meaning for me	0.644		
I really feel that this organisation's problems are my own	0.40		0.499
At the moment, staying with my organisation is a matter of necessity as much as desire		0.655	
It would be hard for me to leave my organisation now even if I wanted to		0.788	
If I had not already put so much of myself into this organisation, I might consider working elsewhere		0.513	
One of the negative consequences of leaving this organisation would be the scarcity of available alternatives		0.681	
Too much of my life would be disrupted if I decided to leave my organisation now		0.724	
I feel that I have too few options to consider leaving this organisation		0.783	
I would feel guilty if I were to leave my organisation now			0.753
I would not leave my organisation now because I have a sense of obligation to the people in it			0.794
I do not feel any obligation to my remain with my current employer (R)[1]			0.704
This organisation deserves my loyalty			0.522
I owe a great deal to my organisation	0.567		0.415
Even if it were to my advantage, I do not feel that it would be right to leave my organisation now			0.756

[1] (R):Item is scored in reverse

Factor 1 corresponds to AC-Org
Factor 2 corresponds to CC-Org
Factor 3 corresponds to NC-Org

Table 3.3.1.b: Results of second Exploratory Factor Analysis of Commitment to the Organisation items

	Significant correlation coefficients		
	Factor 1	Factor 2	Factor 3
Item			
I do not feel like part of the family at my organisation (R)[1]	0.820		
I do not feel emotionally attached to this organisation (R)[1]	0.672		
I would be happy to spend the rest of my career working for this organisation	0.580		
I do not feel a strong sense of belonging to my organisation (R)[1]	0.791		
This organisation has a great deal of personal meaning for me	0.612		
At the moment, staying with my organisation is a matter of necessity as much as desire		0.662	
It would be hard for me to leave my organisation now even if I wanted to		0.788	
If I had not already put so much of myself into this organisation, I might consider working elsewhere		0.520	
One of the negative consequences of leaving this organisation would be the scarcity of available alternatives		0.682	
Too much of my life would be disrupted if I decided to leave my organisation now		0.726	
I feel that I have too few options to consider leaving this organisation		0.788	
I would feel guilty if I were to leave my organisation now			0.768
I would not leave my organisation now because I have a sense of obligation to the people in it			0.805
I do not feel any obligation to my remain with my current employer (R)[1]			0.715
This organisation deserves my loyalty			0.578
Even if it were to my advantage, I do not feel that it would be right to leave my organisation now			0.766

[1] (R):Item is scored in reverse

Factor 1 corresponds to AC-Org
Factor 2 corresponds to CC-Org
Factor 3 corresponds to NC-Org

Table 3.3.2: Results of Exploratory Factor Analysis Commitment to the Profession items

	Significant correlation coefficients		
	Factor 1	Factor 2	Factor 3
Item			
Being a biomedical scientist is important to my self-image	0.682		
I am enthusiastic about the biomedical scientist profession	0.742		
I am proud to be a biomedical scientist	0.798		
I regret having become a biomedical scientist (R)[1]	0.689		
I dislike being a biomedical scientist (R)[1]	0.789		
I do not identify with the biomedical scientist profession	0.717		
Too much of my life would be disrupted if I were to change profession		0.736	
Changing professions now would require considerable sacrifice		0.832	
I have put too much into my career as a biomedical scientist to consider changing now		0.652	
Changing professions would be a difficult thing for me to do now		0.835	
It would be costly for me to change my profession now		0.797	
There are no pressures to keep me from changing professions (R)[1]		0.518	
I feel a responsibility to the biomedical science profession to remain in it			0.756
I do not feel any obligation to remain as a biomedical scientist (R)[1]			0.705
Even if it were to my advantage, I do not feel that it would be right to leave the profession now			0.770
I am a biomedical scientist because I have a sense of loyalty to the profession			0.648
I believe that people who have been trained in a profession have a responsibility to remain in that profession for a reasonable period of time			0.495
I would feel guilty if I left the profession			0.799

[1] (R):Item is scored in reverse

Factor 1 corresponds to AC-Prof
Factor 2 corresponds to CC-Prof
Factor 3 corresponds to NC-Prof

Table 3.3.3: Overall mean scores and Alpha values for Commitment scales

	AC-Org	CC-Org	NC-Org	AC-Prof	CC-Prof	NC-Prof	CarComm
Number of respondents	850	850	854	846	853	858	808
Mean	3.66	4.61	2.87	4.63	4.64	3.11	11.74
SD	1.23	1.11	1.21	1.20	1.19	1.14	3.30
Alpha	0.83	0.79	0.86	0.86	0.83	0.83	0.83

Table 3.3.4: Mean scores and (SD) for components of Commitment by Gender

	AC-Org	CC-Org	NC-Org	AC-Prof	CC-Prof	NC-Prof	CarComm
Male	3.69 (1.25)	4.74 (1.10)	2.78 (1.12)	4.59 (1.26)	4.80 (1.18)	3.05 (1.14)	11.52 (3.2)
Female	3.63 (1.21)	4.51 (1.11)	2.94 (1.22)	4.68 (1.20)	4.51 (1.19)	3.15 (1.14)	11.92 (3.3)
t-test for equality of means							
t=	0.630	2.96**	-1.93	-1.11	3.48**	-1.29	-1.75

**p<0.01

Table 3.3.5: Mean scores and (SD) for components of Commitment by Grade

	AC-Org	CC-Org	NC-Org	AC-Prof	CC-Prof	NC-Prof	CarComm
Trainee	4.06 (0.79)	3.86 (1.14)	3.7 (1.16)	5.11 (1.09)	3.86 (1.14)	3.48 (1.13)	13.55 (2.88)
BMS1	3.47 (1.23)	4.39 (1.19)	2.74 (1.18)	4.45 (1.23)	4.39 (1.19)	2.94 (1.15)	11.34 (3.32)
BMS2	3.49 (1.21)	4.95 (1.07)	2.72 (1.28)	4.54 (1.11)	4.95 (1.07)	3.05 (1.16)	11.40 (3.22)
BMS3	3.96 (1.16)	4.90 (1.10)	3.05 (1.08)	4.94 (1.20)	4.90 (1.10)	3.36 (1.00)	12.42 (2.92)
BMS4	4.47 (1.28)	5.03 (1.25)	3.44 (1.14)	5.19 (1.16)	5.04 (1.25)	3.64 (1.03)	12.75 (3.92)
One way ANOVA							
	$F_{4,853}$	$F_{4,852}$	$F_{4,858}$	$F_{4,850}$	$F_{4,856}$	$F_{4,861}$	$F_{4,810}$
	13.62 **	5.70 **	11.07 **	10.01 **	17.12 **	8.26 **	7.89 **

*p<0.05; **p<0.01

Table 3.3.6: Mean scores and (SD) for components of Commitment by Age Group

	AC-Org	CC-Org	NC-Org	AC-Prof	CC-Prof	NC-Prof	CarComm
21 and under	3.60 (0.76)	3.46 (1.54)	3.15 (1.15)	5.20 (0.27)	3.83 (1.11)	2.58 (0.74)	12.50 (3.32)
22-29	3.65 (1.11)	4.22 (1.02)	3.08 (1.17)	4.61 (1.17)	4.06 (1.16)	3.06 (1.03)	12.20 (3.15)
30-39	3.49 (1.28)	4.43 (1.13)	2.67 (1.22)	4.58 (1.20)	4.48 (1.17)	2.92 (1.17)	11.66 (3.24)
40-49	3.67 (1.22)	4.85 (1.04)	2.85 (1.20)	4.58 (1.24)	4.89 (1.08)	3.13 (1.12)	11.43 (3.23)
50-59	3.93 (1.25)	4.87 (1.13)	3.04 (1.27)	4.83 (1.20)	5.07 (1.19)	3.44 (1.16)	11.77 (3.76)
60 and over	4.63 (1.41)	5.10 (1.12)	3.60 (0.94)	5.14 (1.55)	5.50 (0.75)	4.23 (1.34)	14.20 (3.63)
One way ANOVA							
	$F_{5,851}$	$F_{5,851}$	$F_{5,857}$	$F_{5,849}$	$F_{5,855}$	$F_{5,860}$	$F_{5,809}$
	3.11*	10.70**	3.21*	1.35	16.61**	5.02**	1.69

* $p<0.05$; **$p<0.01$

Table 3.3.7.a: Zero-order Correlations between components of Commitment and demographic variables among BMSs

	Gender, r =	Age group, r =	Grade [1], r =
AC-Org	-0.022	0.091 *	0.213 **
CC-Org	-0.101 **	0.228 **	0.082 *
NC-Org	0.066	0.016	0.146 **
AC-Prof	0.038	0.042	0.187 **
CC-Prof	-0.118 **	0.293 **	0.202 **
NC-Prof	0.044	0.129 **	0.177 **

* $p<0.05$; **$p<0.01$

[1] excluding Trainee BMSs

Table 3.3.7.b: First Order Partial Correlations between components of Commitment and Age Group, controlling for Grade

	Age group, controlling for Grade, r =
AC-Org	0.024
CC-Org	0.223 **
NC-Org	-0.009
AC-Prof	-0.028
CC-Prof	0.219 **
NC-Prof	0.074

** $p<0.01$

Table 3.3.8: Correlations between mean scores for components of Commitment

	AC-Org r =	CC-Org r =	NC-Org r =	AC-Prof r =	CC-Prof r =	NC-Prof r =
AC-Org	-					
CC-Org	-0.37	-				
NC-Org	**0.670****	0.013	-			
AC-Prof	**0.607****	-0.057	**0.511****	-		
CC-Prof	0.085*	**0.781****	0.125**	0.082*	-	
NC-Prof	**0.558****	0.122**	**0.826****	**0.563****	0.261**	-
Car Comm	0.569**	-0.166**	0.530**	**0.720****	0.045	0.549**

*p<0.05; **p<0.01;

Table 3.3.9: Results of Multiple Regression Analysis to determine Predictors of each the 6 components of Commitment

Dependent variable	R^2	ANOVA	Independent variable(s)	β
AC-Org	0.373	$F_{2, 565}$ = 168.32 **	Job Satisfaction Years with current employer	0.601 0.115
CC-Org	0.156	$F_{5, 564}$ = 20.92 **	Years employed as a BMS Years with current employer Job Satisfaction Number of BMSs in laboratory Grade	0.247 0.194 -0.122 -0.122 -0.119
NC-Org	0.240	$F_{2,568}$ = 89.77 **	Job Satisfaction Involvement in a merger	0.480 0.104
AC-Prof	0.361	$F_{2, 560}$ = 158.15 **	Job Satisfaction BMS as deliberate career choice	0.554 0.163
CC-Prof	0.141	$F_{3,569}$ = 31.13 **	Years employed as a BMS Number of BMSs in laboratory Years with current employer	0.261 -0.133 0.122
NC-Prof	0.209	$F_{5,567}$ = 30.02 **	Job Satisfaction Age group BMS as deliberate career choice Involvement in a merger Gender	0.409 0.108 0.093 0.085 0.077

** p<0.01

3.4 Climate

3.4.1 Refinement of the PWE scale

The 60-item climate scale was subjected to exploratory factor analysis (EFA) using SPSS, to determine which items were meaningful in the context of this study group. After the first round, items which gave a coefficient of less than 0.5 were eliminated and the remainder returned to the EFA calculation. This was repeated until a stable scale was obtained, which took five rounds. One factor in which two unrelated items were grouped was discarded after round three. Round four produced a two-item factor which gave a scale with an unacceptably low Alpha value (0.41), which was also removed. The final climate scale which emerged is shown in Table 3.4.1. It comprised 37 items, loading onto 8 factors. Some items loaded onto different factors to those in Newman's (1977) model, while others in a particular group were eliminated from the analysis due to low correlations.

Five of the new factors broadly corresponded to those identified by Newman (1977) and were labelled accordingly. These were: 'Supervisory style', 'Task characteristics', 'Co-worker relationships', 'Employee competence' and 'Performance reward relationships'. Two factors emerged which were combinations of items from Newman's categories 'Equipment and Arrangement of People and Equipment' and 'Work Space'; these were re-labelled 'Equipment and supplies' and 'Layout of laboratory'. Two items, which in Newman's model had been part of 'Performance reward relationships', repeatedly loaded as a separate factor. These were the 'reverse score' items, therefore, for the purposes of this work they were put in an eighth factor called 'Unfair reward relationship'.

Therefore, the eight dimensions of Climate which this analysis identified as being important for BMSs are:

1) Supervisory style: the extent to which the laboratory managers are seen to be interested in the staff, aware of how the laboratory is operating and fair when dealing with people.

2) Co-worker relations: how staff relate to each other within the department within the enclosed environment of the laboratory, where a small group of people spend the day

together in one room dealing with blood, faecal and urine samples, from patients whom they rarely meet.

3) Task characteristics: the variety and challenge in the work, as well as the perception that the laboratory's results contribute to patient care.

4) Employee competence: the extent to which BMSs perceive their colleagues (scientific, clerical, medical) as being proficient and feel that individuals are helped to meet their training needs.

5) Layout of laboratory: the physical arrangement of laboratory, which must minimise accidents and enable staff to work efficiently.

6) Performance-reward relationship: the ways in which good performance is rewarded fairly, through for example granting of study leave, financial support to attend courses, time off *in lieu* of overtime and overt recognition through verbal thanks for good work.

7) Equipment and supplies: Functioning machines and adequate supplies of reagents are crucial to the smooth and efficient working of a laboratory. The equipment should be as up to date as possible and regularly maintained.

8) Unfair-reward relationship: the ways in which performance is rewarded unfairly, such as an impression that the 'wrong' people are being rewarded might arise when the same, 'favourite' people always seem to go on courses or have the weekends off that they require regardless of merit.

Table 3.4.1: Final results of Exploratory Factor Analysis of 60-item climate scale.

	Correlation coefficient
FACTOR 1: Supervisory style	
My boss is flexible when needed	0.69
The manager takes a personal interest in the staff	0.75
The manager gives recognition for work well done	0.74
Staff feel free to talk openly with the manager, especially when they have a problem	0.76
Staff are asked to make suggestions when decisions are being made that will affect them	0.57
Praise is given for doing a good job	0.65
The best way to get along with the manager is to not rock the boat(R)	0.61
Individuals are told about how well they are doing at their job	0.57
The manager stresses good human relations among the staff	0.70
Staff are given a good idea of what to expect	0.52
Staff are able to speak openly and honestly with the manager	0.81
Individuals are able to count on their manager to back them up	0.71
12 items: α= 0.92, n=851, mean score = 3.04	
FACTOR 2: Co-worker relations	
There is serious conflict among staff members (R)	0.68
Staff trust one another and offer to help each other	0.73
Staff in our laboratory get along well with each other and enjoy their work	0.72
There is a friendly feeling among colleagues	0.83
There is teamwork	0.71
5 items: α= 0.84, n=876, mean score = 3.49	
FACTOR 3: Task characteristics	
There is a chance to do a number of different things	0.80
Staff have variety in their tasks at work	0.79
There are opportunities to use my skills and abilities	0.71
There is a chance to do something worthwhile	0.62
4 items: α= 0.82, n=875, mean score = 3.51	
FACTOR 4: Employee competence	
Staff have the proper background and training to do the job	0.74
Everyone knows how to do his/her job	0.65
Staff receive sufficient training to do their jobs	0.75
New staff have problems because they do not get enough training (R)	0.68
4 items: α= 0.80, n=879, mean score = 3.45	
FACTOR 5: Layout of laboratory	
The work area is crowded (R)	0.87
The laboratory is laid out so staff can do their job well	0.71
Staff have lots of space and freedom to move about	0.87
3 items: α= 0.84, n=881, mean score = 3.04	
FACTOR 6: Performance-reward relationship	
Pay increases are related to how well I do on the job	0.69
Staff members are rewarded on the basis of how much work they do	0.59
Promotions are based on how well the job is done	0.63
Staff are rewarded on the basis of how well they do their work	0.78
4 items: α= 0.62, n=867, mean score = 1.61	
FACTOR 7: Equipment and supplies	
There are enough staff and supplies to do my job	0.55
The right type and amount of supplies are available	0.75
The equipment in our laboratory is up to date	0.72
3 items: α= 0.69, n=884, mean score = 3.01	
FACTOR 8: Unfair reward relationship	
Rewards are based not so much on how you do your work but who you know (R)	0.93
Promotions are given on who you know rather than how well you do your job (R)	0.93
2 items: α= 0.86, n=861, mean score = 3.13	
Alpha for overall climate scale=0.92; n=808; mean score=3.03.	

Taking the 37 items together as a 'climate' scale, the Alpha value was 0.92, which exceeded the threshold of 0.7, indicating that it was reliable (see Methods, Section 2.4). This scale was used to determine overall climate scores for each individual, by calculating the mean of the 37 items. As the responses were given from 1 (strongly disagree) to 5 (strongly agree), a climate score of 3 or greater would indicate that the subject had a positive perception of their workplace climate.

The results were analysed at two levels:

i) Using the scores from all questionnaire respondents, to describe 'psychological climate' among BMSs (Section 1.10.3). In the present study, this was labelled Individual Climate. The findings from this analysis are presented in this Section (3.4). The results of the investigation of the relationships between Individual Climate, Job Satisfaction and Commitment for BMSs are presented in Section 3.5.

ii) Collating scores from colleagues employed in the same department, to form an 'aggregate climate' (Section 1.10.3). This was called Laboratory Climate and it was used to consider the influence of Climate on the laboratory's performance in quality assurance measures. The results of this are given in Section 3.7.

3.4.2 Prediction of a positive perception of Individual Climate among BMSs

Using the results for Individual Climate, multiple regression analysis (MRA) was applied to investigate possible predictors of an individual giving a positive climate score. The independent variables were the demographic data and Job Satisfaction scores. The results of this are presented in Table 3.4.2, which shows that these independent variables explained over half of the variation in Individual Climate perception among BMSs in this study ($R^2 = 0.519$). Job Satisfaction emerged as the strongest predictor of Individual Climate ($\beta = 0.667$). The number of staff is a negative predictor ($\beta = -0.244$), indicating where BMSs interact with a relatively small number of colleagues they are more likely to perceive a positive Individual Climate. The individual's grade is a positive predictor ($\beta = 0.128$), implying that BMSs of higher grade have a better workplace experience, while working in a Food, Water and Environmental laboratory may make it slightly worse ($\beta = -0.073$).

3.4.3 Demographic characteristics of BMSs who experience a positive Individual Climate

It was hypothesised that experiences of climate among questionnaire respondents might vary according to a number of demographic categories (particularly noting the 'predictors' in Table 3.4.2). First, the individual characteristics of gender, age group and grade were explored. The mean climate scores were calculated for each category and the results are shown in Figures 3.4.1 - 3.4.3. Figure 3.4.1 shows that the mean Individual Climate score for male respondents was significantly higher than for females (t test for equality of means: $t= 2.55$, $p<0.05$). There was a significant difference between Individual Climate scores among age groups (One way ANOVA $F_{5,805} = 2.77$, $p<0.05$), with only the 50-59 and 60 and over age groups reporting positive mean Individual Climates (Figure 3.4.2). For the grade category, the BMS 4s gave the highest Individual Climate score, while Trainees and BMS3s also reported positive Individual Climates overall, in contrast to the BMS1s and BMS2s (Figure 3.4.3). Scores for each grade were further broken down by gender and these are given in Table 3.4.3. At each grade, there was no statistical difference between mean scores by gender ($p>0.4$) except for at BMS 4, where female respondents reported a significantly higher Individual Climate score ($t= -2.66$, $p<0.01$)

3.4.4 Type of laboratory in which staff experience a positive Individual Climate

The second set of categories used to explore individual BMS's perceptions of climate were characteristics of the laboratory. Mean scores broken down according to the type of employer, shown in Figure 3.4.4 indicate that BMSs working in private institutions report the most positive climate, while PHLS employees experience the lowest. Figures 3.4.5.a and 3.4.5.b consider climate scores according to the type of microbiology laboratory. In figure 3.4.5a, individual sections of PHLs are included separately according to speciality (e.g.virology). To explore whether scores from PHLS employees were skewing the results, the means were re-calculated without the PHLS score and these are given in Figure 3.4.5.b. Individual Climate score was also calculated according to number of staff (including medical and support staff) in the department. Means for all the participating laboratories (taking each PHL as one laboratory) grouped by size are shown in Figure 3.4.6.a, which indicates a trend towards lower mean climate score in larger departments. Since PHL employees were shown to report lower scores than other BMSs, Figure 3.4.6.b considers climate according to number of staff excluding results from PHLs and shows a similar pattern. Figures 3.4.6.c and 3.4.6.d give the

results for PHLs staff firstly taking each PHL as a single department (Figure 3.4.6.c) and then breaking them down into separate sections (Figure 3.4.6.d) These show that mean Climate scores from most whole PHLs and PHL sections were negative (i.e. below 3). Figure 3.4.6.e compares mean climate scores for the PHL sections with results for the remaining, non-PHL departments, which illustrates the differences between the patterns in the two groups.

Table 3.4.2: Results of Multiple Regression Analysis to investigate predictors of Individual Climate

Dependent variable: INDIVIDUAL CLIMATE:	
Independent variable ('predictor')	β
Job Satisfaction	0.667
Number of staff	-0.244
Grade	0.128
Works in food water and environmental laboratory	-0.073

$R^2 = 0.519$, $F_{4,552} = 148.96$ ($p<0.001$)

Table 3.4.3: The effect of gender on mean Individual Climate scores at each grade *

	Mean Climate Individual score (SD)		Mean Climate Individual score (SD)	
	Male	N[1]	Female	N[1]
Trainee	3.24 (0.49)	13	3.12 (0.47)	28
BMS1	2.85 (0.55)	96	2.90 (0.49)	268
BMS2	2.93 (0.44)	107	2.90 (0.48)	112
BMS3	3.13 (0.45)	92	3.17 (0.38)	31
BMS4	3.42 (0.32)	49	3.78 (0.42)	7

[1]N = number of respondents

* see Figure 3.4.3 for overall mean Individual Climate scores at each grade

Figure 3.4.1: Comparison of mean Individual Climate scores by Gender

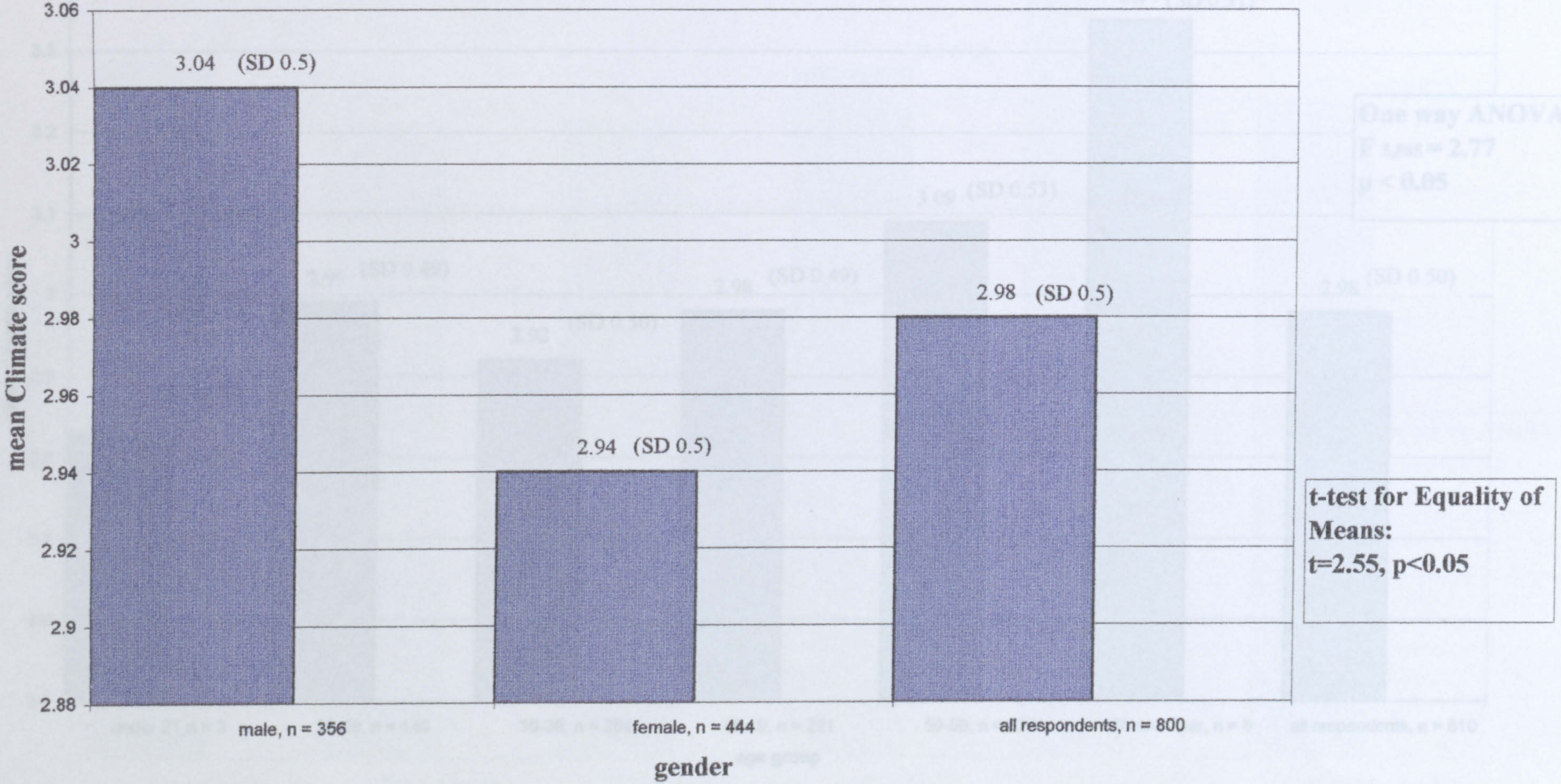


Figure 3.4.2: Comparison of mean Individual Climate scores by Age Group

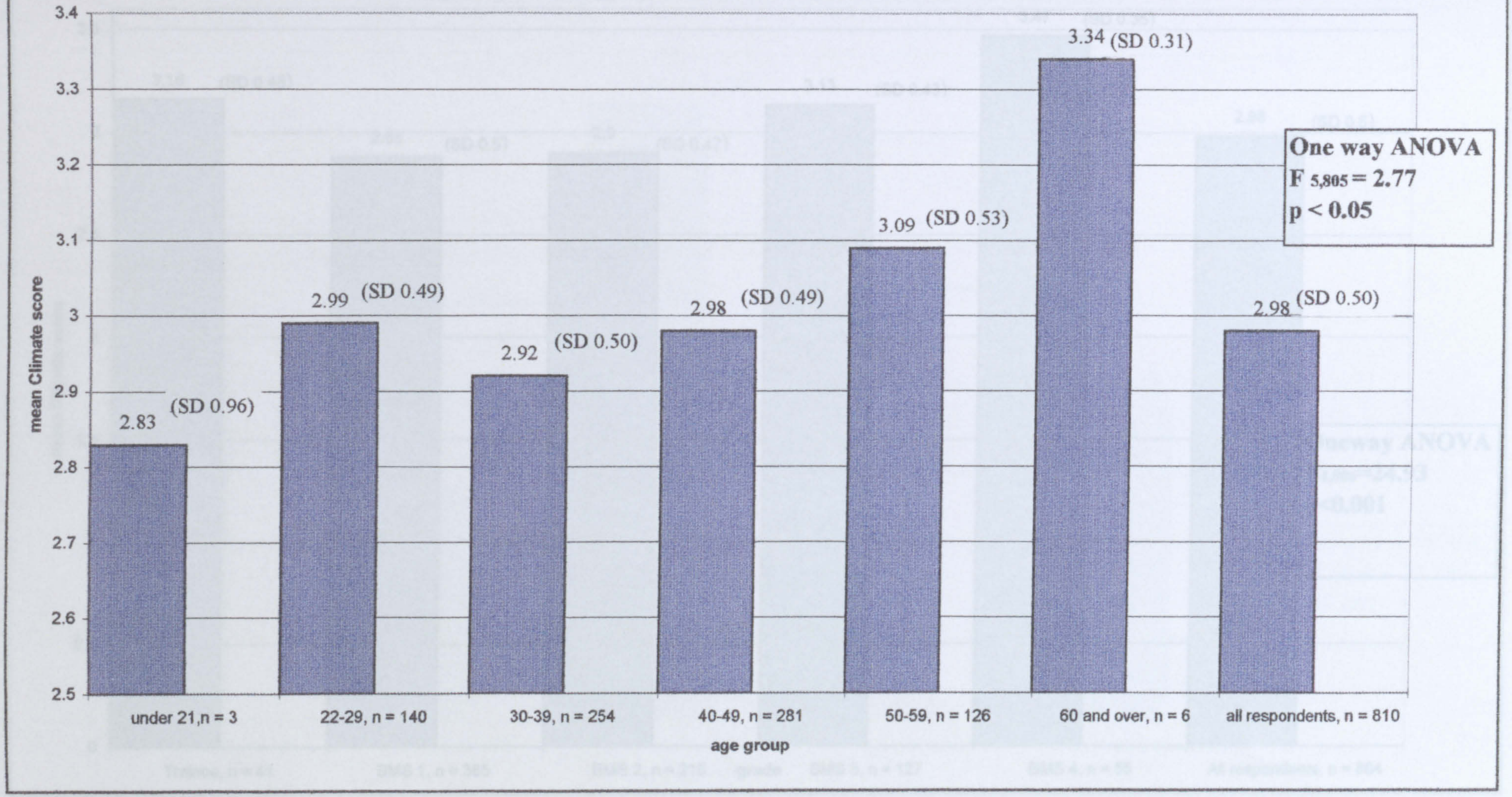


Figure 3.4.3: Comparison of mean Individual Climate scores by Grade

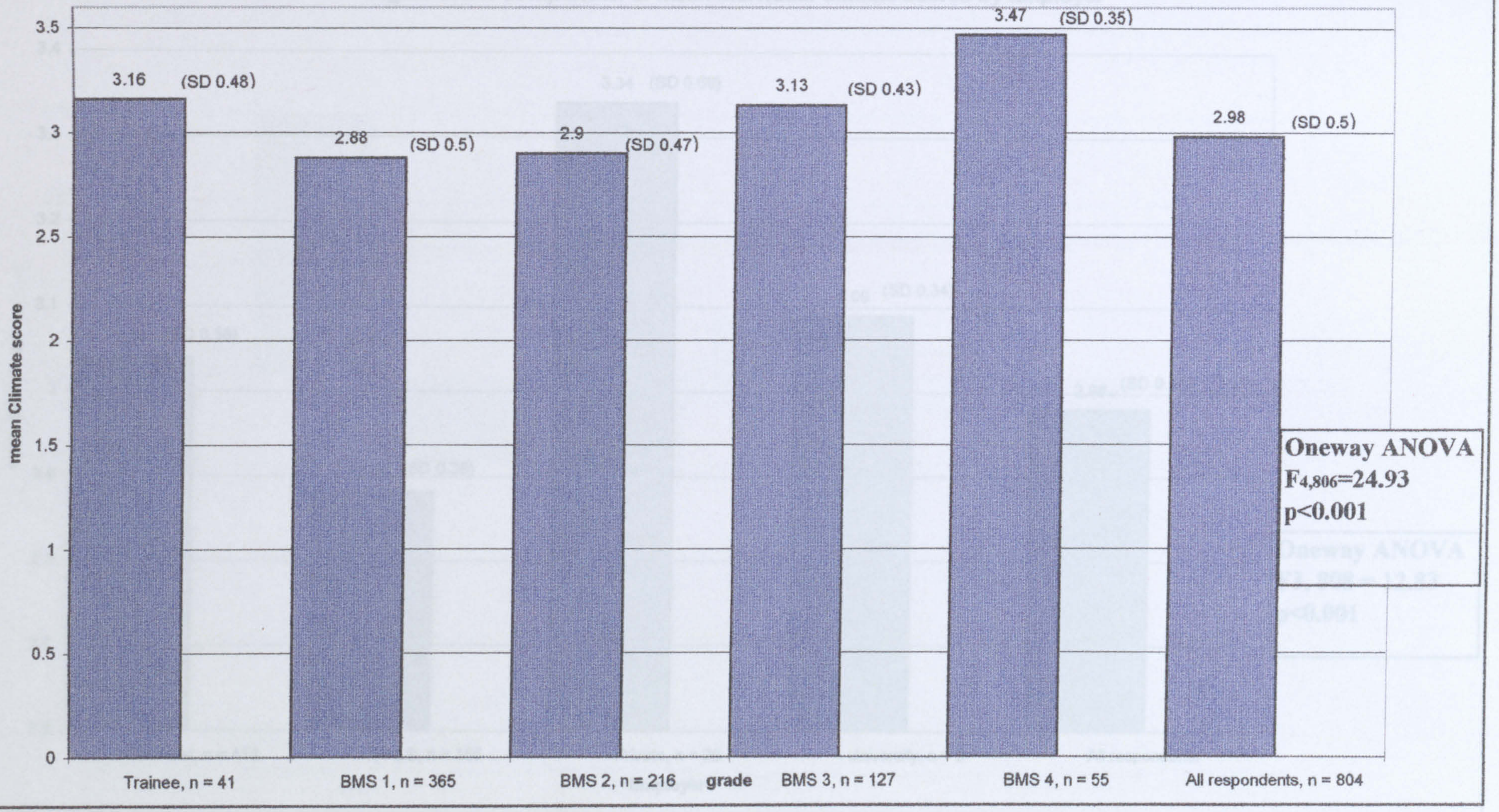


Figure 3.4.4: Comparison of mean Individual Climate scores by Employer

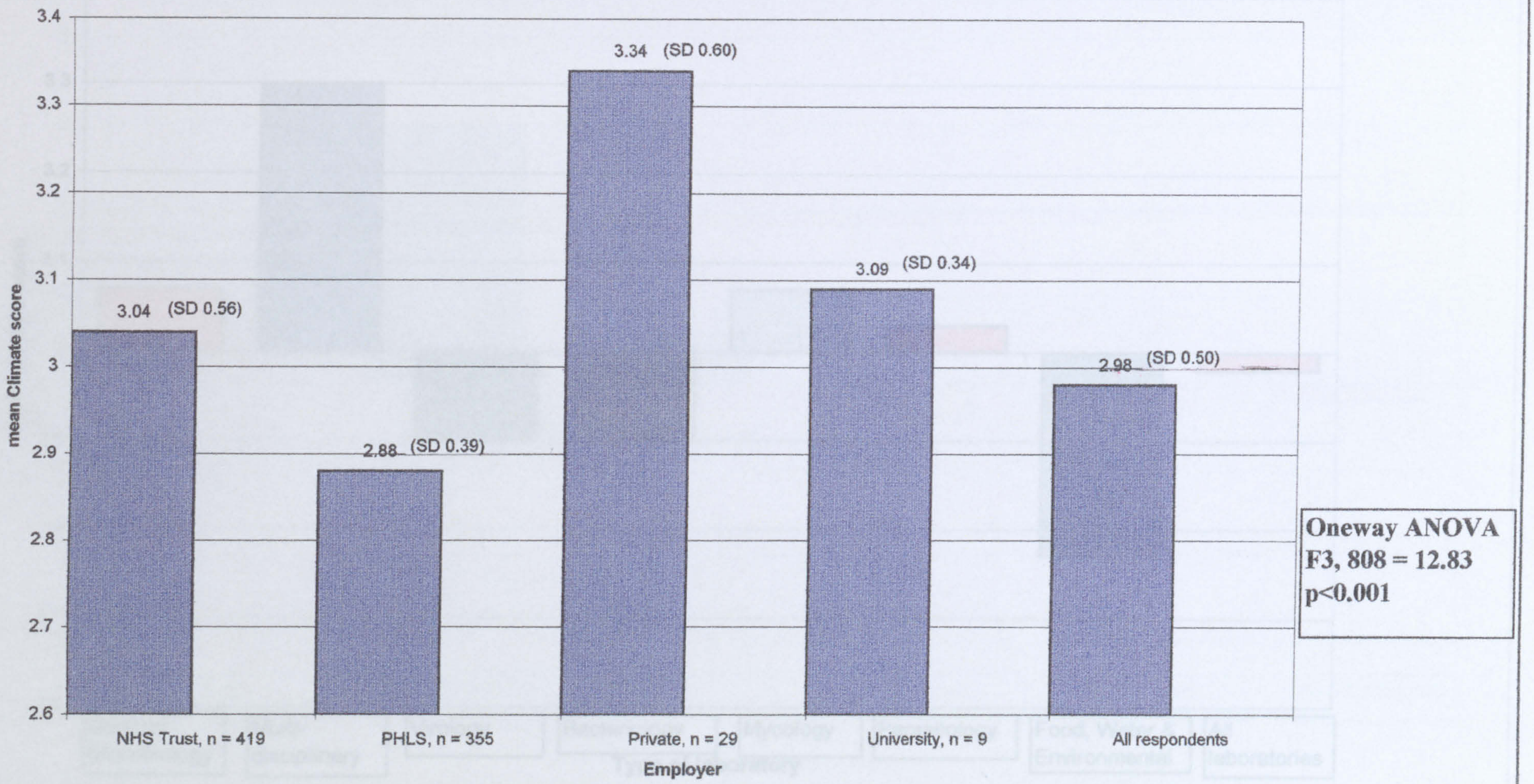


Figure 3.4.5.a: Comparison of mean Climate scores by type of laboratory

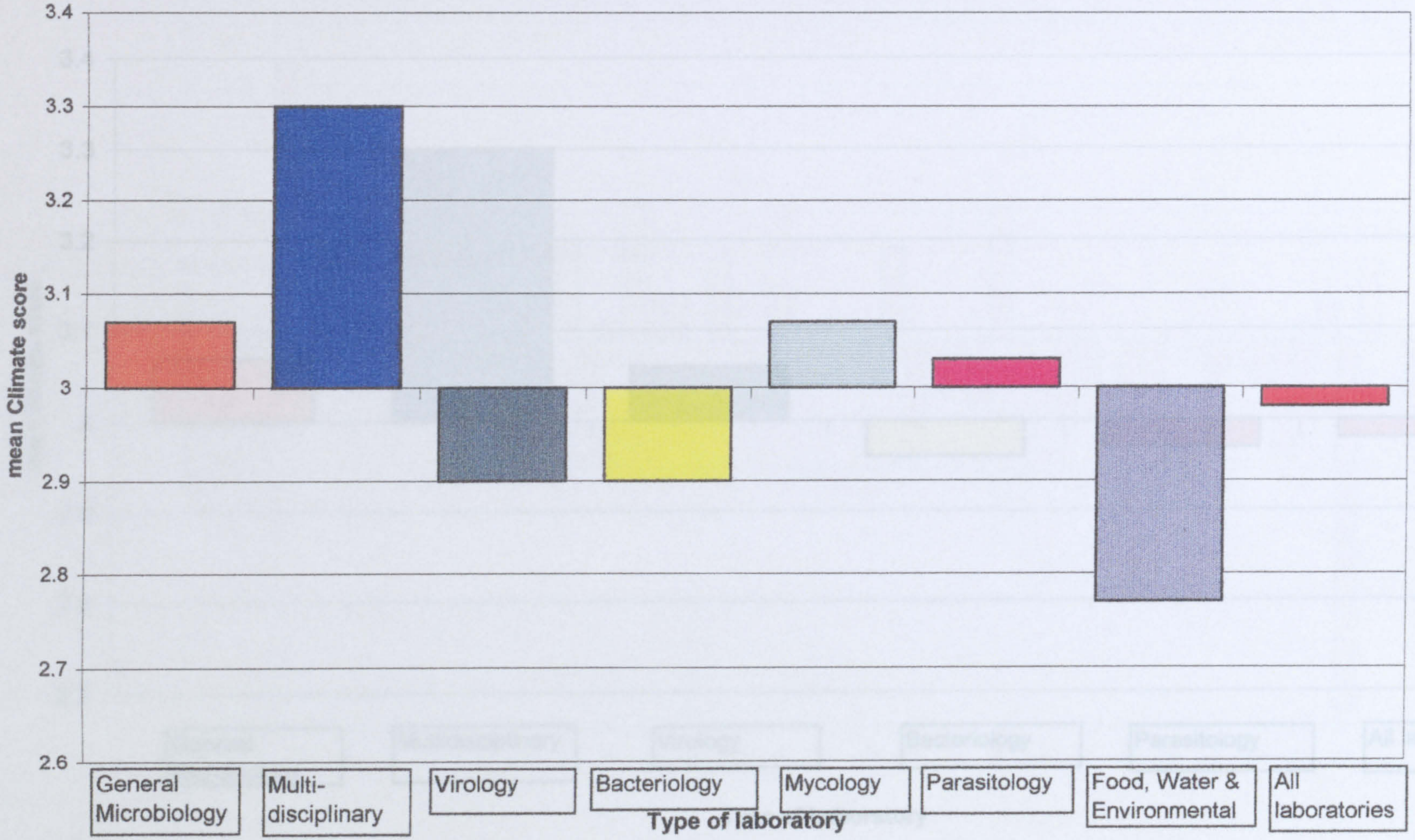


Figure 3.4.5.b: Comparison of mean Climate scores by type of laboratory, excluding PHL sections

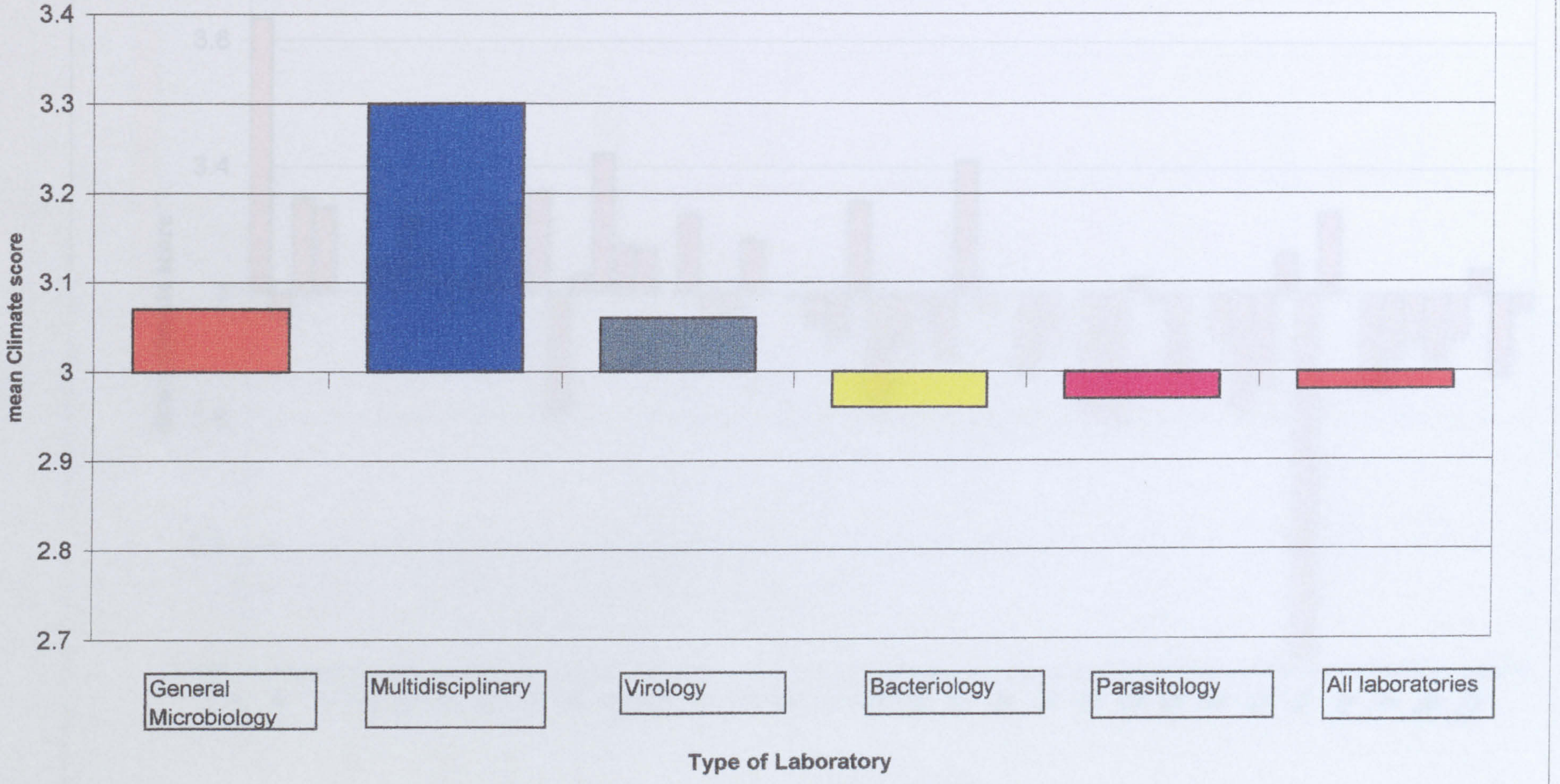


Figure 3.4.6.a: Mean Individual Climate score by number of staff for all laboratories in study

Figure 3.4.6.b: Mean Individual Climate score by number of staff excluding results from PHLs

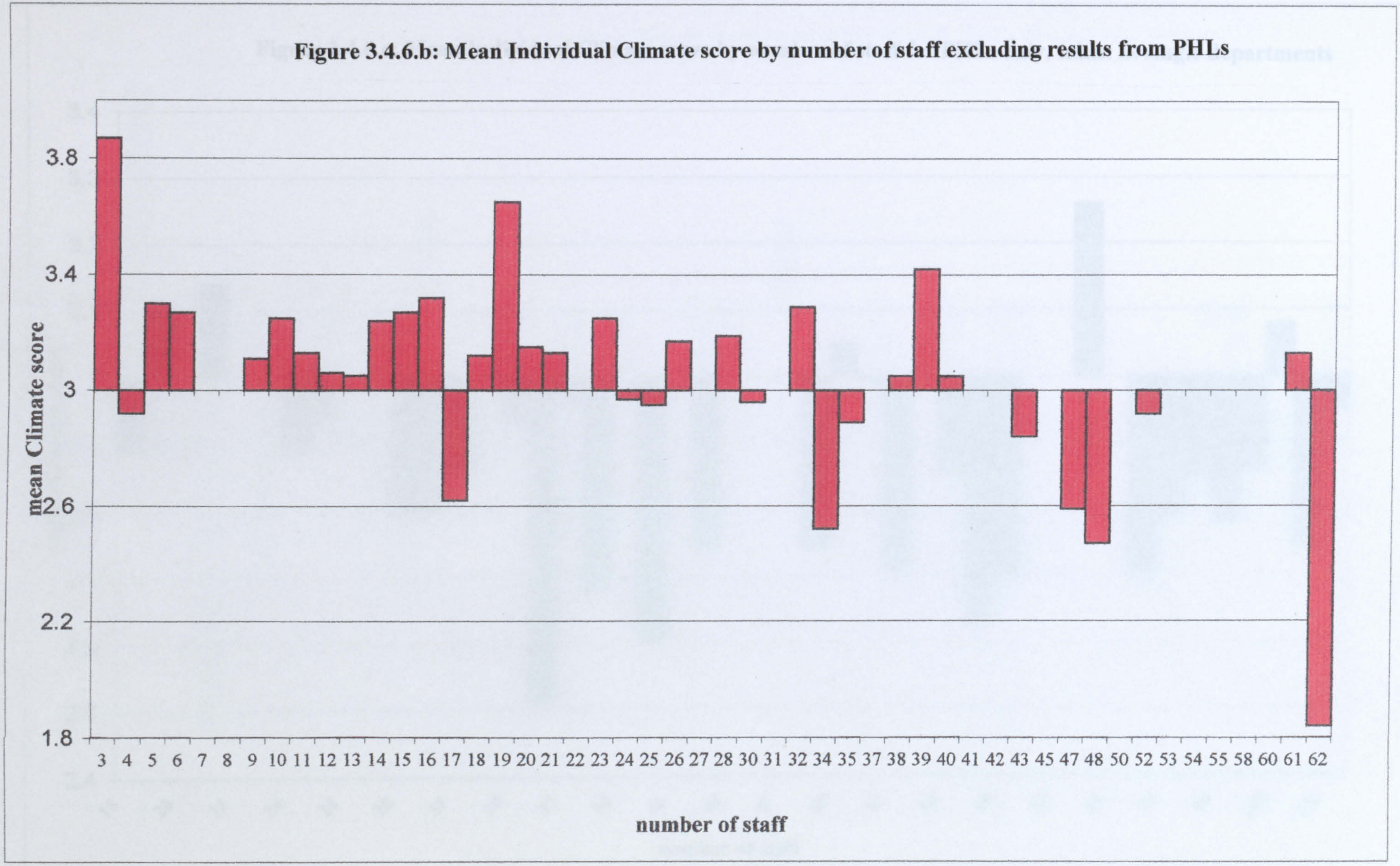


Figure 3.4.6.c: Mean Individual Climate score by number of staff for PHLs only, taken as single departments

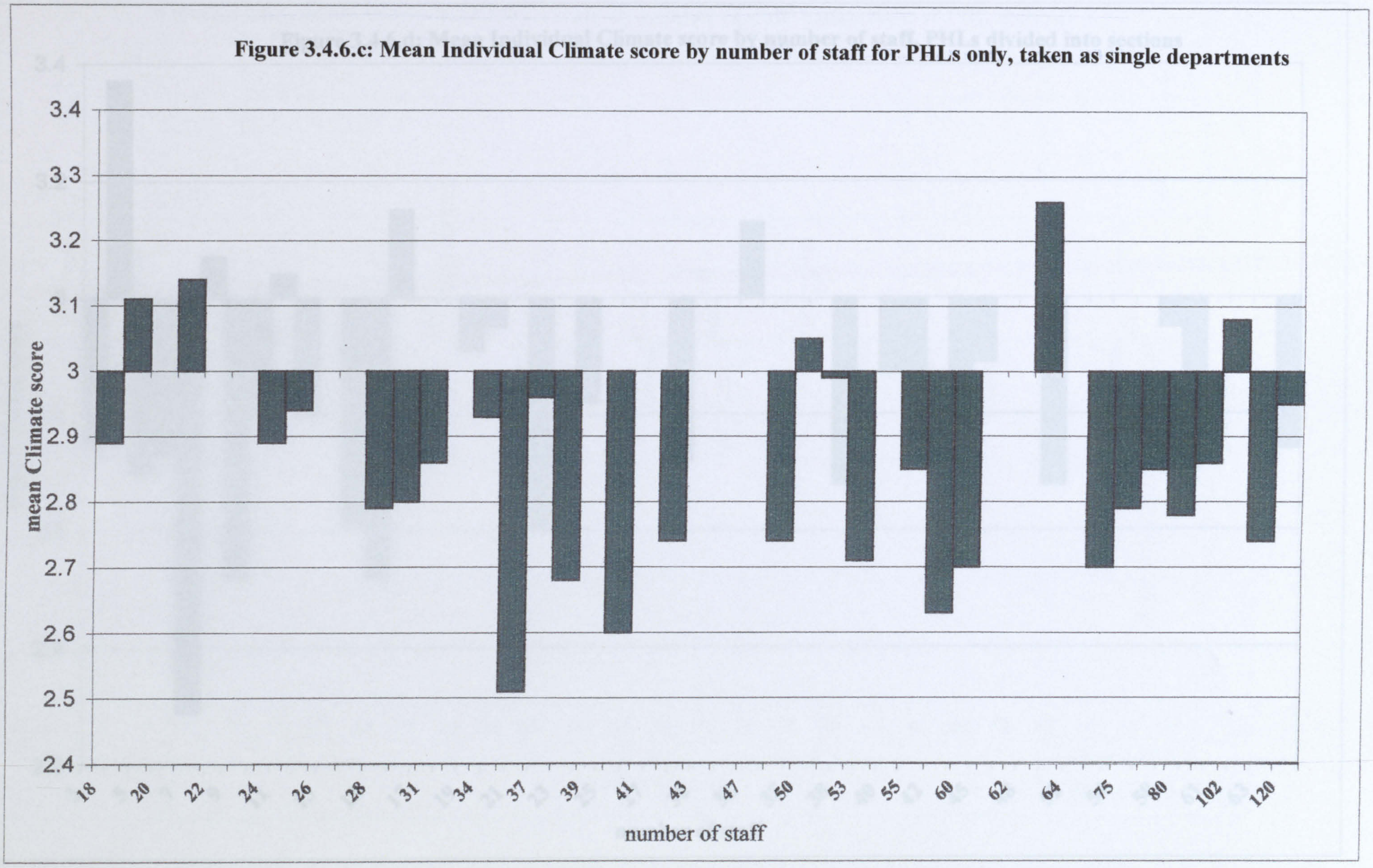


Figure 3.4.6.d: Mean Individual Climate score by number of staff, PHLs divided into sections

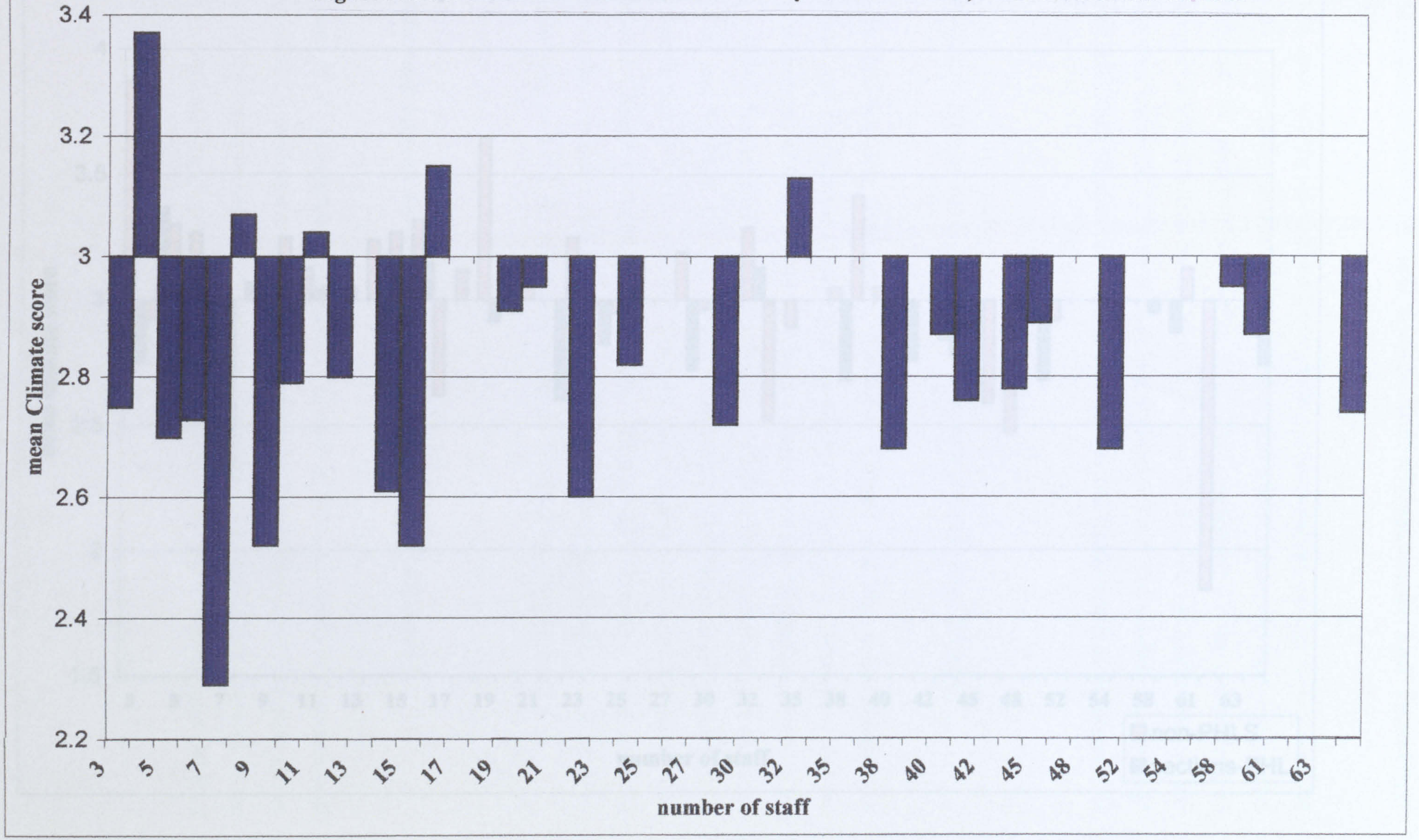
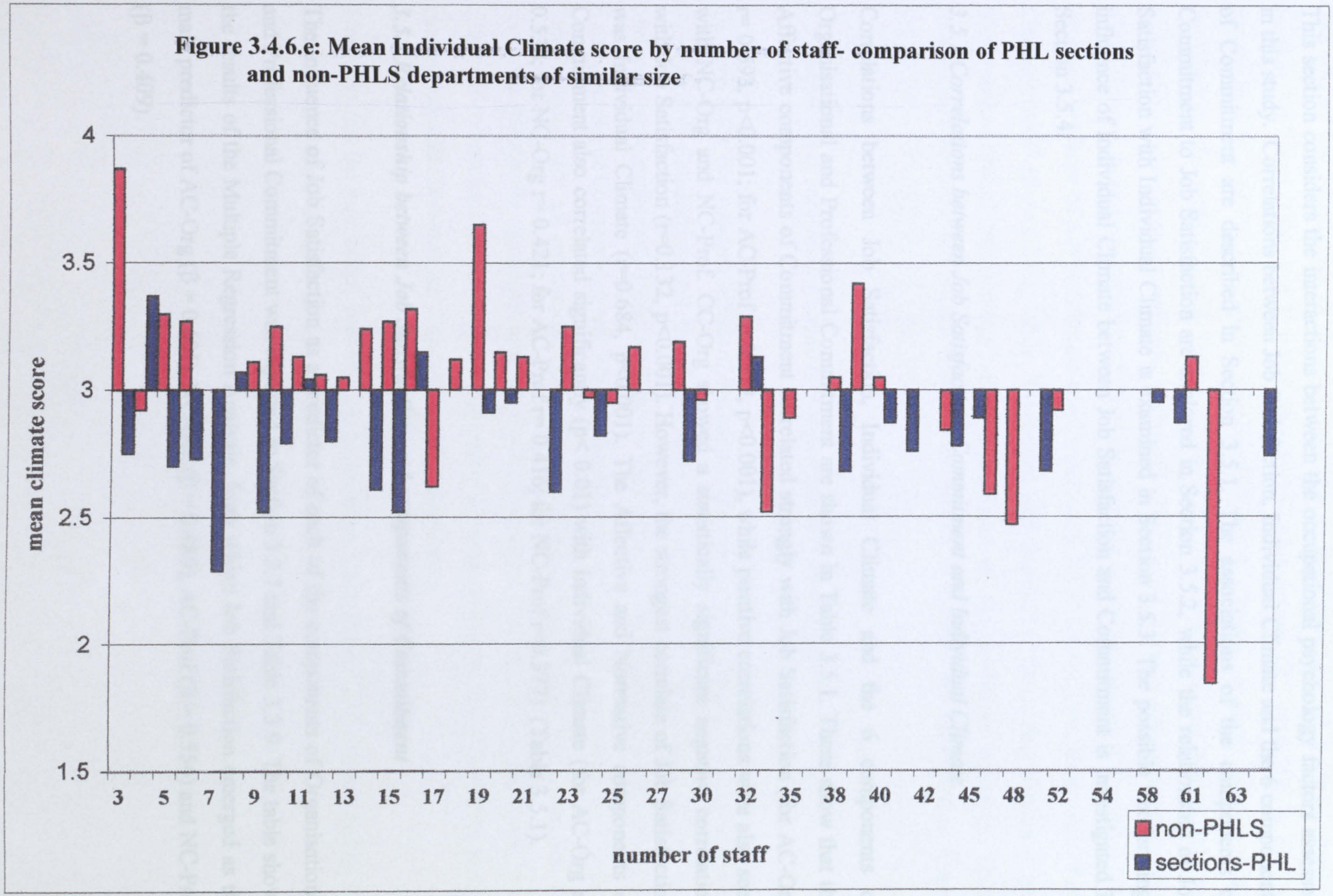


Figure 3.4.6.e: Mean Individual Climate score by number of staff- comparison of PHL sections and non-PHLS departments of similar size



3.5 Relationships between Job Satisfaction, Commitment and Individual Climate

This section considers the interactions between the occupational psychology factors assessed in this study. Correlations between Job Satisfaction, Individual Climate and the 6 components of Commitment are described in Section 3.5.1. The associations of the components of Commitment to Job Satisfaction are explored in Section 3.5.2, while the relationship of Job Satisfaction with Individual Climate is examined in Section 3.5.3. The possible 'moderating' influence of Individual Climate between Job Satisfaction and Commitment is investigated in Section 3.5.4.

3.5.1 Correlations between Job Satisfaction, Commitment and Individual Climate.

Correlations between Job Satisfaction, Individual Climate and the 6 components of Organisational and Professional Commitment are shown in Table 3.5.1. These show that the Affective components of Commitment correlated strongly with Job Satisfaction (for AC-Org $r= 0.593$, $p<0.001$; for AC-Prof $r= 0.572$, $p<0.001$), while positive correlations were also seen with NC-Org and NC-Prof. CC-Org showed a statistically significant negative correlation with Job Satisfaction ($r=0.132$, $p<0.001$). However, the strongest correlate of Job Satisfaction was Individual Climate ($r=0.684$, $p<0.001$). The Affective and Normative components of Commitment also correlated significantly ($p< 0.01$) with Individual Climate (for AC-Org $r= 0.538$; for NC-Org $r= 0.421$; for AC-Prof $r= 0.416$; for NC-Prof $r=0.377$) (Table 3.5.1).

3.5.2 Relationship between Job Satisfaction and components of Commitment

The influence of Job Satisfaction as a predictor of each of the components of Organisational and Professional Commitment was explored in Section 3.3.7 and Table 3.3.9. The table shows the results of the Multiple Regression Analysis, from which Job Satisfaction emerged as the main predictor of AC-Org ($\beta = 0.601$), NC-Org ($\beta = 0.480$), AC-Prof ($\beta = 0.554$) and NC-Prof ($\beta = 0.409$).

3.5.3 Relationship between Job Satisfaction and Individual Climate factors

The role of Job Satisfaction as the main predictor of Individual Climate is investigated in Section 3.4.2 and Table 3.4.2, which shows the MRA results (R^2 = 0.519; β for Job Satisfaction = 0.667). To explore whether Individual Climate similarly predicted Job Satisfaction, the eight Climate factors (Table 3.4.1) were put into an MRA with Job Satisfaction as the dependent variable, as shown in Table 3.5.2. These results indicate that five of the Climate factors accounted for 55% of the variance in Job Satisfaction (R^2 = 0.55). The strongest predictor of Job Satisfaction was 'Supervisory Style' (β = 0.338), along with 'Task Characteristics' (β = 0.256), while 'Equipment and Supplies', 'Co-worker relations' and 'Performance-reward relationships' also formed part of the predictive equation. These relationships between Job Satisfaction and the factors of Climate are illustrated in Figure 3.5.1.

3.5.4 Influence of Individual Climate on components of Commitment

To investigate the possible effect of Individual Climate as a moderator (see Introduction) between Job Satisfaction and the components of Commitment, partial correlations (see Methods) were performed. Table 3.5.3 shows the correlation coefficients between each of the 6 components of Commitment and Job Satisfaction with and without controlling for Climate. This indicates that all correlations that were significant before Climate was controlled for remained statistically significant after the Partial Correlation was carried out. However, in all cases, the correlation coefficient was considerably reduced, indicating that Climate did have a moderating effect between Job Satisfaction and Commitment.

The effect that the interactions between Job Satisfaction, Commitment and Climate had on the measures of Quality is explored in Section 3.7.

Table 3.5.1: Correlations between Job Satisfaction, Organisational Commitment, Professional Commitment and Individual Climate

	Climate	AC-Organisational	CC-Org	NC-Org	AC-Prof	CC-Prof	NC-Prof
Job Satisfaction	0.684**	0.593**	-0.132**	0.488**	0.572**	0.013	0.428**
Climate	-	0.538**	-0.063	0.421**	0.416**	0.059	0.377**

**p<0.001

Table 3.5.2: Results of Multiple Regression Analysis to investigate which factors of Climate predict Job Satisfaction

Dependent variable: Job Satisfaction	
Independent variable ('predictor')	β
Supervisory style	0.338
Task characteristics	0.256
Equipment and supplies	0.163
Co-worker relations	0.180
Performance-reward relationships	0.081

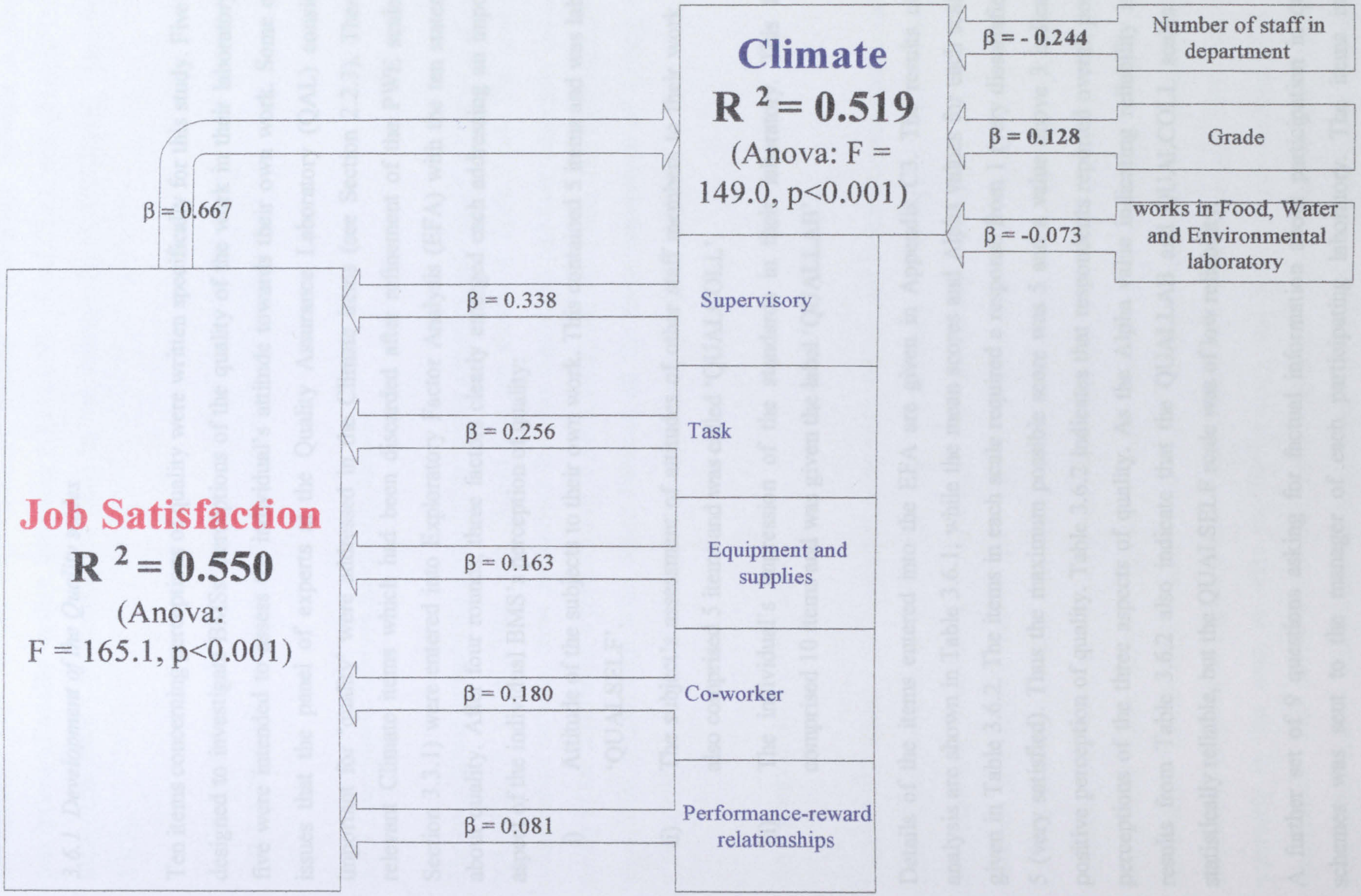
$R^2 = 0.550$, $F_{5,670} = 165.05$ ($p<0.001$)

Table 3.5.3: Zero-order Correlations between the 6 Components of Commitment and Job Satisfaction compared with First Order Partial Correlations, controlling for Climate

Component of Commitment	**Job Satisfaction r=**	**Job Satisfaction, controlled for Climate, r=**
AC-Org	0.593**	0.363**
CC-Org	-0.132**	-0.112*
NC-Org	0.488**	0.286**
AC-Prof	0.572**	0.406**
CC-Prof	0.013	0.001
NC-Prof	0.428**	0.228**

* p<0.05, ** p <0.001

Figure 3.5.1: Relationship between components of Climate and Job Satisfaction



3.6 Quality

3.6.1 Development of the Quality scales

Ten items concerning perceptions of quality were written specifically for this study. Five were designed to investigate BMSs' perceptions of the quality of the work in their laboratory and five were intended to assess the individual's attitude towards their own work. Some of the issues that the panel of experts at the Quality Assurance Laboratory (QAL) considered important for 'quality' were addressed in the Climate items (see Section 2.2.3). Therefore relevant Climate items which had been discarded after refinement of the PWE scale (see Section 3.3.1) were entered into Exploratory Factor Analysis (EFA) with the ten statements about quality. After four rounds, three factors clearly emerged each addressing an important aspect of the individual BMS's perception of quality:

i) Attitude of the subjects to their own work. This contained 5 items and was labelled 'QUALSELF'.

ii) The subject's assessment of attitudes of other staff members to their work. This also comprised 5 items and was called 'QUALCOLL'.

iii) The individual's impression of the standards in their laboratory. This factor comprised 10 items and was given the label 'QUALLAB'.

Details of the items entered into the EFA are given in Appendix C3. The results of this analysis are shown in Table 3.6.1, while the mean scores and Alpha values for each scale are given in Table 3.6.2. The items in each scale required a response from 1 (very dissatisfied) to 5 (very satisfied). Thus the maximum possible score was 5 and a value above 3 indicates a positive perception of quality. Table 3.6.2 indicates that respondents reported overall positive perceptions of the three aspects of quality. As the Alpha value indicating reliability is 0.7, results from Table 3.6.2 also indicate that the QUALLAB and QUALCOLL scales were statistically reliable, but the QUALSELF scale was of low reliability.

A further set of 9 questions asking for factual information about participation in quality schemes was sent to the manager of each participating laboratory. The items in this LABSCORE scale and the method of scoring used are given in Table 3.6.3. The LABSCORE result was used in analysis in two ways:

1. The score for each individual's laboratory was added to the data concerning their perceptions. This allowed exploration of possible relationships between a subject's perceptions of quality in their laboratory (QUALLAB, QUALCOLL and QUALSELF) and their department's performance as rated by the manager (i.e. LABSCORE) (see Section 3.6.2).

2. The 'aggregated Climate' score was calculated for some laboratories and its association with LABSCORE investigated on a departmental basis (see Section 3.7.3).

3.6.2 Correlations between the Quality factors

The correlations between the scores for the scales assessing individuals' perceptions of quality (QUALSELF, QUALCOLL and QUALLAB) are shown in Table 3.6.4. The correlation relationships between these perceptions for each respondent and their laboratory manager's rating of the department's performance (LABSCORE) are also given. The table indicates that significant relationships were found between all the three perceptions of quality, while LABSCORE and QUALLAB correlated significantly ($r = 0.105$, $p<0.01$).

3.6.3 Range of LABSCORE results

LABSCORE sheets were received from 86 NHS, Private and University laboratories. Replies came from sections of PHLs (i.e. the 'Bacteriology', 'Virology',' Food, Water and Environmental Microbiology' 'Mycology' and 'Parasitology' sections). Thirty two PHLs returned LABSCORE results from one or more section. In Figure 3.6.1, the mean LABSCORE for each PHL where several sections had sent replies has been calculated and combined with the results from the other 86 laboratories to display the range of LABSCORE scores. The figure shows a spread of scores from 4 to 9, approximating to a normal distribution. LABSCORE results were also considered according to speciality of the laboratory, as given in Figure 3.6.2. Scores from each department of a PHL were taken separately in this case, as were the Bacteriology and Virology sub-sections of 5 NHS laboratories. This shows that overall, the LABSCORE results from specialist departments were higher than for general and multidisciplinary laboratories. This difference in means was confirmed as statistically significant by one way ANOVA: $F_{5,158} = 5.836$ $p<0.01$.

Table 3.6.1: Results of Exploratory Factor Analysis of 'Quality' items

	Correlation coefficient
Factor 1: QUALSELF	
When considering how well I do my job, I am my own strongest critic	0.73
I usually check my own work thoroughly	0.69
I try to keep myself up to date in my discipline by discussions with colleagues, attending scientific meetings and reading journals whenever possible	0.71
The work requires a lot of technical training	0.63
If a colleague points out a mistake that I have made, I take the criticism personally (R)[1]	0.84
Factor 2: QUALCOLL	
People in this laboratory are proud of their work	0.68
Staff are interested and deeply involved in their work	0.66
The staff try to do their best	0.69
Staff try hard to get ahead	0.64
Staff stick to the rules	0.52
Factor 3: QUALLAB	
The senior managers (i.e. head BMS, consultant) in our department are committed to quality assurance	0.62
There is a chance for staff to take part in deciding what the work methods, activities and goals are	0.70
When technical problems occur in our laboratory, senior managers are not always aware of them (R)[1]	0.60
Important decisions are made by staff members closest to the action	0.66
Staff know what their manager expects of them	0.56
I would say that the standards of staff training in my department is low (R)[1]	0.64
Everyone is granted enough power to do his/her job	0.62
I usually get positive feedback from my supervisor	0.57
There are regular departmental meetings to discuss issues including quality and standards in which all staff working on the bench participate	0.47
There are sufficient well motivated and experienced biomedical scientists in my department to keep the quality of the work high	0.46

[1] R: Item is reverse scored

Table 3.6.2: Mean score and Alpha values for the perception of quality scales

Quality scale	Alpha value	N[1]	Mean score (SD)
QUALSELF	0.42	879	3.86 (0.47)
QUALCOLL	0.72	871	3.37 (0.60)
QUALLAB	0.81	854	3.23 (0.69)

[1] N= number of respondents

Table 3.6.3: Details of the LABSCORE scale

	Reply	Score	Reply	Score	Reply	Score
Item						
Does your department take part in the National External Quality Assurance Scheme?	**Yes**	**1**	No	0	Don't know	0
How would you say your laboratory has scored on NEQAS in the last five years?	**Above average**	**2**	About average	1	Below average	0
Do you have Internal Quality Assurance schemes operating in your department?	**Yes**	**1**	No	0	Don't know	0
Are the results of IQA made available to all biomedical scientists and medical staff in the department?	**Yes**	**1**	No	0	Don't know	0
Is the quality system in operation in your department audited?	**Yes**	**1**	No	0	Don't know	0
Did any serious incidents, mistakes or breaches of safety occur in your lab during the last five years?	Yes	0	**No**	**1**	Don't know	0
Did you have any customer complaints about standards, turnaround times or usefulness of the results provided by your laboratory in the last year?	Yes	0	**No**	**1**	Don't know	0
Is your department currently CPA accredited?	**Yes**	**1**	No	0	Don't know	0

Maximum possible score (all bold answers) = 9

Note: Several respondents indicated 'partial' or 'limited' implementation of IQA or audit and one reported accreditation with the King's Fund (an organisation promoting better healthcare in London), but not the CPA. All replies qualified in this way scored 0.5 for that item

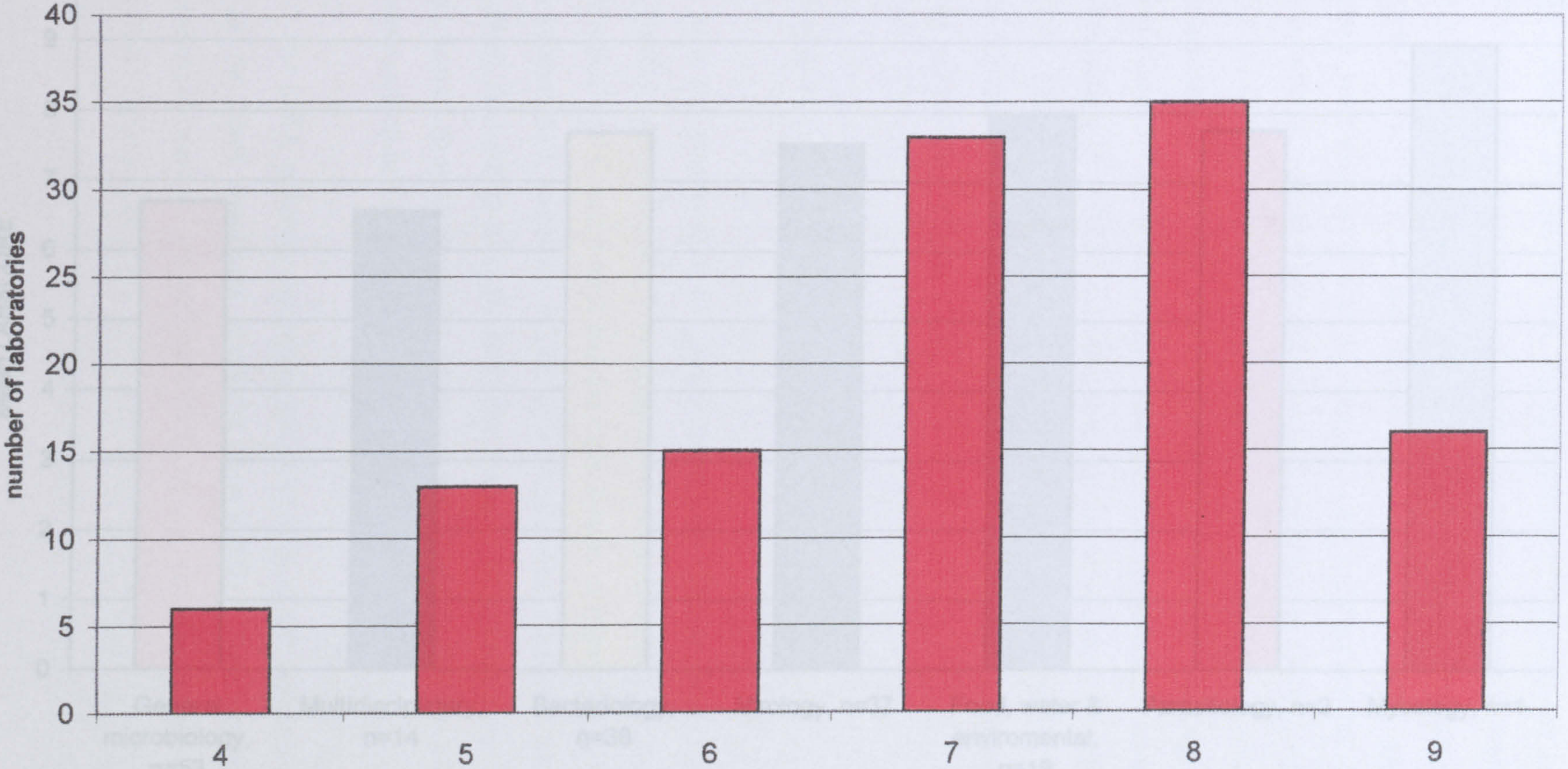
Table 3.6.4: Correlations (r) between the measures of Quality

Quality scale	LABSCORE	QUALSELF	QUALCOLL
LABSCORE	-		
QUALSELF	0.013	-	
QUALCOLL	0.041	0.306**	-
QUALLAB	0.105*	0.219**	0.535**

* $p < 0.05$

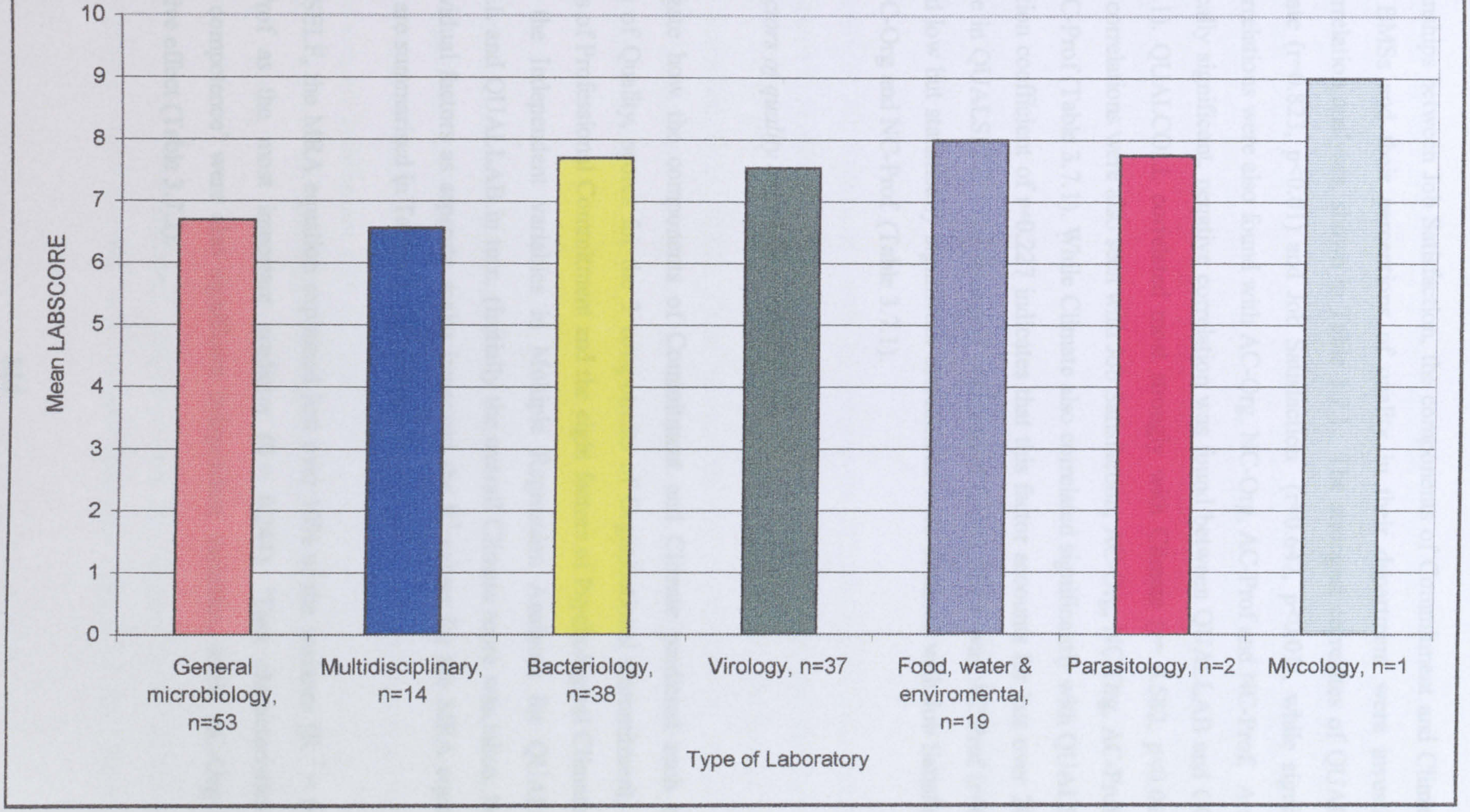
** $p < 0.001$

Figure 3.6.1: Distribution of LABSCORE results
n=118*



* 86 NHS, Private and University departments; overall means from 32 PHLs

Figure 3.6.2: Comparison of mean LABSCORE by type of laboratory



3.7 Factors predicting Quality

3.7.1 Correlations between occupational psychology factors and quality scales

The relationships between Job Satisfaction, the components of Commitment and Climate for individual BMSs and their perceptions of quality in their department were investigated through correlation analyses, shown in Table 3.7.1. The strongest correlates of QUALLAB were Climate ($r=0.823$, $p<0.01$) and Job Satisfaction ($r=0.647$, $p<0.01$), while significant positive correlations were also found with AC-Org, NC-Org, AC-Prof and NC-Prof. A small, but statistically significant, negative correlation was found between QUALLAB and CC-Org (Table 3.7.1). QUALCOLL correlated most strongly with Climate ($r= 0.582$, $p<0.01$) and significant correlations were also seen with Job Satisfaction, AC-Org, NC-Org, AC-Prof, CC-Prof and NC-Prof (Table 3.7.1). While Climate also correlated significantly with QUALSELF, the correlation coefficient of $r=0.227$ indicates that this factor accounts for just over 20% of the variance in QUALSELF. The strongest correlate of QUALSELF was AC-Prof ($r=0.256$, $p<0.01$) and low but statistically significant correlations were obtained with Job Satisfaction, AC-Org, NC-Org and NC-Prof (Table 3.7.1).

3.7.2 Predictors of quality among individual BMSs

To investigate how the components of Commitment and Climate predicted each of the perceptions of Quality, scores for the 3 components of Organisational Commitment, the 3 components of Professional Commitment and the eight factors of Psychological Climate were entered as the Independent variables in Multiple Regression Analyses for QUALSELF QUALCOLL and QUALLAB in turn. (Initially the overall Climate score was taken, but use of the individual factors as separate scales improved the R^2 values for the MRA equation). The results are summarised in Tables 3.7.2 - 3.7.4.

For QUALSELF, the MRA equation explained just over 10% of the variance ($R^2 = 0.112$), with AC-Prof as the most important predictor ($\beta = 0.244$). 'Task characteristics' and 'Employee competence' were also significant independent variables, while AC-Org had a small negative effect (Table 3.7.2).

'Co-worker relations' was the most important predictor of QUALCOLL ($\beta = 0.414$), as Table 3.7.3 shows. The overall equation included three other Climate factors, along with NC-Prof ($\beta = 0.099$), AC-Prof ($\beta = 0.091$) and CC-Org ($\beta = 0.073$), which altogether accounted for 41% of the variance in QUALCOLL ($R^2 = 0.414$).

Over 70% of the variance in QUALLAB was explained by the MRA result ($R^2 = 0.727$). No Commitment components emerged as predictors in the equation, but 7 out of the 8 Climate factors were significant independent variables (Table 3.7.4). The most important predictor of QUALLAB was 'Supervisory style' ($\beta = 0.460$), followed by 'Employee competence' ($\beta = 0.271$) and 'Equipment and supplies' ($\beta = 0.159$). 'Task characteristics', 'co-worker relations', 'performance-reward relationship' and 'unfair reward-relationship' were weak predictors of QUALLAB (Table 3.7.4).

3.7.3 Description of interactions between the occupational psychology factors and perceptions of quality

The association of Job Satisfaction with the components of Commitment and Climate has been highlighted in Sections 3.5.2 and 3.5.3. This information was combined with the results from Table 3.7.2 to produce a description of how these occupational psychology factors interact to determine QUALSELF. These interactions are summarised in Figure 3.7.1. Similarly, the relationships among Job Satisfaction, the components of Commitment, the factors of Climate and QUALCOLL and QUALLAB are given in Figures 3.7.2 and 3.7.3 respectively.

As Figure 3.7.1 shows, the components of Commitment that were important in predicting whether an individual BMSs had a positive perception of QUALSELF were the Affective dimensions of both Professional and Organisational Commitment. The strongest influence on each of these was Job Satisfaction (for AC- Prof, $\beta = 0.544$, $R^2 = 0.361$; for AC-Org, $\beta = 0.601$, $R^2 = 0.373$). Job Satisfaction was also the most important predictor of Climate ($\beta = 0.667$, $R^2 = 0.519$).

For QUALCOLL, the most important predictors were the Climate factors of Co-worker relations, Employee competence and Task characteristics (see Table 3.7.3 and Figure 3.7.2),

along with Performance reward relationships. Three components of Commitment also made significant contributions to the predicting of QUALCOLL. These were the Affective and Normative components of Professional Commitment and the Continuance component of Organisational Commitment. Job Satisfaction was the most important predictor of NC-Prof (R^2 = 0.209, β = 0.409) and AC-Prof (R^2 = 0.361, β = 0.544) and Climate (β = 0.667, R^2 = 0.519), as indicated in Figure 3.7.2.

Climate factors were the only predictors of QUALLAB (Table 3.7.4 and Figure 3.7.3). Job Satisfaction was the most important independent variable in the MRA equation describing BMSs' perceptions of Climate (R^2 = 0.519, β = 0.667), while 5 of the Climate factors predicted Job Satisfaction. This relationship is discussed in detail in Section 3.5.3 and illustrated in Figure 3.5.1.

3.7.4 Investigation of the relationship between Laboratory Climate and Laboratory Quality

From Figure 3.7.3, it is clear that there was a strong link between Climate and the measures of laboratory quality QUALLAB and LABSCORE, as reported by individual BMSs in this study. To determine whether there was a relationship between the Climate in a particular department (i.e. 'Laboratory Climate') and these indicators of laboratory quality, Climate and QUALLAB scores from respondents who worked in the same laboratory were aggregated. It was considered that a reliable picture of Laboratory Climate would only be given where a Climate score was available from 50 per cent or more of the total number of BMSs in the department (as stated by the laboratory manager). Twenty four (non-PHL) laboratories met this criterion and had also returned a 'LABSCORE' sheet. This cut-off excluded some larger laboratories where a substantial number of responses (but less than 50%) had been received. It was decided to also include cases where 9 or more colleagues had given a climate score, where the number of BMSs in that laboratory was greater than 20. This cut-off yielded a further 5 (non-PHL) laboratories. The mean Laboratory Climate and Laboratory QUALLAB scores and the corresponding LABSCORE for each of the 29 selected laboratories are shown in Table 3.7.5.a. Two of these were multidisciplinary laboratories in private hospitals and one was a university diagnostic parasitology department, while the remaining laboratories were in NHS hospitals. There was one virology laboratory, three bacteriology laboratories and 22 were general microbiology departments (Table 3.7.5.a).

To confirm that the results from the individual staff members in each department were sufficiently close to each other to justify aggregation, the Within-Group Interrater Reliability Test was used. The general formula for the estimate of Interrater Reliability ($r_{WG(J)}$) is given and explained in Section 2.4. In this case, it was applied firstly to the Supervisory style factor of the Climate scale, which had 12 items, therefore J = 12. The whole Climate scale was not used in this calculation because a value of 37 for J would be too large for the other variables to have any effect. Since a 5-point response format was used in the Climate section of the questionnaire, A=5 and it follows that $\sigma_{EU}^2 = 2$. Thus, for aggregating the Supervisory style scale, the formula given in Methods became:

$$r_{WG(J)} = \frac{12\,(1\text{-mean of variances}/2)}{12\,(1\text{-mean of variances}/2) + (\text{mean of variances}/2)}$$

For the QUALLAB scale, J =10 and the value for A was also 5, so $\sigma_{EU}^2 = 2$. Thus, for aggregating the QUALLAB scale, the formula given in Methods became:

$$r_{WG(J)} = \frac{10\,(1\text{-mean of variances}/2)}{10\,(1\text{-mean of variances}/2) + (\text{mean of variances}/2)}$$

As Table 3.7.5.a indicates, the results for $r_{WG(J)}$ for both scales were above the cut-off value of 0.7 in all cases, indicating that according to this estimate of Interrater Reliability, aggregation of the Climate and QUALLAB scores from these group of colleagues was justified.

To confirm that the scores reported by colleagues in the same laboratory were sufficiently different from staff in other laboratories to say that each had its own climate, One-way ANOVAs were performed on the individual scores from all BMSs in selected laboratories. Significant differences were found between reported scores according to laboratory for Supervisory style ($F_{28,178} = 3.037$, $p<0.01$), QUALLAB ($F_{28,178} = 2.973$, $p<0.01$) and Climate ($F_{28,171} = 3.288$, $p<0.01$), indicating that Climate in at least some labs is different from some others.

The relationships between Laboratory Climate and LABSCORE and Laboratory QUALLAB and LABSCORE for these 29, non-PHL laboratories are presented graphically in Figures 3.7.4.a and 3.7.5.a respectively.

For the PHLs, LABSCORE sheets had been returned from the Virology, Bacteriology, Mycology and Food, Water and Environmental sections, rather than the whole PHL. Therefore the investigation of laboratory Climate and laboratory quality was conducted using results from individual sections. Due to this difference in organisational structure from the other participating laboratories, these analyses for PHLs were conducted separately. Taking the criterion of Climate scores having been reported by 50% or more BMSs, along with a returned LABSCORE sheet, produced 8 eligible sections. As was the case for the non-PHL laboratories, this cut-off excluded some larger sections where a substantial number of responses (but less than 50%) had been received. It was therefore decided to also include cases where a climate score was available from 10 or more colleagues, provided that number of BMSs in that section was greater than 20. This led to the inclusion of a further 4 sections. The mean Laboratory Climate and Laboratory QUALLAB scores and the corresponding LABSCORE for each of the 12 selected sections of PHLs are shown in Table 3.7.5.b. The number of sections within a particular PHL that fulfilled the criteria for inclusion varied from 0 to 3. Seven of the selected departments were bacteriology sections, three specialised in virology and there was one mycology and one food, water and environmental microbiology section.

The Within-Group Interrater Reliability Test was applied to the Supervisory style factor of the Climate scale and the QUALLAB scale for groups of colleagues in these 12 PHL sections, exactly as described above. The results for $r_{WG(J)}$, which are shown in Table 3.7.5.b were all above the cut-off of 0.7.This confirms that for all these sections, the aggregated scores were a reliable estimate of the Laboratory Climate and Laboratory QUALLAB experienced by the BMSs employed there.

To confirm that the scores reported by colleagues in the same PHL section reflected the climate in that particular section, than a more general impression of the PHLS climate, One-way ANOVAs were performed on the individual scores from all BMSs in selected sections. The result for Supervisory style indicated that the differences between sections were not statistically significant ($F_{11,84} = 1.463$, $p>0.1$). However, significant differences were found between reported scores according to section for QUALLAB ($F_{11,82} = 1.963$, $p<0.05$) and Climate ($F_{11,82} = 1.972$, $p<0.05$). Since the next part of the analysis concerned aggregated scores for the whole Climate scale and QUALLAB, it was considered acceptable to continue with the results from PHL sections. For these 12 PHL sections, the relationships between

Laboratory Climate and LABSCORE and Laboratory QUALLAB and LABSCORE are presented graphically in Figures 3.7.4.b and 3.7.5.b respectively.

The overall correlations between Laboratory Climate, Laboratory QUALLAB and LABSCORE for the non-PHL laboratories and the PHL sections are shown in Table 3.7.6. This shows that there were positive relationships between all three scores, for both groups of laboratory. Although the correlation coefficient between LABSCORE and Laboratory QUALLAB for the PHL sections was high ($r = 0.539$), it was not statistically significant ($p > 0.05$).

Table 3.7.1: Correlations between occupational psychology factors and quality scales

	QUALLAB	QUALCOLL	QUALSELF
Job Satisfaction	0.647**	0.436**	0.144**
AC-Org	0.457**	0.376**	0.145**
CC-Org	- 0.074*	0.047	-0.034
NC-Org	0.364**	0.327**	0.095*
AC-Prof	0.387**	0.374**	0.256**
CC-Prof	0.025	0.112**	0.040
NC-Prof	0.300**	0.309**	0.101*
Individual Climate	0.823**	0.582**	0.227**

* $p<0.05$; ** $p<0.01$

Table 3.7.2: Results of Multiple Regression Analysis to determine predictors of individual BMSs assessment of the standards of their own work, QUALSELF

Dependent variable: QUALSELF	
Independent variable	β
AC-Prof	0.244
Task characteristics	0.139
Employee competence	0.110
NC-Org	-0.099

$R^2 = 0.112$, $F_{4,734} = 23.1$, $p<0.001$

Table 3.7.3: Results of Multiple Regression Analysis to determine predictors of individual BMSs perceptions of the quality of work among their colleagues, QUALCOLL

Dependent variable: QUALCOLL	
Independent variable	β
Co-worker relations	0.414
Task characteristics	0.137
Employee competence	0.164
Performance - reward relationships	0.099
NC-Prof	0.093
AC-Prof	0.091
CC-Org	0.073

$R^2 = 0.494$, $F_{7,728} = 101.4$, $p<0.001$

Table 3.7.4: Results of Multiple Regression Analysis to determine predictors of individual BMSs perceptions of the quality of work in their laboratory, QUALLAB

Dependent variable: QUALLAB	
Independent variable	β
Supervisory style	0.460
Employee competence	0.271
Equipment and supplies	0.159
Task characteristics	0.089
Co-worker relations	0.077
Performance-reward relationship	0.063
Unfair reward relationship	0.050

R^2 =0.727, $F_{7, 722}$ = 274.3, p<0.001

Figure 3.7.1: Commitment and Climate components important in predicting an individual BMSs assessment of their own work, QUALSELF

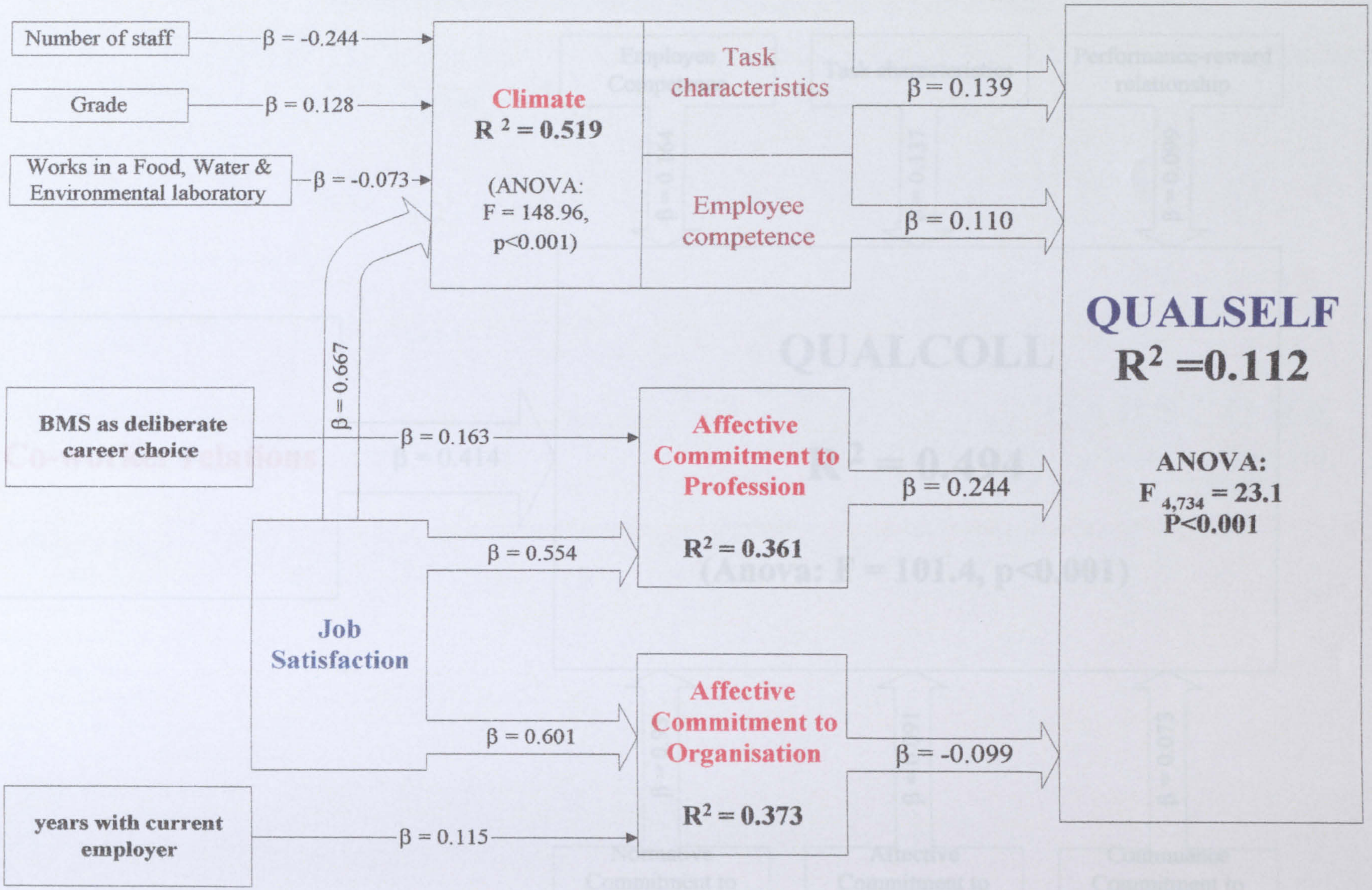


Figure 3.7.2: Climate and Commitment components predicting BMSs attitude towards the quality of work of their colleagues, QUALCOLL

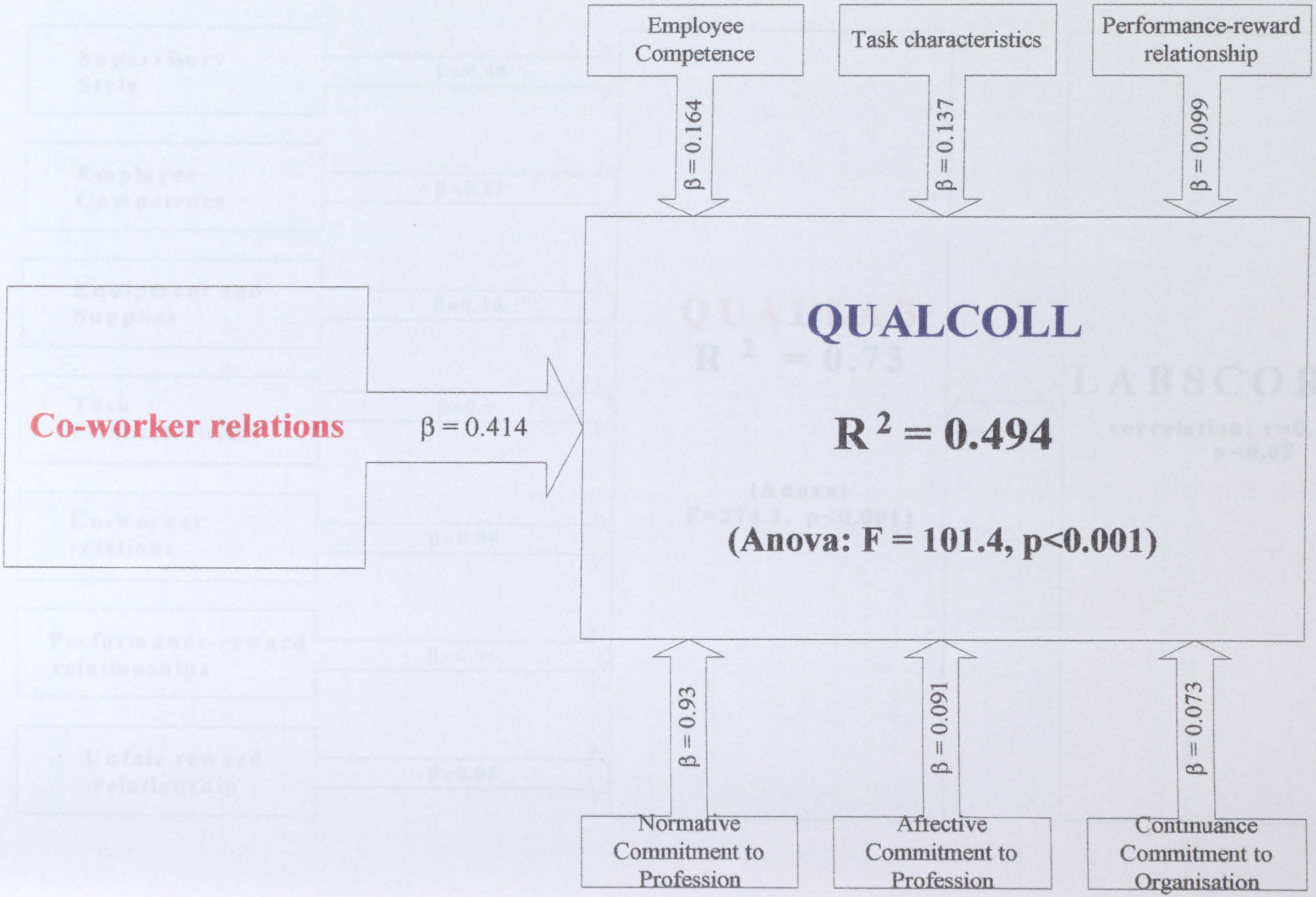


Figure 3.7.3: Aspects of Climate predicting a BMSs perception of the quality of work in their laboratory, QUALLAB and the relationship with manager's rating, LABSCORE

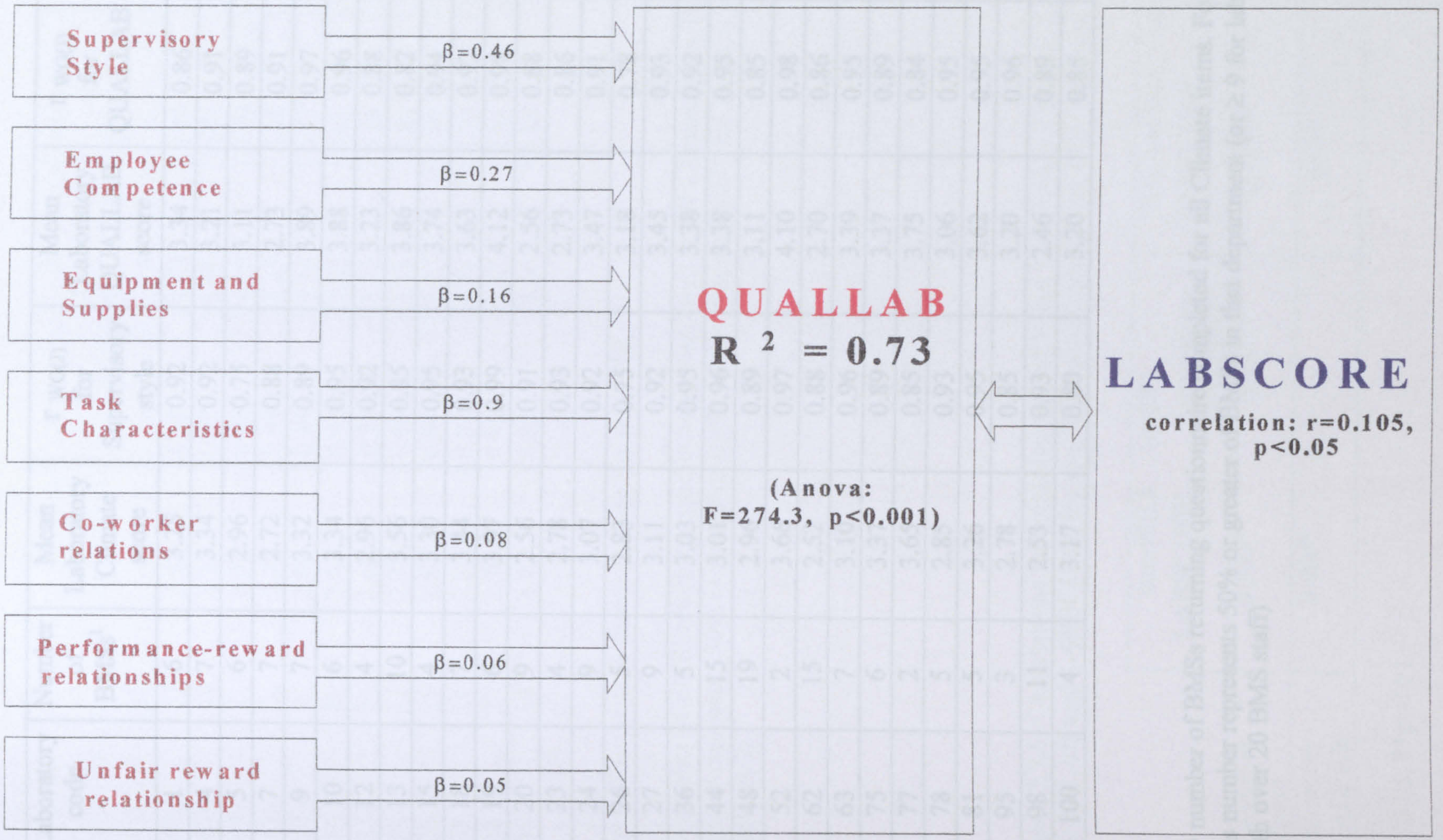


Table 3.7.5.a: Aggregated Laboratory Climate and QUALLAB scores for eligible non-PHL laboratories

Laboratory code	Number of BMSs[1]	Mean Laboratory Climate score	$r_{WG(J)}$ for Supervisory style	Mean Laboratory QUALLAB score	$r_{WG(J)}$ for QUALLAB	LABSCORE
1	6	3.25	0.92	3.34	0.86	8.00
4	7	3.34	0.92	3.21	0.91	7.00
5	6	2.96	0.75	3.11	0.89	7.00
7	7	2.72	0.88	2.73	0.91	8.00
9	7	3.32	0.89	3.89	0.97	8.00
10	6	3.34	0.95	3.88	0.96	9.00
12	4	2.96	0.92	3.23	0.88	6.00
13	10	3.56	0.85	3.86	0.82	7.00
15	4	3.30	0.95	3.74	0.94	5.00
18	7	3.44	0.93	3.63	0.92	5.50
19	6	3.97	0.99	4.12	0.98	8.00
20	9	2.56	0.91	2.56	0.88	5.00
23	4	2.78	0.93	2.73	0.86	7.00
24	9	3.07	0.92	3.47	0.91	6.00
26	5	2.83	0.75	3.18	0.78	4.00
27	9	3.11	0.92	3.45	0.93	9.00
36	5	3.03	0.95	3.38	0.92	5.00
44	15	3.01	0.96	3.38	0.95	7.00
48	19	2.96	0.89	3.11	0.85	5.00
52	2	3.66	0.97	4.10	0.98	8.00
62	15	2.52	0.88	2.70	0.86	4.00
63	7	3.10	0.96	3.39	0.95	9.00
75	6	3.37	0.89	3.37	0.89	7.00
77	2	3.65	0.85	3.75	0.84	7.00
78	5	2.85	0.93	3.06	0.95	7.00
81	5	3.26	0.95	3.62	0.95	8.00
95	3	2.78	0.85	3.20	0.96	7.00
98	11	2.53	0.93	2.46	0.89	6.00
100	4	3.17	0.80	3.20	0.85	6.00

[1] = number of BMSs returning questionnaire completed for all Climate items. For each case, this number represents 50% or greater of BMSs in that department (or ≥ 9 for laboratories with over 20 BMS staff)

Table 3.7.5.b: Aggregated Laboratory Climate and QUALLAB scores for eligible sections of PHLs

Laboratory code[1]	Number of BMS[2]	Mean Laboratory Climate score	$r_{WG(J)}$ for Supervisory style	Mean Laboratory QUALLAB score	$r_{WG(J)}$ for QUALLAB	LABSCORE
107a	11	2.92	0.93	3.27	0.92	8
107b	14	2.95	0.92	3.56	0.91	9
107c	2	3.07	0.98	4.10	0.99	9
112a	2	3.00	0.99	3.25	0.98	8
112b	7	2.89	0.86	3.36	0.87	7
116	8	2.52	0.92	2.60	0.91	7
123a	3	2.68	0.74	3.33	0.88	6
124	11	2.74	0.90	3.18	0.80	7
126	16	2.87	0.94	3.23	0.89	8
133	11	3.22	0.97	3.74	0.95	9
138	2	2.78	0.98	2.65	0.93	8
141	14	2.90	0.85	3.06	0.86	7

[1] = suffixes denote sections within the same PHL

[2] = number of BMSs returning questionnaire completed for all Climate items. For each case, number represents 50% or greater of BMSs in that section (or ≥10 for sections with over 20 BMS staff)

Table 3.7.6: Correlations between aggregated mean Laboratory Climate, Laboratory QUALLAB and LABSCORE for non-PHL laboratories and PHL sections

	non-PHLs (n=29)		PHL sections (n=12)	
	LABSCORE	**Laboratory QUALLAB**	**LABSCORE**	**Laboratory QUALLAB**
Laboratory Climate	0.393*	0.908**	0.750**	0.758**
Laboratory QUALLAB	0.409*		0.539	

* $p<0.05$, ** $p<0.01$

3.7.5 Confirmation of the relationship between Laboratory Climate, QUALLAB and performance on NEQAS.

Since the PHL had been cooperative with the first questionnaire survey and members of staff at the QAL had been very involved in the development of the items for the quality scales, it was anticipated that they would be willing to help with this work. During a series of discussions with the QAL staff, they expressed their interest in the aims of the study. However, it is NEQAS policy not to send anything with the unknown specimens, as burdening laboratory staff with more than the minimum of information could potentially reduce participation rates. Also, despite the assurances by the researcher that every possible safeguard would be in place, there were concerns about the disclosure of information about individual laboratory's NEQAS score, which is currently confidential. Discussions with three laboratory mangers, from different specialities and geographical areas, confirmed that they would be uncomfortable with the idea of QAL providing such private results to a third party. Due to these concerns, this part of the study could not be taken further.

Figure 3.7.4.a: Aggregated Laboratory Climate score by Labscore for non-PHLs, n=29

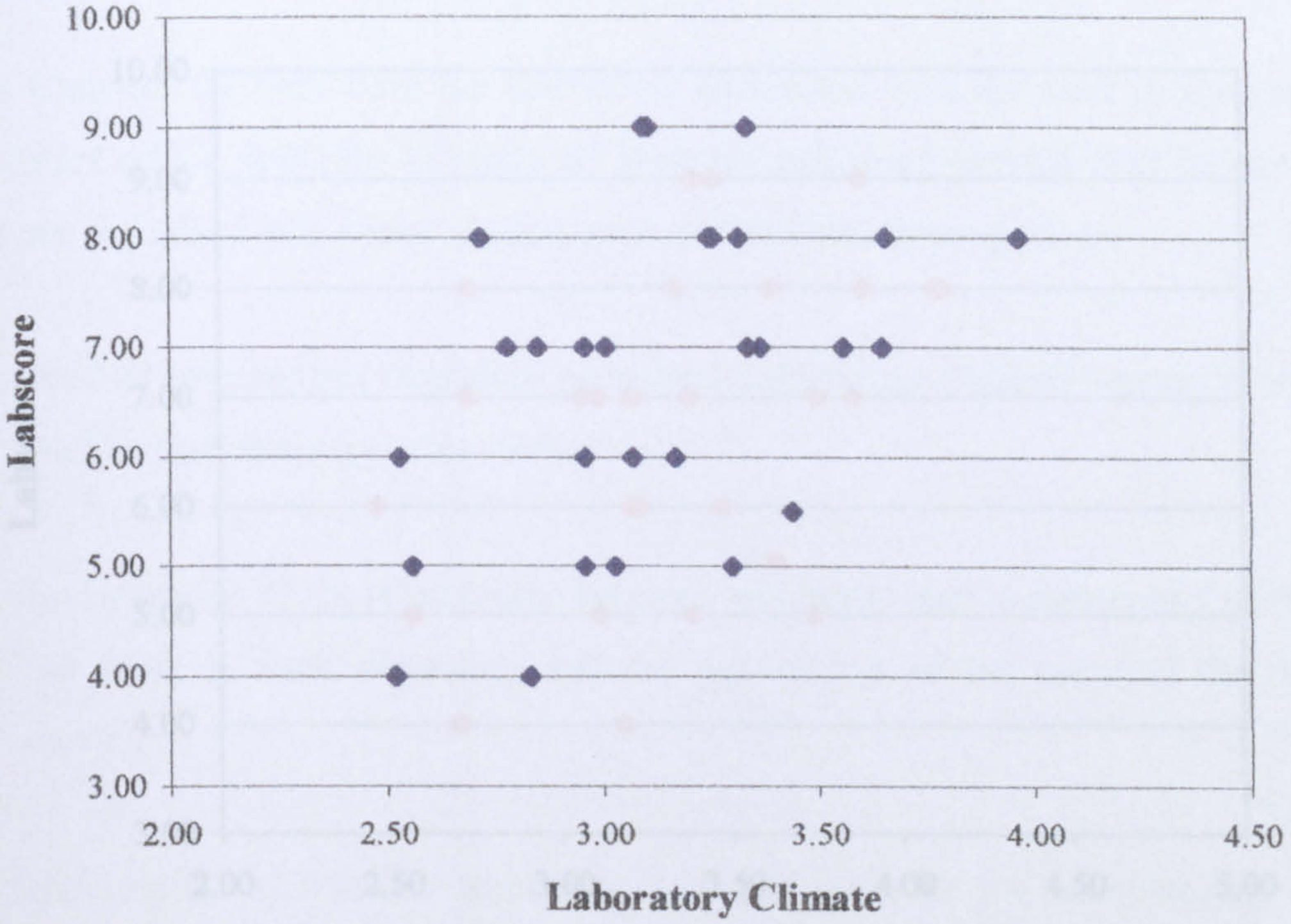


Figure 3.7.4.b: Aggregated Laboratory Climate score by Labscore for PHL sections, n =12

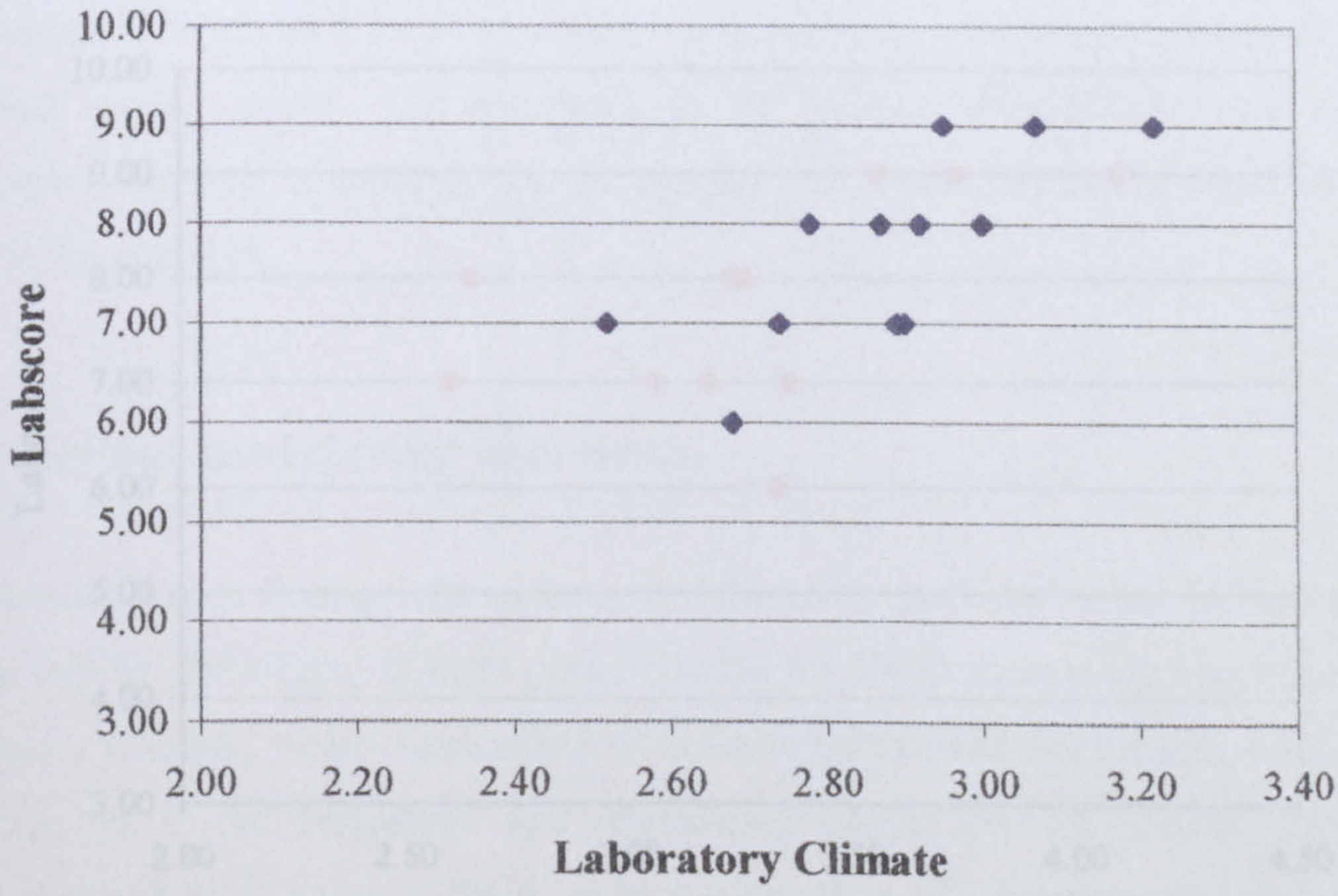


Figure 3.7.5a: Aggregated Laboratory QUALLAB score by Labscore for non-PHLs, n=29

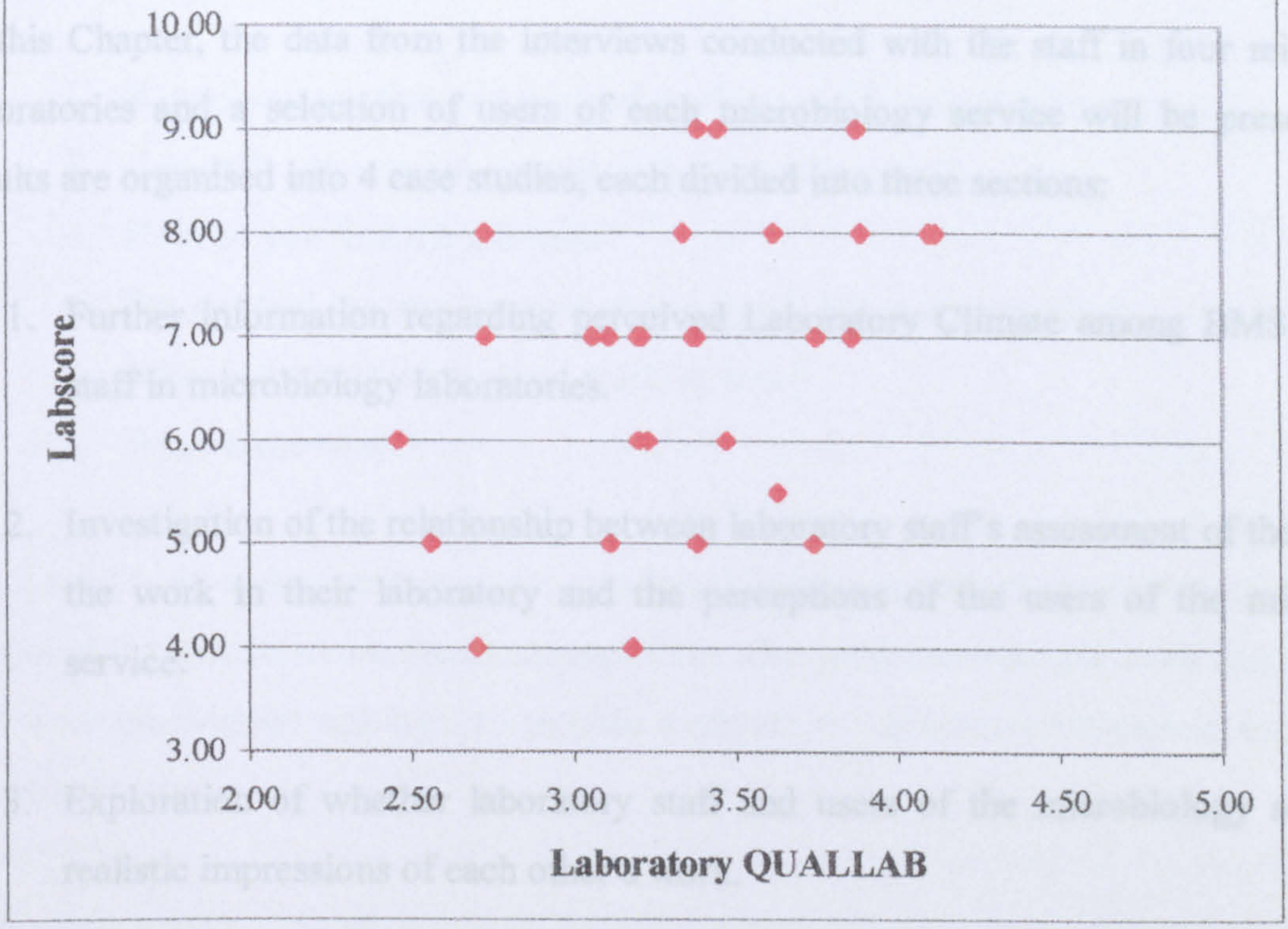
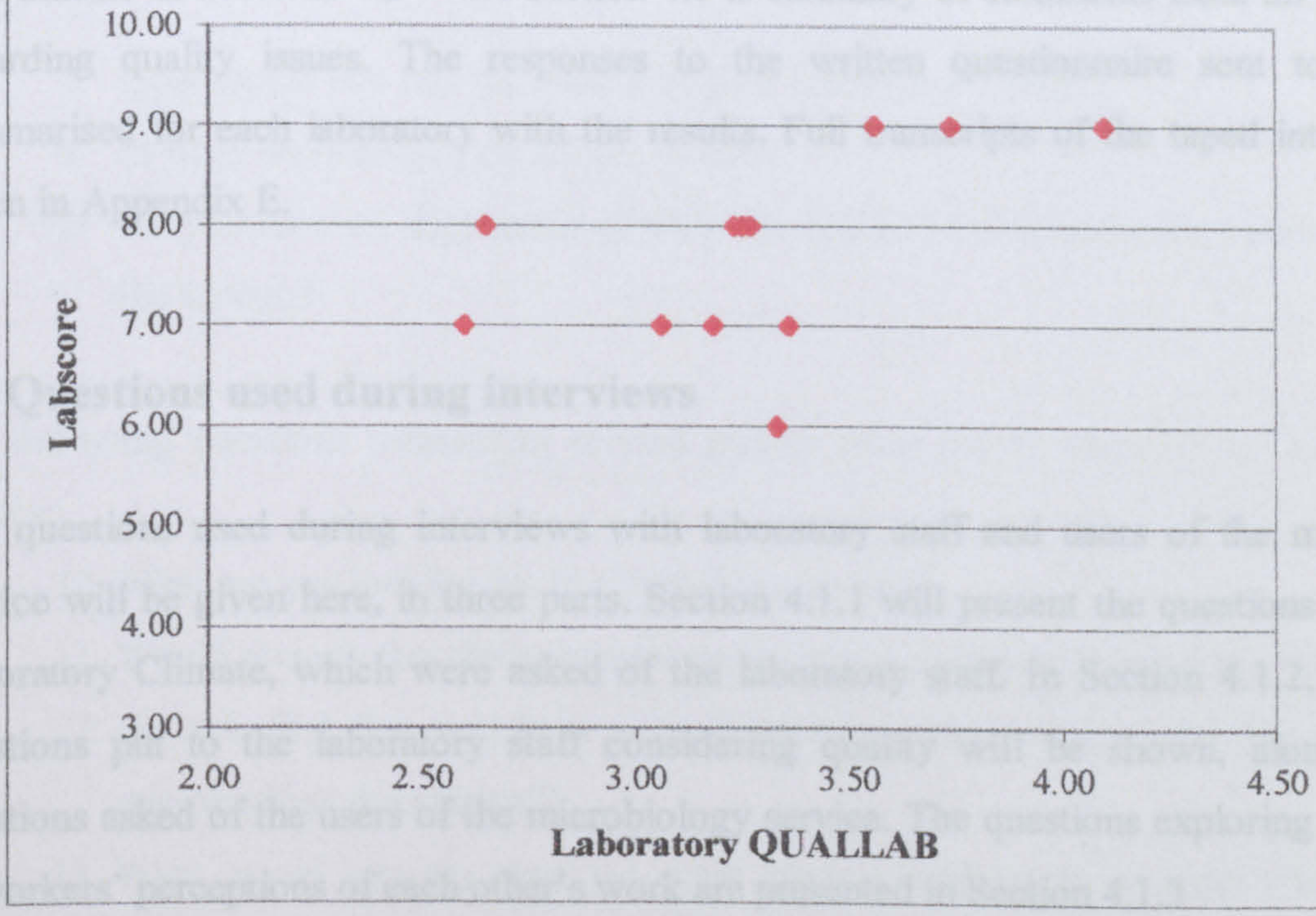


Figure 3.7.5.b: Aggregated Laboratory QUALLAB score by Labscore for PHL sections, n=12



CHAPTER 4: CASE STUDIES

In this Chapter, the data from the interviews conducted with the staff in four microbiology laboratories and a selection of users of each microbiology service will be presented. The results are organised into 4 case studies, each divided into three sections:

1. Further information regarding perceived Laboratory Climate among BMS and other staff in microbiology laboratories.

2. Investigation of the relationship between laboratory staff's assessment of the quality of the work in their laboratory and the perceptions of the users of the microbiology service.

3. Exploration of whether laboratory staff and users of the microbiology service had realistic impressions of each other's work.

The questions that were used during the interviews of laboratory staff and in the questionnaire sent to users of the microbiology service are shown in Section 4.1. The results are presented as case studies in Sections 4.2 - 4.5. Section 4.6 is summary of comments from all participants regarding quality issues. The responses to the written questionnaire sent to users are summarised for each laboratory with the results. Full transcripts of the taped interviews are given in Appendix E.

4.1 Questions used during interviews

The questions used during interviews with laboratory staff and users of the microbiology service will be given here, in three parts. Section 4.1.1 will present the questions concerning Laboratory Climate, which were asked of the laboratory staff. In Section 4.1.2, the sets of questions put to the laboratory staff considering quality will be shown, along with the questions asked of the users of the microbiology service. The questions exploring each group of workers' perceptions of each other's work are presented in Section 4.1.3

4.1.1 Questions concerning Laboratory Climate

The questions considering Laboratory Climate were derived from the dimensions of the PWE (See Section 3.4.1) which emerged as important for BMSs. These were:

1. Would you say that you enjoyed working in this hospital/department?
2. Generally, do you get on well with your colleagues?
3. How do you find the job itself?
4. Do you find the management style helpful, fair and supportive?
5. What is the best thing about working here?
6. What is the worst?

The issue of pay and rewards was not mentioned in these questions, as they are not under the control of the individual laboratory management. The questions were put to all laboratory staff who were interviewed and used to provide a picture of Laboratory Climate in each of the 4 departments studied.

4.1.2 Questions concerning Laboratory Quality and Service Quality

The questions used during interviews with laboratory staff concerning Laboratory Quality were:

7. How would you rate the quality of your laboratory's work?
8. In what ways do you contribute to that?
9. Do you have an impression of what the users of the microbiology service think of the service?

The following questions concerning service quality were put to users of the microbiology service:

10. What are you looking for in a Pathology service?
11. Would you say that the microbiology department at your hospital provides these?
12. Do you feel that you have a good working relationships with the staff in the microbiology department?
13. What would you say were the most important issues to consider when thinking about quality of service in healthcare?

The responses to these questions were collated, to assess whether the perception of the laboratory staff about the quality of their work was similar to the users' opinions. The issues mentioned in reply to question 13 are listed for all users in Section 4.6, rather than forming part of the individual case studies.

4.1.3 Questions concerning the perceptions of laboratory staff and users regarding each other's work

The following questions were asked of laboratory staff considering the users' perceptions of the work of the laboratory and the staff and *vice versa*:

14. Do you have a feel for the users' perceptions of biomedical scientists' work?
15. Do you think you have a realistic view of the work of doctors and nurses?

The questions put to users of the microbiology service considering their perceptions of the work of laboratory staff and *vice versa* were:

16. Do you think that you have a realistic idea of the work that goes on in a clinical microbiology laboratory?
17. Do you think that the staff in the microbiology department have a realistic view of your job?

The responses to these questions were used to assess the level of understanding that service providers and users had of each other's work.

4.2 Case study 1, Laboratory C

Laboratory C was the microbiology department of a small NHS Trust Hospital in the South of England. This laboratory was part of a small district general hospital in a residential area, with a low turnover of residents. Therefore there was a high likelihood that staff would be related to or acquainted with some other employees of the hospital and patients. The laboratory was situated in the main building of the hospital. On walking around the site, the researcher observed a friendly atmosphere.

Ten staff were employed in Laboratory C and all agreed to be interviewed on tape. Their demographic details are summarised in Table 4.2.1.a. Three users of the service were interviewed during the visit to the hospital and a further four (out of the five contacted) responded to the postal questionnaire. Their details are shown in Table 4.2.1.b

4.2.1 Description of Climate in Laboratory C

The laboratory was a single, uncluttered room, which was laid out so that there was plenty of space between each work bench. The head BMS's and consultant's offices had been built to be part of the laboratory and their doors were always open, allowing easy access by all staff. Everyone addressed and referred to colleagues on first name terms. This indicated that junior members of the department felt at ease with more senior staff and that the managers (i.e. head BMS and consultant) took an interest in everyone who worked in their laboratory. A machine which enabled rapid analysis of single serological specimens had recently been purchased.

The responses to the Laboratory Climate questions are summarised in Table 4.2.2. The results show that there was considerable agreement among staff in Laboratory C about their experience of the aspects of Laboratory Climate. All interviewees commented that they enjoyed working in the hospital and their department. Half of the respondents mentioned the friendly atmosphere and 4 people cited the small size of the laboratory and hospital as reasons for this. All interviewees felt that they had good relationships with the colleagues, with half of them saying that they all get on well. Most people (8) enjoyed their work, with the laboratory manager and infection control nurse specifically mentioning the variety and challenge in their work. The consultant microbiologist was happy with the autonomy that his role gave him. In contrast, two of the BMS1s felt that the work was not challenging enough. The management style was considered by all, except the laboratory manager, to be helpful, fair and supportive.

He felt that communications between staff groups were lacking, but that there was no time for formal meetings.

Eight of the interviewees considered that the best thing about working in Laboratory C was the small friendly atmosphere both in the department and the hospital. Lack of staff was most commonly cited as the worst part of working there, while two BMS1s and the BMS2 also mentioned the low pay.

4.2.2 Perceptions of quality among staff and users of Laboratory C

As Table 4.2.3.a indicates, six of the laboratory staff rated the quality of their laboratory's work as "good" or "very good". These included the infection control nurse and the consultant microbiologist, who would have direct contact with other clinical staff and would therefore be most aware of the consequences for patient care of poor quality work. These two respondents considered their role in communication between the laboratory and the wards and general practitioners' surgeries to be their main contribution to maintaining good quality.

While two staff members felt unable to comment, two of the BMS1s, with experience of working in other microbiology departments, mentioned how good the quality was compared with that of other laboratories. However, the senior BMS and the head BMS both rated the quality as average, due to staff shortages and inadequate financial resources. A majority of interviewees (6) commented that their work was compromised by these factors. The head BMS felt that his responsibility to quality was balancing the requirements of good laboratory practice and service provision against the mental and physical well being of his staff.

The users of the service that Laboratory C provided were most concerned with turnaround times for processing specimens, as this was the requirement from a pathology service cited by all seven respondents (Table 4.2.3.b). Six of them felt that the laboratory provided the service they needed, although one of the general practitioners was obviously frustrated by the lack of implementation of an adequate computer system by the Trust. The infection control nurse and head BMS mentioned that this was imminent, but it was clearly a matter for the Trust management and out of Laboratory C's control. Six out of the seven users considered their relations with the laboratory staff to be good, although one thought that they had insufficient contact to comment.

4.2.3 Laboratory staff and users' perceptions of each other's jobs

Six of the 8 laboratory staff felt that users had no idea about their jobs, while two did not want to comment. Perceptions of their understanding of the work of doctors and nurses divided evenly (Table 4.2.4.a). In contrast, 4 out of the 7 users considered that their impression of the work in a microbiology laboratory was realistic (Table 4.2.4.b). Two do not give a reason for this, but one had experience in a Chemical Pathology laboratory. Five of the users thought that the laboratory staff understood their work, at least to some extent, while two definitely did not (Table 4.2.4.b).

Table 4.2.1.a: Demographic details of staff interviewed from Laboratory C

Staff designation	Number of interviewees	Mean number of years employed in department (range)	Number of females	Number of males
Consultant Microbiologist	1	2	0	1
Head BMS	1	22	0	1
BMS2	1	13	1	0
BMS1	4	4.5 (2.5 - 6)	2	2
Trainee BMS	1	0.75	1	0
MLA	1	0.50	1	0
Infection Control nurse	1	7	1	0
Total	10	-	6	4

Table 4.2.1.b: Demographic details of participating users of Laboratory C

Staff designation	Number of interviewees	Mean number of years in current employment (range)	Number of females	Number of males
Nurse Manager	2	23 (21-25)	2	0
Midwife	1	9	1	0
General Practitioner	4	21 (17 – 26)	0	4
Total	7	-	3	4

Table 4.2.2: Responses of the 10 staff in Laboratory C to questions concerning Laboratory Climate

Question	Comment	Number of people making comment
1	**Yes, I enjoy working in this hospital/department**	**10**
Reasons given	Friendly atmosphere	5
	Small size	4
Other comments	I would not have stayed so long if I didn't!	2
2	**Yes, I get on well with my colleagues**	**8**
Reasons given	We all get on well together	5
	I think we've got a pretty good team	1
Other comments	Increasing workload does put a strain on the relationships	1
	More staff would make a difference	1
3	**I enjoy the work**	**8**
Reasons given	It is interesting	3
	It is varied and challenging	2
	I love microbiology	2
	I have autonomy	1
	It's what I always wanted to do	1
	The hours are flexible, which fits in with my children	1
Other comments	Some interesting work, but a lot of it is routine	1
	For me, it is starting to get mundane	1
4	**Yes, the management style is helpful, fair and supportive**	**9**
Reasons given	Good working relationships	3
	I don't think we sell any one short here	1
Other comments	At the moment, we don't have the management meetings or education and training meetings that we should have, due to the pressure on everyone	1
5	**The best thing about working here is:**	
	Small, friendly hospital and department	8
	Nice area to live and work	2
	I enjoy the science	1
	Introduction of new technologies	1
	Making a difference to patients	1
6	**The worst thing about working here is:**	
	Lack of staff	4
	Low pay	3
	In some respects, the hospital is too small, leaving it vulnerable	2
	Low morale	1

Table 4.2.3.a: Responses of the 10 staff in Laboratory C to questions concerning Laboratory Quality

Question	Comment	Number of people making comment
7	**I would rate the quality of my laboratory's work as:**	
	Very good	2
	Good	4
	Average	1
	Don't know	2
Other comments	Variable due to lack of staff and resources	1
	I have worked in other hospitals and I would say this was the best	2
8	**My contribution to quality is:**	
	Facilitating communication between the laboratory staff and clinical colleagues	2
	Taking responsibility for decisions regarding allocation of resources	1
	Working conscientiously	3
Other comments	We do not have enough staff and resources to do everything as well as we would like	6
9	**Do you have an impression of what the users of the microbiology service think of the service?**	
	I don't know-we don't get any feedback except through phone calls when something has gone wrong	3
	Most think that the service is good	5
Other comments	The ones who understand microbiology think they have a good service, but some users still do not understand that microbiology is a manual process and bugs take time to grow.	1
	If any were unhappy it would be with the reporting system	1
	No – don't feel able to comment	2

Table 4.2.3.b: Responses of the 7 users of the microbiology service provided by Laboratory C to questions concerning Service Quality

Question	Comment	Number of people making comment
10	**What I am looking for in a Pathology service is:**	
	Reliability	5
	Efficiency	2
	Quick turnaround time	7
	Accuracy-good quality control	2
	Appropriate range of tests available	2
	Adequate facilities for collecting samples	1
	Adequate transport of samples	1
	The chance to discuss results with experts when required	1
11	**Does the microbiology department at your hospital provide these?**	
	Yes	4
	Most of the time	2
	No	1
Other comments	No computer access to patients records	1
12	**Do you feel that you have a good working relationships with the staff in the microbiology department?**	
	Yes	6
	I never see them	1

Table 4.2.4 a: Comments from the 8 BMSs in Laboratory C regarding their perceptions and those of the users of the microbiology service about each other's jobs

Question	Comment	Number of people making comment
14	**Do you have a feel for the users' perceptions of biomedical scientists' work ?**	
	They don't know what we do	6
	No-can' t comment	2
Other comments	We are the backroom boys and girls within the hospital	1
	I don't think they care, as long as their results arrive in time	1
	They perceive the laboratory as black box	2
15	**Do you think you have a realistic view of the work of doctors and nurses?**	
	Yes	4
	Probably not	4
Other comments	I think they have very stressful jobs	2
	I think they work under pressure - as we do	2

Table 4.2.4.b: Comments from the 7 users of Laboratory C's microbiology service regarding their perceptions and those of the BMSs about each other's jobs

16	**Do you think that you have a realistic idea of the work that goes on in a clinical microbiology laboratory?**	
	No, probably not	4
	Yes	3
Other comments	I tend to think it is a bit like school chemistry and yet I know it is very much about patient care	1
	As a cadet nurse I worked in a pathology laboratory but that was over 20 years ago, so it's probably out of date now	1
	I have a BSc in Chemical Pathology	1
17	**Do you think that the staff in the microbiology department have a realistic view of your job?**	
	They think we're idiots!	1
	I think they understand the pressures were are under	2
	Yes	2
	To some extent	1
	No	1
Other comments	I think there is a lack of communication between the wards and the laboratory. It would be nice to visit Pathology and meet some people	1

4.3 Case study 2, Laboratory D

Laboratory D was the bacteriology department of a specialist NHS Trust teaching hospital in a major city in England. As the hospital was a specialised reference centre, the patients would come from a wide geographic distribution. Similarly, since it was in an inner city, the majority of staff would not live locally. Although the laboratory was part of the hospital site, it was situated in a new, purpose-built pathology block, remote from the wards.

There were 18 staff in Laboratory D, 12 of whom were BMSs. Six people including the head BMS and consultant microbiologist volunteered to be interviewed. Their demographic details are summarised in Table 4.3.1.a. From the five users of the service that were sent questionnaires, two replied. Their details are shown in Table 4.3.1.b

4.3.1 Description of Climate in Laboratory D

The laboratory felt very busy and looked cluttered. However, the equipment appeared to be up to date. The head BMS's and consultant's offices were easily accessible from the laboratory. The head BMS had only recently been promoted to that post and the consultant microbiologist had joined the department 6 months previously. Therefore the management team was relatively new, but they seemed to have good rapport with each other and the junior staff.

The responses to the Laboratory Climate questions are summarised in Table 4.3.2. They show that the staff in Laboratory D generally agreed about their experience of the aspects of Laboratory Climate. All interviewees commented that they enjoyed working in the hospital and their department. While the laboratory manager found some aspects of her work frustrating, three other people considered the work to be interesting and challenging. One BMS also commented that the relatively small size of the laboratory helped to make working there enjoyable. All interviewees felt that they had good relationships with the colleagues. Dealing with internal and external problems seemed to have brought the staff closer together. Only one of the BMSs interviewed from Laboratory D definitely enjoyed their work. The consultant microbiologist found that the work had conflicting demands. The head BMS felt overwhelmed by paper work, while the other 3 BMSs commented that the work was very routine and some parts of it had become quite boring. The management style was considered by all the BMSs to be helpful, fair and supportive. The consultant microbiologist considered that after only a few months in the job, he could not comment.

The choices of best and worst things about working in Laboratory D were diverse. Two people commented that the best things were the positive atmosphere being proud to part of a hospital with an international reputation. Other comments were more personal, but all reflected the flexible and supportive management style. The most common selection for the worst thing about working in Laboratory D were the low pay for BMSs and the problems with commuting, both of which are external to the department.

4.3.2 Perceptions of quality among staff and users of Laboratory D

All six interviewees from Laboratory D rated the quality of their laboratory's work as "very good" or "mostly good" (Table 4.3.3.a). The head BMS and BMS3 both cited their internal and external quality control results as evidence for this. The laboratory managers (i.e. head BMS, BMS 3 and consultant microbiologist) all considered that communication within the laboratory and with the staff on the wards was their most important contribution to maintaining good quality. In contrast, the three BMS1s felt that their main role was to work conscientiously. All interviewees believed that the users regarded their laboratory's service as good. The head BMS and consultant microbiologist seemed the most unsure about this, considering that the scarcity of complaints suggested that users were generally satisfied.

As Table 4.3.3.b shows, the comments from the users highlighted a range of requirements, including rapid turnaround time. They both felt that Laboratory D provided the service that they needed and that their relations with the laboratory staff were good. This had clearly been enhanced by personal contacts particularly between the medical staff, for example on ward rounds).

4.3.3 Laboratory staff and users' perceptions of each other's jobs

Table 4.3.4.a indicates that 3 of the 5 BMSs felt that the service users probably had no idea about their jobs, while two thought they had some idea, but not a full appreciation. Four of the BMSs considered that they probably did not completely understand the work of doctors and nurses. The two users did feel themselves to be knowledgeable about the work in a microbiology laboratory and that conversely, laboratory staff had at least a reasonable idea of their jobs (Table 4.3.4.b).

Table 4.3.1.a: Demographic details of staff interviewed from Laboratory D

Staff designation	Number of interviewees	Mean number of years employed in department (range)	Number of females	Number of males
Consultant Microbiologist	1	0.5	0	1
Head BMS	1	24	1	0
BMS 3	1	12	0	1
BMS1	3	10 (7 –16)	2	1
Total	6	-	3	3

Table 4.3.1.b: Demographic details of participating users of Laboratory D

Staff designation	Number of interviewees	Mean number of years in current employment (range)	Number of females	Number of males
Hospital Consultant	2	6 (2.5 - 10)	0	2
Total	2	-	0	2

Table 4.3.2: Responses of the 6 staff in Laboratory D to questions concerning Laboratory Climate

Question	Comment	Number of people making comment
1	**Yes, I enjoy working in this hospital/department**	**6**
Reasons given	Aspects of the work are interesting	2
	The work in the hospital is exciting and a challenge	1
Other comments	The laboratory is not too big	1
	Sometimes it is totally frustrating	1
2	**Yes, I get on well with my colleagues**	**6**
Reasons given	We've had problems outside the laboratory which have managed to keep us together and quite close	1
Other comments	We care for each other	1
	There are conflicts, but it is a questions of how you deal with them	1
3	**How do you find the work?**	
Comments	I enjoy the work	1
	I some ways it is interesting, but the range is limited and a lot of it is routine	1
	Repetitive and mundane	2
	Too much paperwork	1
	I seem to be pulled in lots of directions	1
4	**Yes, the management style is helpful, fair and supportive**	**5**
Reasons given	The are always problems, but they seem to be dealt with properly and in good time	2
Other comments	You don't always get back up when you want it	2
	I don't know	1
5	**The best thing about working here is:**	
	The atmosphere within the hospital is good	2
	Being internationally renowned, people want to come and work here	2
	I have small children and management understand my situation	1
	Routine work and relatively low workload	1
	You opinions are valued, whatever grade you are	1
	The chance to lead and innovate	1
6	**The worst thing about working here is:**	
	Lack of recognition for the profession	1
	Low pay	2
	Commuting in to work	2
	So many people working in one room can be hard work	1
	The computer system	1
	Doing 'on call'	1

Table 4.3.3.a: Responses of the 6 staff in Laboratory D to questions concerning Laboratory Quality

Question	Comment	Number of people making comment
7	**I would rate the quality of my laboratory's work as:**	
	Very good	3
	Mostly Good	3
Other comments	Some room for improvement	1
	Our external and internal quality control results are good	2
8	**My contribution to quality is:**	
	Communication between laboratory staff, clinical microbiologists and staff on the wards	3
	Working conscientiously	3
Other comments	Encouraging good quality control	1
	Discussing technical problems in staff meetings	1
	Promoting staff development	1
	Helping to create a positive atmosphere	1
	Implementing changes where necessary	1
9	**Do you have an impression of what the users of the microbiology service think of the service?**	
	Most seem to think that the service is good	4
	Since we do not get many complaints, they seem to think it is good	2
Other comments	We get Christmas cards from all the units!	1
	Many do not realise that it takes 18-24 hours to get a meaningful result from bacterial culture.	1
	It would be nice to get proper feedback	2

Table 4.3.3.b: Responses of the 2 users of the microbiology service provided by Laboratory D to questions concerning Service Quality

Question	Comment	Number of people making comment
10	**What I am looking for in a Pathology service is:**	
	Rapid turnaround time	1
	Colleagues who feel part of the 'treating team'	1
	Appropriate range of tests available	1
	Flexible service	1
11	**Does the microbiology department at your hospital provide these?**	
	Yes	2
Other comments	This has improved recently with the introduction of microbiologists and virologists to ward rounds	1
12	**Do you feel that you have a good working relationships with the staff in the microbiology department?**	
	Yes	2

Table 4.3.4 a: Comments from the 5 BMSs in Laboratory D regarding their perceptions and those of the users of the microbiology service about each other's jobs

Question	Comment	Number of people making comment
14	**Do you have a feel for the users' perceptions of biomedical scientists' work?**	
	Yes, they have a reasonable idea	1
	They don't fully appreciate the work and the problems that we have	1
	No, probably not	3
Other comments	Some don't understand the time scales for bacterial culture	2
	In a biggish hospital, it can be hard to appreciate the work of other departments	1
	We actively encourage people to visit the laboratory	3
15	**Do you think you have a realistic view of the work of doctors and nurses?**	
	Probably not	4
	Yes, I've got a reasonable idea	1
Other comments	I don't think we fully appreciate the work they do and what problems they are faced with	1
	I have never worked on a ward	1

Table 4.3.4.b: Comments from the 2 users of Laboratory D's microbiology service regarding their perceptions and those of the BMSs about each other's jobs

16	**Do you think that you have a realistic idea of the work that goes on in a clinical microbiology laboratory?**	
	Yes	2
Other comments	Their workload has increased dramatically recently	1
17	**Do you think that the staff in the microbiology department have a realistic view of your job?**	
	Yes	1
	Reasonable	1
Other comments	Although most laboratory staff do not come on ward rounds, they are aware of the numbers of patients and their complexity	1

4.4 Case study 3, Laboratory E

Laboratory E was a privately owned laboratory which provided the microbiology service for an NHS Trust Hospital and surrounding general practitioners in the suburbs of a major English city. Changes to the Trust's management of the pathology service 5 years previously, had led to collaboration with a commercial company under a 'Private Finance Initiative'. The microbiology laboratory was part of a purpose built pathology building, situated in an industrial estate three miles away form the main hospital. Tea, coffee and cold drinks were provided free of charge for all staff. The atmosphere within building was very open and friendly, although staff appeared to take their work very seriously. Telephone enquiries to the pathology service were dealt with, as far as possible by a team of receptionists called the 'Client Response Team'. This enabled the telephone to be answered quickly and allowed the laboratory staff to carry out their work without constant interruptions.

There were 15 staff in the department and 11 were available for interview. Their demographic details are summarised in Table 4.4.1.a. Eight users of the service were contacted to request their participation in the study and six returned a postal questionnaire. Their details are shown in Table 4.4.1.b

4.4.1 Description of Climate in Laboratory E

All the rooms seemed bright, airy and clean. The air conditioning system worked well. New, up to date equipment was available to all departments and staff reported that reagents were supplied as required. The microbiology department comprised a series of large rooms, with the head BMS's office adjoining the main laboratory. The consultant microbiologist was based at the hospital, in order to fulfil clinical duties there, but was observed by the researcher during two visits to the laboratory, discussing results and problems with all staff. Although she was interested in the study, it was not possible to arrange an interview the consultant.

The responses to the Laboratory Climate questions are summarised in Table 4.4.2a and continued in Table 4.4.2.b. Although there was considerable agreement among staff in Laboratory E that they experienced the aspects of Laboratory Climate positively, the reasons that they cited for this were quite diverse. Eight of the 11 interviewees said they enjoyed working in Laboratory E, with the interesting work and nice people being the main reasons for this, while three respondents were less enthusiastic (Table 4.4.2.a). The staff all seemed to like

and respect their colleagues. Three people used the word "definitely" in their answer to this question and only one felt it necessary to qualifying their comment. Perceptions of the management style were divided, with 5 respondents considering their managers to be supportive and fair and four feeling that they could do better. One person felt that they were uncaring and unhelpful and one, relatively new, staff member did not want to comment.

The question about the best thing about working in Laboratory E highlighted how much most staff enjoyed it. While one respondent could not give a simple reason, the most frequent comments concerned the people and the work itself. Although three interviewees considered that the stress was the worst aspect of the job and two were unhappy with the way the company operated, other comments reflected personal issues, which were external to Laboratory E (Table 4.4.2.b).

4.4.2 Perceptions of quality among staff and users of Laboratory E

Ten out of the 11 staff rated the quality of their laboratory's work as "good" or "very good" (Table 4.4.3.a). The head BMS and BMS3, who each had wide experience of other types of microbiology laboratory and employer, both considered Laboratory E to be the best they had known. All interviewees seemed to think that their main contributions to quality were working hard and to the best of their ability. While 7 staff made positive comments regarding the users' perception of the service, three said that they did not know what the users' thought, due to lack of feedback to the laboratory. Although the BMS3 considered the consultant microbiologist's feedback to be helpful, the head BMS perceived that he was only involved with problems (Table 4.4.3.a). This is at least partly attributable to the work of the Client Response Team, which was favourably remarked on by one of the users (see Table 4.4.3.b)

The most frequently cited requirements from the users of Laboratory E's service were consistent high quality of work, efficiency, rapid turnaround time and availability of clinical advice (Table 4.4.3.b). All six users felt that they received the service that they needed at least some of the time. Four users considered that they had good relations with the microbiology department, although two commented that they did not have contact with the laboratory staff.

4.4.3 Laboratory staff and users' perceptions of each other's jobs

Only one member of the microbiology staff felt that users understood their work, while the others clearly thought that they did not. Perceptions of their understanding of the work of doctors and nurses were divided (Table 4.4.4.a). Similarly, five out of the six users thought that they probably did not have a realistic idea of the microbiology laboratory's work and *vice versa* (Table 4.4.4.b).

Table 4.4.1.a: Demographic details of staff interviewed from Laboratory E

Staff designation	Number of interviewees	Mean number of years employed in department (range)	Number of females	Number of males
Head BMS	1	15	0	1
BMS2	3	5 (1 – 11)	1	2
BMS1	4	7 (0.7 – 12)	2	2
Trainee BMS	2	2 (1.5 – 3)	0	2
MLA	1	0.9	0	1
Total	11	-	3	8

Table 4.4.1.b: Demographic details of participating users of Laboratory E

Staff designation	Number of interviewees	Mean number of years in current employment (range)	Number of females	Number of males
Hospital Consultant	3	15 (10 – 21)	1	2
Midwife	1	12	1	0
General Practitioner	2	11 (9 – 13)	1	1
Total	6	-	3	3

Table 4.4.2.a: Responses of the 11 staff in Laboratory E to questions concerning Laboratory Climate

Question	Comment	Number of people making comment
1	**Yes, I enjoy working in this hospital/department**	**8**
Reasons given	I enjoy being involved in the practical work	1
	There work is interesting and there is something different every day	4
	The people are nice	3
	It's a good place to work	2
	I love the work	1
	The laboratory is my second home	1
	This department provides a lot of the things that I am looking for	1
	It is challenging and exciting	1
Other comments	I enjoy the work to some extent	3
	I don't really enjoy work, but this department is as good as anywhere I've worked	1
2	**Yes, I get on well with my colleagues**	**10**
Reasons given	I am fairly easy-going and I get on with everybody	2
Other comments	Definitely!	3
	I get on most people most of the time	1
3	**I find the work**	
	Quite routine at times	2
	Interesting	2
	Highly demanding	2
	Stressful	4
	Enjoyable	2
Other comments	I love microbiology-it's is about getting something new every day	2
	The workload is not too much	2
	There are not enough staff to cover for holidays and sickness	3
4	**Yes, the management style is helpful, fair and supportive**	**5**
Other comments	The management style is reasonable, but it could be better	4
	No, they don't care about the stress and pressure we are under	1
	Being relatively new to the department, I can't comment	1

Table 4.4.2.b: Further comments from the 11 staff in Laboratory E concerning Laboratory Climate

Question	Comment	Number of people making comment
5	**The best thing about working here is:**	
	There are opportunities and support to develop the service and introduce new tests	2
	I enjoy microbiology	2
	I enjoy working with my colleagues	3
	I don't know-but I do enjoy it!	1
	I am proud to work for this company	
	We have very up to date equipment, it is easier to get funding for that	1
	Very nice environment	2
	I don't know	1
	The challenge and variety in my work	1
6	**The worst thing about working here is:**	
	The stress	3
	The infrastructure of the company	2
	Travelling to work	2
	Being indoors all day	1
	The food in the canteen	1
	Not being able to get on with some people	1
	I don't know	1
	Few chances for promotion	1

Table 4.4.3.a: Responses of the 11 staff in Laboratory E to questions concerning Laboratory Quality

Question	Comment	Number of people making comment
7	**I would rate the quality of my laboratory's work as:**	
	Very good	6
	Good	4
	Not as good as it should be	1
Other comments	Having worked in the NHS, PHLS and another private laboratory, this has got to be on of the better laboratories I've worked in	1
	Better than anything I've known from working in the NHS	1
	There is a lot of quality control and the results are good	2
	Quality is one of the goals of this company	1
	NEQAS specimens are treated as special, which is hypocrisy as far as I'm concerned	1
8	**My contribution to quality is:**	
	Working conscientiously	7
	Working extra, unpaid hours to keep on top of the work	2
	Lateral thinking!	1
	Organising and documenting of quality auditing	1
9	**Do you have an impression of what the users of the microbiology service think of the service?**	
	I would say they are generally happy	5
	Don't know	3
	The laboratory has a good reputation	1
	We only get involved with the problems!	1
Other comments	Our consultant is very good at providing feedback	1
	I assume that if the service was not good enough, we would not be sent the work	3
	We don't get any feedback; queries are dealt with by the client response team	3

Table 4.4.3.b: Responses of the 6 users of the microbiology service provided by Laboratory E to questions concerning Service Quality

Question	Comment	Number of people making comment
10	**What I am looking for in a Pathology service is:**	
	Consistent high quality of testing	4
	Quick turnaround time	3
	Clinical advice available when required	3
	Efficiency	3
	Accurate results	2
	Good out of hours service	1
	Easy access to results	1
	Positive response to users requirements for changes	1
	Staff pleasant and interested in their work	1
	Reliability	1
	Understanding of GP's problems	1
11	**Does the microbiology department at your hospital provide these?**	
	Yes	3
	Most of the time	2
	To some extent	1
Other comments	Results could always be available quicker	1
	Poor IT reporting system for results	2
	Lack of quality control on certain test	1
	Some difficulties with continuity of clinical advice service	1
	The Client Response Team are very efficient and helpful	1
12	**Do you feel that you have a good working relationships with the staff in the microbiology department?**	
	Yes	4
	Consultant, yes	1
	I do not really have direct contact with laboratory staff	2
Other comments	Very helpful and efficient when contacted	1
	More distant since 'privatisation'	1

Table 4.4.4 a: Comments from the 11 BMSs in Laboratory E regarding their perceptions and those of the users of the microbiology service about each other's jobs

Question	Comment	Number of people making comment
14	**Do you have a feel for the users' perceptions of biomedical scientists work?**	
	They don't have clue!	4
	They don't understand our work	6
	Yes, I think they do know what we do	1
Other comments	They don't seem to understand how long bacterial culture takes	3
	Nobody know who the BMS is- I think this profession deserves more publicity	1
	They want results before the specimens arrive!	2
	Most of them are only interested in the result-not what we do and what goes on in the laboratory.	1
15	**Do you think you have a realistic view of the work of doctors and nurses?**	
	Probably not	4
	Not always, no	3
	Yes, I think so	4
Other comments	I probably understand their job more than they do ours	1
	It is not always easy to see the clinician's point of view-plus the long hours and stress	1
	I have worked on the wards	1
	We are in an exclusion zone from the hospital-we have no contact with the patients	1

Table 4.4.4.b: Comments from the 6 users of Laboratory E's microbiology service regarding their perceptions and those of the BMSs about each other's jobs

16	**Do you think that you have a realistic idea of the work that goes on in a clinical microbiology laboratory?**	
	No, probably not	5
	Yes	1
Other comments	I probably have a very simplistic view of workload and activities	1
	I am not sure that anyone can have a realistic idea of what goes on in another department	1
	I studied with a microbiologist	
17	**Do you think that the staff in the microbiology department have a realistic view of your job?**	
	No	1
	Probably not	2
	I think so, but I am not sure	1
	Yes (certainly the medical microbiologists do)	1
	I don't know	1

4.5 Case study 4, Laboratory F

Laboratory F was the microbiology department of an NHS Trust Hospital in the North of England. The hospital comprised a series of buildings, spread over a large site on the edge of the town and the pathology block was one of these. The hospital was a large district general hospital and part of a Trust which had been involved in a series of mergers during the previous 5 years.

Eight of the 11 staff employed in Laboratory F were interviewed. Their demographic details are summarised in Table 4.5.1.a. Two users of the service responded to the postal questionnaire out of the five who were contacted. Their details are shown in Table 4.5.1.b

4.5.1 Description of Climate in Laboratory F

The department consisted of one large laboratory, where the main bulk of the work was done, with several side areas and smaller rooms for more specialised procedures. Everyone had adequate workspace and there appeared to be a relaxed atmosphere within the laboratory, with plenty of laughter. The consultant's office was one of those small rooms off the corridor. The head BMS and BMS 3 used the next room, which also contained laboratory equipment, as they had been allocated offices in a separate building. The doors to both rooms were open and all staff moved in and out of them freely. The department was struggling to cope with staff shortages, as permanent replacements had not been found for the two BMSs and an MLA who had resigned during the previous twelve months.

As Table 4.5.2 indicates, most staff in Laboratory F felt that they enjoyed their work, had good relationships with their colleagues and were supported by their managers. Four of the 8 respondents liked the work, but a majority (5) considered themselves to be under too much pressure, which was partly due to staff shortages. One BMS did not like working there and considered the management style to be unhelpful.

The comments regarding the best thing about working in Laboratory F mostly reflected that staff felt pleased to be part of a hospital with an apparently bright future. Also they were happy that the department was small enough for everyone to know each other and that they worked well together (Table 4.5.2). Although three people mentioned the local issue of lack of

staff as the worst thing about working in Laboratory F, low pay, low morale and lack of recognition for the profession were more frequently cited.

4.5.2 Perceptions of quality among staff and users of Laboratory F

Most of the staff in Laboratory F (7) rated the quality of their laboratory's work as "good" or "very good" (Table 4.5.3.a). The consultant microbiologist, head BMS and BMS 3 considered their role as managers, providing support to the rest of the staff, as their main contribution to quality, while 4 of the other BMSs thought that working conscientiously was their most important responsibility.

Although the head BMS and consultant microbiologist were among the interviewees who thought that users regarded the laboratory service as good, other BMSs felt that they could not make a judgement, since they never received feedback. The two users of Laboratory F cited aspects of the service which involved direct contact with staff (prompt and pleasant service and expert advice) as important to them. Rapid turnaround times, reliability and flexibility were also mentioned (Table 4.5.3.b). One clearly felt that the laboratory provided the service they needed, although the other thought that the service had declined. They both considered their relationships with the laboratory to be good (Table 4.5.3.b)

4.5.3 Laboratory staff and users' perceptions of each other's jobs

Six of the 8 BMSs in Laboratory F felt that users had no idea about their jobs, while two did not want to comment. Their perceptions of their understanding work of doctors' and nurses' jobs divided evenly (Table 4.5.4.a). Two interviewees gained their impressions from relatives in these professions, while two others had recently been inpatients themselves. A further two BMSs considered the laboratory to be distanced from other aspects of patient care.

The users thought that they probably did not fully understand the work of the microbiology laboratory and while they expected the consultant microbiologist to have a realistic idea of their job, they thought that the BMSs would not (Table 4.5.4.b).

Table 4.5.1.a: Demographic details of staff interviewed from Laboratory F

Staff designation	Number of interviewees	Mean number of years employed in department (range)	Number of females	Number of males
Consultant Microbiologist	1	11	1	0
Head BMS	1	28	0	1
BMS 3	1	16	1	0
BMS2	1	16		1
BMS1	4	9.5 (3 – 19)	3	1
Total	8	-	5	3

Table 4.5.1.b: Demographic details of participating users of Laboratory F

Staff designation	Number of interviewees	Mean number of years in current employment (range)	Number of females	Number of males
Hospital Consultant	2	12 (9 – 15)	1	1
Total	2	-	1	1

Table 4.5.2: Responses of the 8 staff from Laboratory F to questions concerning Laboratory Climate

Question	Comment	Number of people making comment
1	**Yes, I enjoy working in this hospital/department**	**8**
Reasons given	I like the job	4
	We're a good team	2
	I find it a challenge	1
Other comments	I've always enjoyed microbiology	
	I do not particularly enjoy working here	1
2	**Yes, I get on well with my colleagues**	**8**
Reasons given	Everybody gets on well	3
3	**I find the work:**	
Reasons given	Quite frustrating because it is not microbiology	1
	Challenging	1
	Interesting-but we BMSs don't have as much input as we used to	1
	Too much; we are under a lot of pressure	5
Other comments	We are actively recruiting more staff	4
	I love the 'hand-on' side of things	1
4	**Yes, the management style is helpful, fair and supportive**	**7**
Reasons given	It's very much give and take	1
	There are some things I would do differently	1
Other comments	As a manager, I try hard to remember to say 'thankyou' to people	1
	No, the management is not supportive or fair-they ignore problems	1
5	**The best thing about working here is:**	
	The hospital is expanding and going somewhere	2
	The nature of the work-I enjoy microbiology	2
	We are quite a happy bunch of people	2
	The department is not too big, so we know each other quite well and feel part of a team	2
	Contributing to patient care	1
	The department is moving forward	1
	The journey to work is not too bad	1
6	**The worst thing about working here is:**	
	Low pay	5
	Low morale-feeling undervalued	4
	We don't have enough staff to operate properly	3
	Being told "You don't matter, you're a backroom boy"	2
	The work can be frustrating and routine	1
	Finding that you are not as good as you thought you were	1
	Lack of promotion prospects	1

Table 4.5.3.a: Responses of the 8 staff from Laboratory F to questions concerning Laboratory Quality

Question	Comment	Number of people making comment
7	**I would rate the quality of my laboratory's work as:**	
	Very good	1
	Good	6
Other comments	We do more than other laboratories	
	Considering the pressure we are under	2
	The laboratory is moving forward	1
	We do OK in most quality controls, but the specimens are treated differently	1
	We could improve with more staff	2
	The majority of staff take pride in their work	2
8	**My contribution to quality is:**	
	Checking reports and giving clinical interpretation	1
	Working conscientiously	4
	Motivation of junior staff	1
	Trying to keep myself up to date	1
	By making sure the resources and staff are in the right place at the right time	1
Other comments	Having a positive approach to people helps-if people feel happy, then the quality of the work improves	1
9	**Do you have an impression of what the users of the microbiology service think of the service?**	
	Not really	3
	Most think that the service is good	3
	They don't think about it until they don't get the results they want	1
Other comments	We don't get feedback	3
	I don't think we are highly thought of	1
	We come out very well compared to other pathology departments	1

Table 4.5.3.b: Responses of the 2 users of the microbiology service provided by Laboratory F to questions concerning Service Quality

Question	Comment	Number of people making comment
10	**What I am looking for in a Pathology service is:**	
	Prompt and pleasant service	2
	Reliability	1
	Quick turnaround time	1
	The chance to discuss results with experts when required	2
	Flexibility	1
	Contribution to patient management / monitoring	1
11	**Does the microbiology department at your hospital provide these?**	
	Yes	1
	Most of the time	1
Other comments	Service has declined in recent years	
12	**Do you feel that you have a good working relationships with the staff in the microbiology department?**	
	Yes	1
	Only really have contact with medical microbiologist	1

Table 4.5.4 a: Comments from the 8 BMSs from Laboratory F regarding their perceptions and those of the users of the microbiology service about each other's jobs

Question	Comment	Number of people making comment
14	**Do you have a feel for the users' perceptions of biomedical scientists' work?**	
	Quite a lot have no idea at all	3
	I don't think they've got a clue	3
Other comments	They don't realise that for example a urine samples takes 1 – 2 days to process	1
	I don't think they realise how important a cog in the wheel that we are	1
	We don't have any contact with medical staff-we are definitely the "backroom boys and girls"	1
15	**Do you think you have a realistic view of the work of doctors and nurses?**	
	I think so	3
	Probably not	3
Other comments	I have been in hospital recently and you realise that the nurses are under pressure	1
	I have doctors and nurses in my family	2
	From talking to people in other departments on personnel training courses I realise that I do not have much idea about their jobs	1
	We are a bit isolated here and don't really see what's going on in the hospital	1

Table 4.5.4.b: Comments from the 2 users of Laboratory F's microbiology service regarding their perceptions and those of the BMSs about each other's jobs

16	**Do you think that you have a realistic idea of the work that goes on in a clinical microbiology laboratory?**	
	Probably not	1
	Only partly	1
17	**Do you think that the staff in the microbiology department have a realistic view of your job?**	
	The medical staff do, yes	2
Other comments	Others may have little understanding of my work	1

4.6 Summary of comments concerning service quality

In this section, comments made by users and laboratory staff which concern service quality are presented.

Table 4.6.1 summarises the issues that the 17 participating microbiology service users identified as important for quality in healthcare. They show that these hospital doctors, nurses, midwives and general practitioners identified quality control, reliability and accuracy as significant aspects of quality. Communication and team work among all staff were seen as at least as important as issues surrounding patient welfare and accessibility to care (Table 4.6.1).

Table 4.6.2 collates all the points raised by the users (previously shown for each case study – i.e. Tables 4.2.3.b, 4.3.3.b 4.4.3.b and 4.5.3.b) concerning their requirements for a pathology service. 88% of the users considered that their local microbiology department provided the service they needed most or all of the time.

Taking the responses from the 35 laboratory staff interviewed here together, 18 respondents (51%) felt that users thought that their department provided a good service. Only one person perceived their service as poor. 9 of the laboratory interviewees considered that they did not receive sufficient feedback to comment, while three did not want to comment at all. The remaining 4 respondents, which included laboratory managers and senior BMSs, thought that they only heard the complaints, but since these were not continuous, they assumed their service was acceptable most of the time.

Table 4.6.1: Summary of the issues that the 17 microbiology service users considered most important for quality on healthcare

Quality issue	% of users identifying that issue
High quality / quality control	29
Reliability	29
Communication	29
Accuracy	24
Accessibility for all patients	24
Working as a team	24
Priority of patient welfare	18
Acceptability to patients	12
Value for money	12
Efficiency	12
Accountability	12
Drive for continuous improvement	12
Attitude	12
Validity	6
Attainability	6
Evidence-based approach	6
Staff satisfaction	6
Good service provision	6
Good range of services	6

Table 4.6.2: Summary of the microbiology service users' requirements for a pathology service

Requirement	% of users citing that requirement
Rapid turnaround time	82
Accurate and reliable results	53
Expert / clinical advice readily available	47
High quality	24
Appropriate range of tests	24
Flexible service	18
Pleasant and helpful staff	18
Easy / easier access to results	12
Staff interested in their work	6
Staff feel part of 'treating team'	6
Facilities for sample collection	6
Adequate specimen transport	6
Good out of hours service	6
Understanding GP's problems	6

CHAPTER 5: DISCUSSION

This study was an investigation into the ways in which attitudes of BMSs in clinical laboratories might affect the quality of the work produced. Occupational Psychology measures were used to assess Job Satisfaction, Commitment and Climate among staff in clinical microbiology departments. This is the first report of a study exploring the relationships between these perceptions and measures of laboratory quality among BMSs in the UK.

The work involved developing, piloting and distributing a questionnaire to BMSs throughout the UK. This sought to assess their attitudes towards their profession, the job itself, their colleagues, the work environment and quality issues, using quantitative psychometric scales. This was complimented by qualitative data, collected through written comments and interviews. A measure of the technical quality of a laboratory's work was devised and the relationship between the occupational psychology results and the 'scientific' quality explored.

The first part of this chapter (Sections 5.1 - 5.2), will consider the response to the questionnaire survey. In the second part, (Sections 5.3 - 5.7), the discussion will concentrate on the results obtained for Job Satisfaction, Commitment and Climate, their interactions and the possible implications. The third part of this chapter (Sections 5.8 to 5.11) will examine the data regarding quality and how laboratory performance might be affected by the BMSs attitudes towards professional, workplace and quality issues. The quantitative questionnaire results will be supported where appropriate by comments made by BMSs in writing or verbally. Finally, the qualitative data obtained form the case studies will be discussed in Section 5.12.

5.1 Questionnaire Response

Although the style of the survey was likely to be unfamiliar to most recipients, the response was considerable. Altogether 914 replies were received from staff working in 143 laboratories, a response rate of 39%, which exceeded initial expectations. This number of responses is a strong data set for statistical analysis and appears to compare favourably with published studies considered in this thesis. For example, in their study of climate and research excellence among staff in selected departments of 14 British Universities, West *et al.* (1998) received 573 replies (38% response). Four hundred and seventeen Medical Laboratory Technologists (MLTs) in the USA out of 1000 randomly chosen from the professional register returned a postal questionnaire regarding Job Satisfaction (Harmening *et al.*, 1994). Other work, also discussed in this thesis, had higher response rates to questionnaires but lower absolute numbers. Blau and Lunz (1998) reported an initial response of 58% to their survey of MLTs, but drew their conclusions about career development in this group from 457 subjects. In the study which developed the model of Commitment followed in this thesis, 61% of nurses contacted returned questionnaires and 530 were used (Meyer *et al.*,1993). Schneider *et al.* (1998) quoted a response of 64% rather than exact numbers, but their data set from bank employees' questionnaires, investigating Climate, is at least 1300, which appears to be unusually high for this type of study. However, since the bank endorsed the research and it was expected to help improve customer service, most employees may have felt that participation was expected. All these surveys were part of wider studies that had already been running for several years, so the subjects would be likely to be informed about the nature and purpose of the research work and less suspicious about the consequences of filling in a questionnaire.

It could be argued that while all clinical microbiology laboratories in the United Kingdom had an equal chance to be involved in the study, each individual sent a questionnaire was not selected randomly. Information about the discipline that a particular biomedical scientist is trained and practising in is not in the public domain and the chosen method of distribution was considered the most practical way of targeting microbiology staff without breaching anonymity. West *et al.* (1998) reported similar careful selection of specific Universities, departments and staff members for their study of the effect Climate on research excellence, so the approach adopted here is not unprecedented. The methods used to inform BMSs about the study, seek laboratory managers' cooperation and distribute the questionnaires produced a good response rate, which affords credibility to the results.

5.2 Demographic data

The overall gender, age and grade gender distribution of the questionnaire respondents reflected that of the whole population of BMSs in the UK (see Section 3.1). Therefore the study group can be considered a representative sample, giving confidence in any conclusions drawn. In a study involving MLTs (the equivalent professional group in the USA), Blau and Lunz (1998) without quoting exact numbers, gave the mean gender as "1.2" (1=female). This implies that were slightly more female respondents. This is similar to the finding here that 56% of the BMS returning a completed questionnaire were female. However, Harmening *et al.* (1994) reported that 90% of replies to their Job Satisfaction survey among MLTs were from females. Since neither of these studies attempted to survey populations representing all MLTs as in this present study, further comparison of age and grade profiles are not possible.

The finding that the majority of respondents were female in their 30s and 40s and grade 1 is not unexpected, as more women tend to stay in the profession, particularly at lower grades. This is partly because career breaks and part-time employment due to childcare responsibilities make it harder to achieve promotion. As one female BMS1 observed in the free –response section of her questionnaire:

> "Questions assume that there has been employment without break but a lot of women have maternity/child leave"

Female BMSs also perceive that some male managers are prejudiced against promoting women. As one female BMS 1 in her 30s commented:

> "Very few females hold higher management posts.....those that do struggle to be taken seriously by male members of staff.....no way of changing deep seated attitudes to opposite sex"

Another female BMS1 in her 40s pointed out that:

> "Out of a technical staff of 21 only 1 senior grade is female.....I do feel that the playing field in this discipline is far from level and greatly undervalues its female staff"

Another reason why women may be over represented in the lower BMS grades is the relatively poor salary (see Section 5.3). This encourages single people and the main wage earners to either seek promotion within the BMS profession, often requiring geographical relocation, or to change career. Women who have a partner and children are less likely to have opportunities to move or retrain, but do not rely solely on their salary to survive. For example, a female BMS 1 in her 30s wrote:

> "I enjoy my job but I am seriously considering alternatives due to the lack of financial reward and promotion prospects"

The following comments, both written by female trainee BMS1s in their 20s clearly illustrate the point:

> "As a trainee with a First class honours in biomedical science.....I feel very undervalued when I am earning less than a checkout person"

> "Valued? Not at all, hence why I am planning to return to college to train as a teacher"

A male BMS1 in his 20s complained:

> "I love my job - it's something that I've ALWAYS wanted to do - but I'm considering changing careers now - there are no prospects or money in this job"

While a female BMS 1 in her 50s observed:

> "We are constantly losing staff to industry. However as my last MLA increased his salary by £5,000 who can blame them?"

Therefore, from the statistical analysis of the demographic data and the qualitative results from participants suggest that the pattern of age gender and grade distribution among the respondents to this survey can be considered representative of BMSs in clinical microbiology laboratories in the UK.

5.3 Job Satisfaction

The scale used to assess Job Satisfaction among BMSs in this study was chosen for its scientific content and clarity of format. Also its previous use in a study of Medical Laboratory Technologists (MLTS), the equivalent profession in the USA (Blau and Lunz, 1998), allowed direct comparison with the present results. This potential for evaluating the Job Satisfaction results was important, since there is little published data on this perception of work among British BMSs.

The measure generally performed well and produced results as expected. However, 187 respondents apparently interpreted some items as ambiguous or decided they were not applicable and did not answer them. The item most frequently overlooked was "shift requirement". This was likely to have been because most Microbiology BMSs in the UK are not required to work in formal shifts; although laboratories provide an 'out of hours' service for emergencies, participation in this work is voluntary. This item was included to allow comparison of Job Satisfaction scores between BMSs and MLTs and it was anticipated that respondents would understand that their official starting and finishing times would count as their 'shift'. If this measure was to be used for British BMSs in future studies, a modification of this item to, for example: " the hours you are required to work" would be necessary.

BMSs in this study reported positive overall Job Satisfaction, although as Table 5.1 shows, the American MLTs scored almost 9 points higher on exactly the same scale (Blau and Lunz, 1998).

Table 5.1 Results of Job satisfaction scale compared with published data

Study	N	Alpha	Mean	SD
Present study	737	0.86	37.31	7.09
Blau and Lunz, (1998)	599	0.86	46.0	7.5

The American data was collected from recently graduated and registered MLTs, as part of a long-term study of career progression. Therefore they would have been working at the equivalent grade to BMS1. Also their mean age is given as 25, so comparisons with BMSs employed at grade 1 and in their 20s would be more reasonable. The mean score for

respondents in the present study who were BMS1s aged 22-29 was 37.22 (Table 3.2.4). Therefore the results suggest that overall the MLTs seemed to be more satisfied than UK BMSs.

Possible reasons for reduced Job Satisfaction were explored during a preliminary survey by the same research team of 457 MLTs, who had been entered into the professional register 10 years previously (Harmening *et al.*, 1994). The authors did not state the scales used, but reported that 83% of respondents considered that their Job Satisfaction had been "moderate or high" in 1983, while 77% had that level of satisfaction when the questionnaire was administered in 1992. Reasons that the MLTs gave for low job satisfaction "included low wages, working conditions, recognition factors and respect from supervisors" (Harmening *et al.*, 1994, p. 775)

In the present study, three factors emerged as being perceived particularly poorly by respondents to the Job Satisfaction scale. These were 'fringe benefits', 'number of personal growth options' and 'salary'. Most of the survey participants were employed in the NHS, which offers very few fringe benefits for ordinary staff. For example, places in crèches are often limited and relatively expensive (a BMS1 in Laboratory A, pers. comm.), there are no arrangements for Christmas or performance-related bonuses, as in the private sector (the manager of Laboratory C pers. comm.) Most MLTs in the USA are employed in the private sector (Guiles and Lunz, 1995) and would therefore be expected to receive at least some of these benefits.

Poor pay was the most commonly cited reason by BMSs for feeling 'undervalued' (Figure 3.2.2). Therefore some of the difference in Job Satisfaction between BMSs and MLTs might be to be due to disparity in respective salaries. The average salary of MLTs was reported to be above the US national average in 1992, although they did not earn as much as other healthcare professionals with similar qualifications such as nurses and occupational therapists or teachers (Guiles and Lunz, 1995). BMSs salaries are correspondingly lower than those of other graduate healthcare and scientific professionals in the UK, as Table 5.2 illustrates. This compares the starting salary for a BMS1, after completing post-graduate training and registering with the CPSM, with the pay for basic grades of similar professions.

Table 5.2: Starting salaries for newly–registered healthcare and scientific employees in the UK public sector for 1999*

Profession (Grade)	Qualification	Starting salary (post-registration)
Nurse (Grade D)	Degree	£14,400
Speech and Language Therapist (Grade 1)	Degree	£14,236
Physiotherapist (Basic grade)	Degree	£14,845
Civil Service Scientific Officer (Grade C)	Degree	£12- 26,000
Biomedical Scientist (Grade 1)	Degree	£11,500

*source of data : MSF (2000)

Unlike their US counterparts, however, BMSs' pay is also well below that of the national average for graduates. For example a Trainee BMS could expect to start their career on a salary of £7,494 in 1999, which is about half the UK starting salary for public sector graduates of £ 15, 972 (MSF, 2000).

The finding that lack of opportunities for personal growth and career development adversely influenced BMSs' Job Satisfaction was also expected. Staff in clinical microbiology laboratories are required to process ever-increasing numbers of specimens through routine tests, leaving very little time for reflection or study. This point was supported by the qualitative data regarding 'feeling undervalued' (Figure 3.2.2). Many BMSs commented that they had to deal with too much routine work, while feeling that there was no time for studying themselves or training others was also common.

Since the mean scores for BMS1s and BMS2s in the present study were significantly lower than those for other grades, it is likely that these three factors, as well as other issues would be important in their low perception of Job Satisfaction.

While a Trainee BMS is extremely poorly paid compared with other new graduates in the UK (as discussed above), they nevertheless reported experiencing higher Job Satisfaction than their qualified colleagues (Table 3.2.3). This suggests that as they are learning new skills and start to feel a valued member of the laboratory's team, they feel that they are growing as

professionals. This is illustrated by the following comments from female Trainee BMSs is the 22-29 age group:

> " (I am) not considering myself as a professional yet, but see scope for being valued"

> "As a trainee, I am pleased with the time and effort that others have given me, which does make me feel valued"

> "I feel valued as a trainee because of the high level of training I receive"

The higher overall Job Satisfaction for laboratory managers is likely to come from the increased variety in their work, as well as the responsibility and autonomy that they are given, factors which are all accounted for by particular items in the Job Satisfaction scale. Their managerial role would enhance their organisational and administrative skills, for which they are adequately rewarded financially.

As one male BMS4 in his 30s commented:

> "I make a difference to the organization..... more time to think!"

A female BMS3, in her 30s, who was the manager of the a section of a PHL wrote:

> "I feel I do a worthwhile job"

Laboratory managers' comments showed more concern for their staff and the future of the profession than themselves. This written comment from one male BMS 3 in his 40s was typical:

> "Whilst I enjoy my job I hate the treatment / salaries of young junior and basic grade staff"

47% of the questionnaire respondents who completed the Job Satisfaction section were BMS1s, most of whom were females of a range of ages, so a detailed examination of the differences in the levels of Job Satisfaction among subjects is worthwhile. Many BMS1s

expressed a feeling of not being respected as individuals and professionals in the free-response section. For example, a male BMS1 in his 20s commented:

> "management feel churning out specimens is most important - staff are often forgotten"

Older staff had similar perceptions, as illustrated by the remarks of one female BMS1 in her 50s:

> "We do not feel valued at the BMS1 level, only a worktool and not a person"

and a male BMS1 in his 50s:

> "... I feel I am regarded as just a cog in the laboratory machine. As such I only receive attentions when I malfunction!"

The lower satisfaction for male BMS1s in their 20s and 30s was unexpected, because younger people are obliged to spend time gaining experience at the junior grades as part of the normal career progression. The smaller percentage of males at BMS1 and their lack of satisfaction suggests that they try to gain promotion or seek alterative careers more actively than female colleagues. From their written comments, this seems to be the case. Some female BMS1 s did express their dissatisfaction:

> "I do not feel valued as a biomedical scientist"

and

> "nurses are not the only well qualified, overworked, underpaid members of hospital staff"

were both contributions from female BMS1s in their 20s. However, they were also more likely to report feeling valued. For example:

> " In my present post I do feel valued" female BMS1 in 20s

and

> "I do feel valued"

were also comments from female BMS1s in their 20s. While a female BMS1 in her 30s felt that:

> "I didn't realise how much I was valued as a scientist until I went on maternity leave....when I came back I realised I was missed....."

A female BMS1 in her 50s observed:

> "I feel valued.....and I am happy to be an MLSO. Being valued as an individual does not always equate with one's salary"

In contrast, the following were typical of male BMS1s:

> "Like many biomedical scientists I entered the profession out of interest.....I feel that I will have to leave the profession very soon as I wish to live a higher standard of life both in material and personal development terms"

wrote a male BMS1 in his 20s. One male BMS1 in his 30s commented:

> "I feel no value at all in my profession"

while another remarked:

> "I feel as if pathology in general is regarded as a "test factory"- sample in - results out. There is a wealth of knowledge and expertise which is largely unused (in my employment at least)."

and a male BMS1 in 40s considered himself to be:

> "overworked, underpaid and undervalued"

The factors affecting Job Satisfaction among British BMSs are important and should be explored further. In this study, as in many others, Job Satisfaction has been assessed because of its potential influence on other Occupational Psychology perceptions and performance

measures. In this case, these were Commitment, Climate and Quality. These relationships will be explored in Section 5.8

5.4 Qualitative comments

The use of qualitative data to support quantitative results is widely practiced by occupational psychologists (Oppenheim, 1992). In this study, the collection of the comments made in the free-response section of the questionnaire into three categories proved to be a useful way of organising the data. It allowed common themes under the broad headings of 'Valued', 'Not valued' and 'Improvements' to emerge (see Section 3.2.6). This highlighted BMSs' main reasons for feeling fulfilled, as well as frustrated, in their professional lives, and their hopes and concerns for the future of pathology. Proctor and Wright (1998) similarly included two 'open' questions as part of a questionnaire designed to collect quantitative data from a group of ante- and post-natal women. These subjects were asked to comment on their feelings about the maternity care that they had received and whether anything had "impressed" or "bothered" them. These authors reported that 71% of the respondents made comments in the open section, (Proctor and Wright, 1998), while 81% of the BMSs in the present study did so (Section 3.2.6). These high rates of response show that participants usually value the opportunity to describe their feelings in their own words. Data collected in this way can be useful because it can highlight areas that respondents considered important but which were not addressed in the quantitative section of a questionnaire. Tick-box scales, such as those used in this study, can be focussed on one particular perception, which is necessary to answer some research questions. However, an individual person's reaction to their situation, for example as an employee or a customer, is likely to comprise a mixture of feelings. In the context of maternity services, Proctor and Wright (1998, p.155) stated that "understanding the complexity of women's perceptions of the service is important prior to trying to actively manage both the positive and negative information gathered". The midwives providing the care could then address the issues of real concern to patients, rather than assuming that the 'professionals' understood the situation and knew best. Therefore the information published by Proctor and Wright (1998) should have helped to change midwifery practice.

The results presented here provided documentary evidence of the aspects of work which make BMSs happy and unhappy. They show that more BMSs considered that it was important to be appreciated by their colleagues and managers than felt personal fulfilment from the technical

side of their job (Figure 3.2.1). As expected, impressions that their salaries were poor (see Section 5.3), workload was high and a career structure was lacking contributed to BMSs feelings of not being valued (Figure 3.2.2). However, the comment which occurred most often concerned lack of recognition by the general public (Figure 3.2.2). This perception was also expressed by 93% of participants in response to the single item about public awareness of their work (see Section 3.2.7). Similarly, the low profile of laboratory staff among other healthcare workers was the third most frequent concern. This shows that most BMSs are proud of their contribution to patient care and are more likely to feel undervalued as professionals when this is not acknowledged. This perceived lack of recognition brings the issue of low salaries into sharper focus, since the pay that a particular job attracts is taken as a marker of the value that society places on it. If BMS were reasonably well paid this could partly compensate for having to work hard, without feeling appreciated. This is supported by the fact that two most frequent comments in the 'Improvements' category, by a large margin concerned better pay for BMSs and higher profile with the general public (Figure 3.2.3). In the same way that Proctor and Wright's findings could prove useful to midwives and managers of maternity services, the results presented in this section have been disseminated to practising biomedical scientists through the literature (Pitt, 1999). Subsequently, the IBMS has launched a major publicity campaign (Anon, 2000b) and the researcher has been contacted by the head BMSs of several clinical microbiology laboratories requesting information to support improvement of management practices.

5.5 Commitment

As expected from previous work with other professions (e.g. Reichers, 1986; Meyer and Allen, 1997), the results of this study show that UK BMSs' experience of Commitment is complex and multidimensional. In contrast with other recent investigations (see Section 5.5.2), the present findings clearly supported Meyer and Allen's (1991) three-component model, producing statistically reliable scales for both the three Organisational Commitment and the three Professional Commitment measures. The strong correlation between AC-Prof and CarComm (r=0.72) supports the theory that CarComm is " the affective dimension of professional commitment" (Blau and Lunz, 1998, p. 267), by showing that the attitudes they assessed are very similar. Since the literature lacks reports of studies where these two measures of affective commitment were used concurrently (N. Allen, University of Western

Ontario, pers. comm.) this is a significant finding. This result confirms the common theoretical basis of AC-Prof and CarComm (Blau, 1985; Allen and Meyer, 1990). The latter scale was used in this study to allow comparison with published work concerning MLTs (e.g. Lunz *et al.*, 1996; Blau and Lunz, 1998). However, since they each theoretically assessed 'affective commitment to the profession', and this was borne out in practice, CarComm was not used in this study for the investigations of the relationships between components of Commitment and Job Satisfaction, Climate and Quality.

5.5.1 Comparison of present results with published work using Blau's (1985) Career Commitment scale

The first report of the CarComm scale to assess professional commitment among US MLTs used a seven-item scale (Lunz, *et al.,* 1996). In later published work, the same research team used a five-item scale (Blau and Lunz, 1998), which was followed in this study. No reason was given for this change, but direct comparison between the present results and the earlier study is not possible. However, Lunz *et al.* (1996), reported higher mean CarComm scores for Laboratory Managers than for other qualified staff, which was also the case for the results presented here for BMS4s (Table 3.3.6). Interestingly, they also found that the area of biomedical science in which a person worked seemed to affect their CarComm score. MLTs working in 'Blood banking' reported higher commitment (Lunz *et al.,* 1996), although they did not speculate on the reasons for this finding. The mean scores for the various specialties were not significantly different and the results for microbiology MLTs was third highest out of 6 (Lunz *et al.,* 1996), indicating that there is nothing particularly unusual about the microbiologists' experience of Career Commitment.

A modified version of the seven–item CarComm scale was used in a study of Commitment among pharmacists in Illinois by Kong (1995). This author found that females reported significantly greater career commitment than males, in contrast to the results from MLTs (Blau and Lunz, 1998) and the present study (Table 3.3.4). Since CarComm effectively assesses the same attitude as AC-Prof (Blau and Lunz, 1998), the pharmacists' gender difference is inconsistent with the literature (see Section 5.5.2), but Kong (1995) does not suggest an explanation for his result.

The overall mean score for the five-item CarComm scale for the UK BMSs in the present study was 11.74 (SD=3.30). Blau and Lunz (1998), using the same scale, recorded a mean

score of 13.5 (SD= 2.2) for US MLTs. Their published work forms part of a long-term study of career development in MLTs, which began by sending questionnaires to recent graduates in 1993. At that time, most respondents had recently received professional registration and reported a mean age of 25 (Blau and Lunz, 1998). The CarComm questionnaire was administered the following year, so it is most useful to compare results for the MLTs with BMSs in the present study who were in their 20s and at Grade 1, which would be the equivalent career stage. As Section 3.3.2 shows, the mean CarComm score for BMSs in the 22-29 age group, employed at BMS 1 was 11.68 (SD=3.03). Although the number of subjects in the equivalent BMS group (N=112) is lower than for the MLTs (N=457), there is still a trend towards greater Commitment to one's career among the American laboratory scientists. Since investigation of Commitment was not the main focus of either study, it is not clear whether this is a true difference. There was no relationship between gender and CarComm for the MLTs (Blau and Lunz, 1998), as there was no difference in overall mean scores for male and female BMSs (Table 3.3.4). Although age was a factor affecting mean CarComm scores in the UK study, with the highest scores found among the 'under 21' and '60 and over' groups (Table 3.3.4), the subjects in the US study were not sufficiently diverse in age for comparison, as explained above. A detailed survey of professional commitment, assessing both this attitude and the factors that have been shown to influence it (Job Satisfaction, deliberate choice of a career in laboratory science, see Section 5.5.3), using well-matched groups of BMSs and MLTs, would be helpful. Such an investigation was beyond the remit of this present study, but if it could be shown that American MLTs do feel a greater commitment to their profession than British BMSs, and the reasons for the discrepancy clarified, it could help laboratory managers and hospital human resources staff to improve Commitment. Since CarComm only measures the affective component of professional commitment (Blau and Lunz, 1998), while this and other studies have indicated the equal importance of normative and continuance commitment (Meyer and Allen, 1997) the most useful research would involve use of the three-component model (Meyer *et al.*, 1993).

5.5.2 Comparison of present results with published work using Meyer and Allen's (1991) three-component model of Commitment

Tables 5.3.a and 5.3.b summarise results from examples of published work using Meyer and Allen's (1991) three-component model for Organisational Commitment (Table 5.3.a) and Professional Commitment (Table 5.3.b). Surveys have been carried out among a variety of workers throughout the world. The tables show that the mean scores for each scale in the

present study are broadly comparable with previous findings. Of particular relevance are studies the studies by Meyer *et al.* (1993) and Irving *et al.* (1997) in Table 5.3.b, which involved nurses and civil servants respectively, in Canada, where for each component of commitment, the absolute scores are fairly close. Scores for Organizational Commitment in the present study follow the pattern of CC > AC > NC, in common with most other reports (Table 5.3.a). The results for Professional Commitment differ slightly from the trend, in that mean AC score is relatively low and the same (as opposed to greater than) mean CC. However, the overall implications are that UK BMSs experience the three components of commitment in similar ways to other public service workers previously studied.

An important finding from the BMSs surveyed here is that the overall mean score for each component of Professional Commitment is higher than the equivalent aspect of Organisational Commitment (Tables 3.3.3 and 5.3.a). The difference is most marked between mean AC-Org (3.47) and mean AC-Prof (4.63), while the mean scores for Continuance and Normative Commitment show less variation. The possible reasons for these findings are discussed in section 5.5.3, which considers the correlations between components.

Table 5.3 a: Comparison of mean scores from reported studies using Meyer and Allen's 3-component model of Organisational Commitment

				AC-Org	CC-Org	NC-Org
Study	Employing Organisation	Country	Number of respondents	Mean score (SD)	Mean score (SD)	Mean score (SD)
Meyer *et al* (1993)	Hospitals (Nurses)	Canada	603	3.91 (1.47)	4.03 (1.39)	3.04 (1.41)
Shore and Wayne (1993)	Multinational	USA	388	3.89 (0.71)	3.40 (0.74)	NT
Ko *et al* (1997)	Research Institute	Korea	278	3.21 (0.78)	2.92 (0.58)	2.94 (0.69)
Ko *et al* (1997)	Airline	Korea	589	2.98 (0.82)	3.09 (0.64)	2.81 (0.68)
Jaros (1997)	Aerospace company	USA	158	4.00 (1.50)	4.80 (1.40)	3.90 (1.20)
Jaros (1997)	Various (part-time MBA)	USA	158	4.30 (1.70)	4.50 (1.50)	3.90 (1.20)
Present	Hospitals (BMSs)	UK	914			

Table 5.3 b: Comparison of mean scores from reported studies using Meyer and Allen's 3-component model of Professional Commitment

				AC-Prof	CC-Prof	NC-Prof
Study	Profession of subjects	Country	Number of respondents	Mean score (SD)	Mean score (SD)	Mean score (SD)
Meyer *et al* (1993)	Nursing	Canada	603	5.38 (1.26)	4.73 (1.37)	3.04 (1.44)
Irving *et al* (1997)	Various (Civil Service)	Canada	232	5.16 (1.03)	4.74 (1.28)	3.34 (1.22)
Present	Biomedical Science	UK	914	4.63 (1.21)	4.64 (1.2)	3.1 (1.14)

The effect of gender on 'affective' Organisational Commitment (either measured by Mowday *et al.*'s (1979) Organizational Commitment Questionnaire (OCQ) or Meyer and Allen's (1991) AC-Org, used in the present study (see Section 1.9.2) is generally considered to be negligible. (For reviews see Mathieu and Zajac, 1990; Meyer and Allen, 1991). Consistent with this, AC-Org was found here not to be significantly different among male and female BMSs (section 3.3.3, Table 3.3.4). Possibly due to the lack of gender effect found in earlier work, reports of studies involving Meyer and Allen's (1991) three-component model of Organisational Commitment rarely consider gender. In a meta-analysis of investigations using their model, Meyer and Allen, (1996) did not discuss whether differences between male and female experiences of Commitment have been found. Exceptions to this include Wahn's (1998) investigation of CC-Org among Canadian human resource professionals, using an 8-item version of the scale. Data presented from her study suggested that women experience higher CC-Org than men (Wahn, 1998). This conflicts with the results given here (Table 3.3.4), which show a significantly higher ($p<0.01$) mean CC-Org score for males. Means from the two studies cannot be directly compared, due to the slight difference in scales used. However, Wahn used the following calculation to determine the 'magnitude' of the gender difference in scores:

$$\text{Effect size} = \frac{\text{(mean score for men) - (mean score for women)}}{\text{overall standard deviation for all scores}}$$

(Wahn, 1998 p. 262)

Using the results of the present study in this equation gives a value of 0.21:

$$\text{Effect size} = \frac{4.74 - 4.51}{1.11} = 0.21$$

which indicates a similarly 'small effect size' to the -0.32 which Wahn found. Therefore the two sets of results give a similar level of difference between CC-Org for males and females, but in opposite directions. In the Canadian study, 36% of the respondents were male, which Wahn acknowledges is not representative of the population sampled. In the present study, 44% of the replies came from men; in addition, the spread of age and grade was as expected among the biomedical scientist population. (IBMS, pers. comm.; Department of Health, 1998).

There is also a dearth of information regarding the effect of gender on Professional Commitment. However, research involving Canadian government employees showed

no relationship between gender and AC-Prof or NC-Prof, but higher CC-Prof in males (Irving *et al.*, 1997). Results presented here for UK BMSs concur with this finding (Section 3.3.3, Table 3.3.4).

One reason that male BMSs might feel stronger continuance commitment than females could be that more men were in the older age groups, when it is harder to change employer or profession. However, this was not the case (Table 3.1.2). Another possibility would be that men were at higher grades. Since there are fewer BMS3 and BMS4 posts, it would be harder for someone at that grade to find a job in another hospital (leading to high CC-Org). It would also be psychologically harder to re-train in a different profession for a laboratory manager than a person working at BMS1 who would have up-to-date transferable laboratory skills (leading to higher CC-Prof in the former). In this study group, 39% of male respondents were employed at Grade 3 or 4, while only 8% of all the females were at these grades so this may account for the difference. However, gender was not found to be an important predictor of CC-Org or CC-Prof, so this relationship was not investigated further here.

In view of the discrepancy between the results for CC-Org and a lack of other data, further investigations of gender differences with respect to the three components of commitment, particularly CC, in Meyer and Allen's model seem to be important, as Wahn (1998) advocates.

Significant differences were found between mean scores for all components of Organisational and Professional Commitment with age group among UK BMSs, except AC-Prof (Table 3.3.6). Mathieu and Zajac (1990) concluded from their meta-analysis that there was a positive correlation between age and commitment to the organisation. Interestingly, their results suggested that 'attitudinal' commitment increased more markedly with age than 'calculative' (equivalent to 'continuance') commitment. The relationships between the components of commitment and age have not often been mentioned in studies involving Meyer and Allen's (1991) model, thus, there is limited data with which to compare the results presented here. The results for BMSs show highest mean scores for all components of commitment in the older age groups ('50-50' and '60 and over'), with the exception of NC-Org and AC-Prof, which seem to be experienced strongly by BMSs under 21 years of age (Table 3.3.6).

Considering Professional Commitment, the breakdown in mean scores obtained in the present study suggests that young BMSs at the start of their career, feel a strong bond with their

profession (AC-Prof), which is similar to older colleagues in their 50s and 60s (Table 3.3.6). Although the scores decreased slightly among the middle age groups, they remained positive and fairly constant, implying that BMSs identify strongly and feel proud of their profession throughout their working lives. While there was no clear pattern for feelings of obligation towards the profession (NC-Prof) in BMSs under 40, mean scores were significantly higher in respondents over 50 (Table 3.3.6). However, there seemed to be a definite increase in CC-Prof with increasing age. This would be expected, because the older someone is, the harder it is to re-train for and find employment in a new profession. Meyer *et al.*, (1993) used correlation to test whether scores for the three components of Professional Commitment were affected by age, among Canadian nurses. They found that mean scores for AC-Prof and NC-Prof increased with age, while there was no significant association between age and CC-Prof (Meyer *et al.*, 1993). However, a subsequent study of employees of a government agency in Canada concluded that age does not affect attitudes towards any of the three components of Professional Commitment (Irving *et al.*, 1997). The correlations given in Tables 3.3.7a and b allow direct comparison with the published data. They show that while there is apparently a small but significant relationship between NC-Prof and age (Table 3.3.7.a), similar to the findings of Meyer *et al.* (1993), this is lost when the correlation is controlled for grade (Table 3.3.7.b). Therefore age is a 'confounding variable' (Cramer, 1998) in the relationship between NC-Prof and grade, rather than truly affecting this component of Commitment. As the patterns in Table 3.3.6 suggest, BMSs do not become more affectively committed to their profession as they become older (Tables 3.3.7.a and b). In contrast to the published reports, age does correlate positively with CC-Prof for BMSs (Table 3.3.7.a) and this association remains when the test is controlled for grade (Table 3.3.7.b). It would be expected that an older person trained in a particular profession would feel that they had invested more time and effort in specialised training than a younger colleague and would also anticipate more difficultly in finding a suitable alternative career. These attitudes are measured by the CC-Prof scale, so the results presented here fit the theory.

The pattern for Organisational Commitment through the age groups for BMSs is similar to that found for Professional Commitment. The differences in means were significant (Table 3.3.6), but the only component which was clearly felt more strongly with increasing age was CC-Org. As for CC-Prof, a genuine correlation was found between CC-Org and increasing age that was not accounted for by grade (Tables 3.3.7 a and b). Meyer *et al.*, (1989) assessed AC-Org and CC-Org among managers in a food service organisation in Canada and found no significant association with age (Meyer *et al.*, 1989). However, in later work, Meyer's

research group reported that scores for all three components of Organisational Commitment increased with age among Canadian nurses (Meyer *et al.* (1993). Results of another study in Canada, involving groups of nurses and bus operators, suggested that there is no association between age and AC-Org or NC-Org (Hackett *et al.*, 1994). However, these authors did report a positive association between age and CC-Org for the bus operators, but not the nurses. They speculated that this might be attributable to older nurses having a greater range of transferable skills than older bus operators and also to the fact that there were several hospitals but only one bus company in the study area (Hackett *et al.*,1994). Thus, the bus operators would feel greater Continuance Commitment due to lack of available alternative employers. This is the situation in which many BMSs in the UK currently find themselves, as discussed in Section 5.5.3.

Reasons for the divergence among published work regarding the effect of age on components of Professional and Organisational Commitment and age are not clear. The study groups discussed above were mainly public service workers in Canada and all authors quoted a mean age for their subjects in the 30s, with the exception of the bus drivers in Hackett *et al.*'s (1994) work, where the figure was given as 40.70. The published results are so variable that further work, specifically focusing on the effect that age has on the components of Commitment, seems justified. For example, it could be helpful to investigate whether Affective Commitment does increase with age, as reported by Meyer *et al.*, (1993) and if entering a particular profession, or joining a given employer, at a younger age enhances a person's Commitment. The lack of evidence for increasing Continuance Commitment with age in the published work contrasts sharply with the results for BMSs presented here. One possibility to explain this could be that the age ranges in the previous studies appear to be quite restricted, with none including people over 50. The present study included a representative proportion of BMSs in their 50s and 60s, which may account for the clear trend towards increasing Continuance Commitment with age found here. Age is only one variable that might affect Commitment and it may not prove to be very important, but further research could help managers understand Commitment.

Distinction between career stages or management levels is rarely used as a marker of Commitment in the literature. One example is the study by Hicks-Clark and Iles (2000) of 'climate for diversity' (see Section 1.10.3), among managers of healthcare Trusts and branches of a retail company in the UK. Organisational commitment was one of the perceptions measured, although the Meyer and Allen (1991) scale was not used, so detailed

comparison with the present results is not possible. These authors found that mean scores for organisational commitment increased with management level (Hicks-Clark and Iles, 2000). As Table 3.3.5 shows that there were significant differences in the mean scores for all components of Organisational Commitment, together with CC-Prof and NC-Prof with grade for the BMSs in the present study. Trainee BMSs scored higher for Affective and Normative Commitments than their colleagues at BMS grades 1-3, which is likely to be because a person starting a new career in the health service would identify both their chosen profession and employing organisation, for example the NHS. They might also feel a strong sense of obligation to patients (see Section 5.5.3). Both these components of Commitment could wane when a person feels undervalued, a situation which many BMS1s and BMS2s expressed in this survey (see Sections 3.2.6 and 5.3). However, as Table 3.3.7.a shows, leaving out the results for Trainee BMSs, the trend was towards stronger perceptions of Affective and Normative Commitment with higher grade. Mean scores for AC-Prof were the highest and although they gradually increased from BMS1 to BMS4, the difference in scores for AC-Prof among the grades was not significant (Table 3.3.5). This implies that career stage does not affect a BMS's strong identification and 'bonding' with their profession. Results for CC-Org and CC-Prof indicate increasing Commitment with higher grade (Table 3.3.5). It would be expected that a BMSs who has achieved success and promotion in their profession would feel that changing career would be a greater sacrifice than someone at who had remained at grade 1. Many of the participants in this study at grades 3 and 4 reported staying with the same employer for many years, which explains the relationship between grade and CC-Org, although this association is possibly complicated by the effect of age (see above).

5.5.3 Consideration of the components of Organisational and Professional Commitment

Two aspects of Meyer and Allen's model have recently been criticised. Firstly, the distinction between the AC and NC scales is not always clearly defined (Allen and Meyer, 1996; Jaros, 1997). Factor Analysis of the items comprising the three - component scale usually produces loading on three factors corresponding to the AC, CC and NC scales (e.g. Dunham *et al.*, 1994; Hackett *et al.*, 1994; Allen and Meyer, 1996; Irving *et al.*, 1997; Ko *et al.*, 1997). In this study, factor analysis revealed the three-factor solution to be the best fit for the data, for both the Organizational and Professional Commitment scales (Tables 3.3.1b and 3.3.2). However, significant correlations between the AC and NC scales have been consistently observed (Meyer *et al.*, 1993; Irving *et al.*, 1997; Ko *et al.*, 1997; Jaros, 1997). The results presented here concur with this (Table 3.3.8), as the correlation between AC and NC to the

Organization was strong (r=0.67). This finding may be due to the nature of the employing organization, as most of the survey respondents were employed by NHS Trusts or the PHLS, both of which are part of the United Kingdom 'National Health Service'. People who choose to work in the NHS are likely both to strongly identify with the idea of free healthcare to all (AC), and to feel a sense of duty in their role in patient care (NC) within that setting. Similarly, the relationship between AC and NC to the Profession was also significant in this case (r=0.56). Within the context of healthcare, an affective bond to a profession which is involved in patient care might be expected to be linked in the minds of workers to the sense of vocation in their chosen career. The model's authors acknowledge this problem, and suggest that feelings of a sense of 'bonding' to an organization and an 'obligation' towards it " may have inherent psychological overlap. It may simply not be possible to feel a strong obligation to an organization without also having (or developing) positive emotional feelings for it." (Allen and Meyer, 1996, p. 272). However, the constructs do seem to be empirically discrete (as shown for example, by factor analysis). Antecedents of AC and NC are also hypothesised to be distinct, and their outcomes have been shown to be different (Allen and Meyer, 1996), supporting the continued investigation of AC and NC as two separable components of commitment.

Of particular interest is what variables predict each component of Commitment. As the results from the Multiple Regression Analyses (MRA) shown in Table 3.3.9 indicate, the main predictor of AC in each case is job satisfaction. This relationship is discussed further in Section 5.8. AC-Org was also predicted by the number of years the subject had been with the current employer. For AC-Prof, the second best predictor was a negative response to the question "Would you say that you became a BMS more by accident than career choice?" (yes=1, no=2). This implies that affective bonding is enhanced with length of service, although it may be due to retrospective internal psychological adjustment ('since I have been at this hospital/ in this profession for so long, I must believe in it') (Meyer, 1997).

NC to both employer and profession is also most strongly predicted by job satisfaction (for NC-Org, $\beta = 0.480$; for NC-Prof, $\beta = 0.409$, see Table 3.3.9). It is not intuitively obvious why enjoying one's job would cause feelings of obligation towards an employer/profession, or *vice versa*. It may be that some BMSs feel a duty to remain with an organisation and/or profession that allows them to do a job they enjoy so much. In addition, the sense of duty may actually be to patients, and this might be a component of Job Satisfaction (for further

discussion see Section 5.8). Being involved in the merger of two laboratories has a predictive effect on both NC-Org ($\beta = 0.104$) and less strongly, NC-Prof ($\beta = 0.085$), as given in Table 3.3.9. This suggests that BMSs who have experienced the difficulties of joining sets of colleagues with different loyalties and working practices feel a duty to stay with that laboratory and make the new arrangements work. Increasing age and being female appear, from this analysis, to predict NC-Prof (Table 3.3.9). However, other tests show the gender effect to be slight (Tables 3.3.4 and 3.3.7.a), while the apparent relationship with age (Tables 3.3.5 and 3.3.7.a) is actually due to grade (Table 3.3.7.b). For further discussion see Section 5.6.2).

The strongest predictor of CC is increasing number of years employed as a BMS (Table 3.3.9). This is interesting, and may partly show a lack of a clear distinction between these two concepts in the minds of clinical laboratory staff, since 'number of years with current employer' is also a positive predictor of both CCs (for CC-Org, $\beta = 0.194$; for CC-Prof, $\beta = 0.122$). The relationship between tenure and CC to both Organisation and Profession is as expected and consistent with the literature (Meyer *et al.*, 1989; Meyer *et al.*, 1993; Hackett *et al.*, 1994). It also seems that since 'number of BMSs in laboratory' is a negative predictor of each type of CC (for CC-Org, $\beta = -0.122$; for CC-Prof, $\beta = -0.133$), working in a larger department has a negative influence (Table 3.3.9). This may be because staff in smaller laboratories feel that their training has equipped them particularly for their current job (i.e. to perform the wider range of non-specialist tests that small laboratories tend to do, which the subject feels would not be transferable to a large specialist department).

The strong relationships among corresponding scales for commitment to the organisation and to the profession are also interesting. As Table 3.3.8 shows, the correlation between NCO and NCP is very high ($r = 0.83$). This is likely to reflect the fact that being an employee of a hospital and a BMS both engender feelings of moral obligation towards the same objective, patient care. A similar relationship is found between the two types of CC ($r = 0.78$, Table 3.3.8). This could be attributable to the current structure of the public healthcare service. Mergers of adjacent Hospital Trusts and Public Health laboratories have meant that local pathology services tend to become centralised into one laboratory, thus cutting down available alternative employers. As all hospital employees hold professional qualifications, a BMS who wanted to stay in the same Trust in a different job would have to undergo a second degree-level training, which is unlikely to be feasible for most people. So, to stay within the

profession a BMS would have to continue in employment by the Trust and to remain within the Trust; he/she would have to carry on working as a BMS. Interestingly, while affective commitment to the employer and to the profession are clearly linked (r = 0.607, Table 3.3.8), the correlation is weaker than for CC and NC, showing that the sense of 'bonding' to each of these is more distinct in BMSs' perceptions. These relationships between Organisational and Professional components of Commitment are comparable with previous findings among nurses, which show significant, strong correlations between NC-Org and NC-Prof (r = 0.618, $p<0.05$, Meyer *et al.*, 1993, p. 545) and also for CC-Org and CC-Prof (r = 0.743, $p<0.05$, Meyer *et al.*, 1993, p. 545). As in the present study, a statistically significant, but numerically smaller, link was found between AC-Org and AC-Prof (r = 0.431, $p<0.05$, Meyer *et al.*, 1993, p. 545). This suggests that for healthcare workers such as nurses and BMSs, the distinction between Continuance and Normative Commitment to one's hospital and one's Profession is blurred, while identification and bonding (AC) with a profession and then an employer is less ambiguous. More investigations, considering both Organisational and Professional Commitment simultaneously, would be worthwhile in order to explore these links in members of other professions.

A second problem found with Meyer and Allen's original model is that CC may show two components. McGee and Ford (1987) found that items assessing CC due to lack of available alternative employment (which they labelled 'CC: Low Perceived Alternatives') loaded separately from items measuring CC due to specialized training and investments in the organization (which they called 'CC: High Personal Sacrifice') in factor analysis. Subsequent studies have confirmed that a two-factor oblique model is the best fit for this scale (e.g. Dunham *et al.*, 1994; Hackett *et al.*, 1994; Ko *et al.*, 1997, Iverson and Buttigieg, 1999) although correlation between the two sub scales is usually strong and relationships with other variables are similar (Hackett *et al.*, 1994; Allen and Meyer, 1996). In this study, exploratory factor analysis of the data did not yield this result; the three-factor model was consistently found to be the 'best fit', and CC emerged as one factor from both Organisational and Professional Commitment items (Tables 3.3.1.b and 3.3.2). This finding was confirmed by running each set of continuance items through an oblique model, which again loaded onto a single factor. This discrepancy with previous work may be because the two aspects of CC are not clearly distinguishable in the context of the present study group. Considering CC-Org, one of the main reasons for lack of available alternative employment (i.e. 'CC: Low Perceived Alternatives') is that the specialised post-employment and postgraduate training of biomedical

scientists best equips them for work in clinical laboratories (i.e. 'CC: High Personal Sacrifice'), and there are fewer of them now than 10 years ago. Another recent study has also failed to find two factors from the CC-Org items (Suliman and Iles, 2000). The distinction between the two parts of CC has been less extensively investigated for CC-Prof. Irving *et al.*, (1997) reported that the three-factor model of Professional Commitment was the best fit –i.e. that CC-Prof is a single factor- in accordance with the results shown here for BMSs. This is obviously an issue of some debate in the literature and likely to be the subject of further research. Although a statistical distinction has been demonstrated in some cases, CC: Low Perceived Alternatives and CC: High Personal Sacrifice are clearly linked and, as the original authors state: "the practical implications of treating the two factors separately have yet to be demonstrated" (Allen and Meyer, 1996, p. 448).

5.5.4 Implications of findings for Commitment among UK BMSs

The results presented here contribute to the available information about Meyer and Allen's (1991) three-component model of Commitment, by clearly supporting the construct for both. This contrasts with recent findings, particularly regarding CC-Org, as discussed in Section 5.6.3. Some of the discrepancies may be accounted for by the country in which the questionnaire was administered. For example, Ko *et al.* (1997) surveyed employees in Korea and found that several items from all three Organisational Commitment scales had very low correlation coefficients on Factor Analysis as well as calculating that the two–factor model for CC-Org was the best for their results. Suliman and Iles (2000) concluded that NC was not applicable to their subjects, who were Jordanian. Important cultural differences, which might have influenced their responses to Commitment issues, may exist between these groups and the Canadian public service workers on whom the model was developed and tested (Meyer and Allen, 1991; Meyer *et al.*, 1993, Hackett *et al.*, 1994; Irving *et al.*, 1997). Also, it must be noted that both the Korean and Jordanian sample were heavily biased towards males, which may have affected their results. However, the problems identified by McGee and Ford (1987) with the CC-Org scale, have been widely corroborated among Canadian and North American workers (see Section 5.6.3). Therefore, the lack of evidence for two CC subscales in this study is a significant finding.

Although Meyer and Allen's (1991) model has been widely used (see Allen and Meyer, 1996 for a review) and is increasingly endorsed by authors in the Commitment field (e.g. Benkhoff,

1997), few studies have provided data from healthcare professionals in the UK. The results discussed here for BMSs will enhance the understanding of Commitment among employees of both the private and public health service. This study has also highlighted the value of distinguishing between Professional and Organisational Commitment. While a positive association has been consistently found between the two types (e.g. Meyer *et al.*, 1993; Allen and Meyer, 1996; Boshoff and Mels, 2000), it is thought people with specialist training and qualifications are likely to be more committed to their profession (Wallace, 1993). The BMSs in this current study scored more highly on the Professional Commitment scales, particularly AC-Prof. The important consequences of this, in terms of effect on Job Satisfaction and Quality are discussed in Sections 5.8 and 5.9 respectively.

5.6 Climate

Studies concerning the effect of climate on a variety of outcomes have been reported for other healthcare workers, (e.g. Duxbury *et al.*, 1982) engineering scientists (e.g. Kozlowski and Hults, 1987) and academic staff (e.g. West *et al.*, 1998), but BMSs in diagnostic laboratories have previously been neglected. This group is interesting because they are the only healthcare professionals who work specifically for patients without having any direct contact with them. Doctors, nurses, therapists and pharmacists in hospitals all interact with patients and network with other staff. BMSs have limited exchanges with other staff and are normally confined to the laboratory, so their experience of climate is likely to be influenced mostly by colleagues in their own department.

5.6.1 Refinement of the PWE scale

The eight factors, which emerged after exploratory factor analysis of the PWE scale in this study, provided a slightly different description of climate from that in Newman's (1977) original 11-dimension model (see Section 2.2.2). Four of the factors found here were broadly similar to the published dimensions and were therefore assigned the same label (namely, 'supervisory style', 'co-worker relations', 'task characteristics', 'employee competence') see Table 3.4.1. Newman (1977) used a three-point response scale ('yes', 'no', 'don't know'), precluding direct comparison with the results reported here, which were collected using a 5-point response scale. Items from two of Newman's (1977) dimensions, called 'equipment and

arrangement of people and equipment' and 'work space' became combined during factor analysis of the results from BMSs, to produce two new factors, which were labelled here as 'layout of laboratory' and 'equipment and supplies'. 'Performance-reward relationship', which was originally conceived by Newman (1977) as a single dimension, clearly emerged as two factors in the present study, with the two reversed-scored items forming one, named 'unfair reward relationship' and the remainder constituting a revised version of 'performance-reward relationship'. Although it was anticipated that all the dimensions in the PWE would be important to describe climate among BMSs, there were four which did not form factors in exploratory factor analysis here. These were 'employee work motivation', 'decision-making policy', 'pressure to produce' and 'job responsibility/importance'. The last two were also excluded from the version of the PWE used by Jackofsky and Slocum (1988), although they did not state their reasons for this. Three out of the five items in the 'employee work motivation' dimension loaded onto the QUALCOLL scale (see Table 3.6.1), which was derived specifically from the results of this study. QUALCOLL is a measure of individual BMSs' perceptions of the attitudes of their colleagues towards working in ways that promote quality (see Section 5.9.2). Since 'employee work motivation' is "the extent to which employees show concern for the quality of their work, try to get ahead, are involved in their work, etc." (Newman, 1977, p.524), it is similar to, but not the same as QUALCOLL. The latter was identified as a dimension of Climate, but clearly formed part of the measurement of Quality in this study (see section 5.9.2). The inclusion of a dimension regarding decision-making policy in a climate measure has been criticised by Payne (1990, p.79), who considered this to be "about decentralization of authority" within an organisation's structure rather than individual perceptions. Thus, the eight-factor model which has emerged from this work to describe Climate among BMSs is broadly consistent with current research. As there is no published data on Climate among clinical laboratory staff, this study provides a baseline account of perceptions of atmosphere in the workplace for UK BMSs. It is clear that the optimal climate for biomedical scientists would involve positive perceptions of all the dimensions shown in Table 3.4.1 except 'unfair reward relations'. Taken together, these describe a laboratory environment where staff perceive the management to be open, supportive and to give rewards fairly, colleagues to be friendly, helpful, professional and well–trained and work to be challenging but not overwhelming. They would also consider that their laboratory is arranged sensibly, the equipment is up to date and functioning well and consumables for tests are always available. Where BMSs experience a climate like this, they are likely to enjoy their time at work and, as discussed in Sections 5.8 and 5.11, perform at their best.

5.6.2 Factors influencing the experience of Individual Climate for BMSs

Most reported studies of climate have considered it only as a departmental or organisational perception and have used aggregated scores to assess effect on outcomes within the department or organisation (see Section 5.11). The explicit use of demographic data to describe psychological climate, as presented here, seems to be unusual in the literature and results are conflicting. For example, Newman (1977) used the fact that groups of employees, categorised according to "hierarchical level, department, workgroup" as well as "sex, age, education" scored differently on the PWE, scale endorsed the validity of the scale (Newman, 1977, p.527). However, the nature of these differences was not discussed. Conversely, Patterson *et al.* (1996) stated that they found no significant effects of gender, age or tenure of employees of a construction firm, on formation of collective climates, but also did not give any details. More recently, Hicks-Clark and Iles (2000) reported finding that mean scores for various aspects of their 'climate for diversity' increased with management level. The lack of research into the effects of demographic variables on climate is surprising, since individual climate results are used to investigate relationships with such variables as job satisfaction (see Section 5.8.2), which is also measured on an individual basis. The way in which gender, age and seniority affect perception of climate might therefore be important in a clearer understanding of, for example, Job Satisfaction, so investigations to elucidate this apparent inconsistency would seem justified. In this study, gender, age, grade, employer, type of laboratory and size of department were explored in order to provide a baseline description of climate for BMSs. It was considered necessary to understand the characteristics and circumstances of BMSs who experienced positive climates, so that perceptions of those who feel their climate to be negative could be improved in future.

It is clear from the results of Multiple Regression Analysis (Table 3.4.2) that an individual BMSs job satisfaction has an important bearing on their experience of climate. This relationship will be discussed in Section 5.8. Table 3.4.2 gives the other factors that appear to influence climate. The possible causes and effects of these findings are discussed below.

The mean Individual Climate score for male respondents in this study was significantly higher than for females (Figure 3.4.1). The effect of gender on climate is rarely considered in the literature and several reported studies involved participants of one gender. For example, in their study of climate among neonatal intensive care nurses, Duxbury *et al.* (1982) only sent questionnaires to female staff, while all the subjects in Zohar's (2000) investigation of safety

climate were male. It is likely that this gender difference is influenced to some extent by the grades of the respondents. As Table 3.4.1 shows, a higher grade is an important predictor of a positive climate score. One hundred and fifty one males (39%) were at trainee or grade 1 level, as opposed to 355 females (66%). Two hundred and sixty five of respondents at grade 2 or over indicated that they were male (68%), while 168 (33%) were female. To explore the cause of this apparent difference in gender scores, mean climates were calculated at each grade. Referring to Table 3.4.3, males and females at the same grade experience climate similarly. Therefore the disparity in gender indicated in Figure 3.4.1 is actually attributable to the higher proportion of females employed at the training and basic grades. Similarly, Figure 3.4.2 shows an increase in the mean climate score with age group. It is clear from Table 3.1.4 that the majority of respondents in the '50-59' and '60 and over' groups were of grade 2 or above and that the strength of the grade effect is affecting the results.

Trainees, BMS3s and BMS4s tended to experience a positive climate (i.e. score over 3) The reasons for this become clearer when considering the converse statement: "BMS1s and BMS2s seem to give negative climate scores, below the sample average" in relation to the eight dimensions of the climate scale. While 'supervisory style' and 'co-worker relations' will affect all staff, trainees are likely to be afforded some protection from poor laboratory management and internal conflict by their BMS1 and 2 colleagues. The BMS3 and 4s will be the managers, possibly unaware of the effects of their own behaviour and of problems among junior staff. While trainees are learning new skills, their assessment of 'task characteristics' will be positive, as the work will be interesting and they feel it to be worthwhile. Qualitative feedback (from an 'open response' section in the questionnaire) from laboratory managers suggests that they accept the responsibility and relish the challenges of their roles. BMS1 and 2s often reported their work to be quite routine, with increasing numbers of samples to process and in recent years much less time for research and development. These were the staff who felt most strongly that 'employee competence' was suffering, due to lack of opportunities and financial resources for attending training courses. They also reported having less time available to help trainees (Figure 3.2.2).

The 'layout of the laboratory' and 'equipment and supplies' are in the control of the BMS 3 and 4s. Trainees are unlikely to have experience of another department or previous manager, while BMS1 and 2s might feel their current situation compares unfavourably with a former employment. Regarding the 'performance – reward' factors of climate, low pay and decreasing promotion prospects are currently very important issues for BMSs. Salaries for

those at higher grades, while poor for managers by comparison with the private sector, are satisfactory, while staff at lower grades are badly paid compared with other scientific and technical staff even in the public sector. Since trainees will be pleased to be earning a regular income after being students, the perception of being poorly rewarded is felt by BMS1 and 2s. There are few ways in which laboratory managers can acknowledge contributions of staff members (e.g. financially, through giving extra leave or time to attend courses) as the service is currently understaffed and under funded. It is the BMS1 and 2 staff who feel the effects of this most acutely.

There are a number of possible reasons for the significant difference in the climate experienced by BMSs employed by different types of organisation, as shown in Figure 3.4.4 These became clearer by comparing the situations for the four different employers in the light of the elements that are important in climate for BMSs. From discussions with BMSs, it seems that in a private laboratory, the manager is likely to have a lot of autonomy, both in terms of their approach to staff and budget control. Positive perceptions of 'supervisory style' and 'co-worker relations' could be enhanced through the manager's freedom to tailor tasks and responsibilities to suit an individual staff member. Thus each person feels that the manager has taken a personal interest in them and since they are allowed to 'play to their strengths' they should be happy at work and relate well to their colleagues. Also the individual is likely to feel positive about 'task characteristics'. This does occur in the public sector to some extent, but the gradings are more rigid there and the routine workload is usually greater. Greater financial support in the private sector also means that staff can readily attend training courses, up to date equipment and consumables can be purchased more easily and there are pay bonus systems to reward good work.

It is much less common that it was 15 years ago for diagnostic staff in teaching hospitals to be employed by a university. Where this occurs, BMS are likely to benefit from a system which is more orientated towards research and development (variety in 'task characteristics') and to have access to up to date equipment because of research (positive experience of the 'equipment and supplies' dimension of climate). There are many constraints on staff in the NHS and PHLS which could cause negative perceptions of climate. Relatively poor pay, lack of opportunities for career advancement and increases in routine workload could all have contributed to this in recent years. The formation of NHS Trusts was designed to reduce centralisation of the service and empower local managers. Laboratory staff could experience a positive climate due to flexibility at Trust level, albeit limited, allowing mangers to respond to

some of their needs in some of the categories. However, in the last 10 years, many Trusts have been formed through the mergers of hospitals (and therefore laboratories), which could have adversely affected climate. Relationships among staff have often been strained due to redundancies and requirements to work on different sites. The PHLS recently underwent a process of forming 'groups' of geographically close laboratories. As in the NHS, this involved mergers of the laboratories leading to loss of some staff and re-deployment of others. There were some advantages to this, in that it provided more regional autonomy in terms of budgeting. However, extra layers of bureaucracy were introduced, meaning that decisions affecting many aspects of climate (e.g. which tasks are carried out in which laboratory, which equipment and consumables to buy, resources to send staff on training courses) have been effectively taken away from the individual managers.

Positive climate scores were generally reported by staff in all types of laboratory except in food, water and environmental laboratories (this is a negative 'predictor' of climate), virology and bacteriology departments (Figure 3.4.5.a). These three categories included some subjects employed by the PHLS, who have a significantly lower mean climate score, as discussed above. When data from PHLS employees was excluded, the mean climate score for virology departments became positive, as given in Figure 3.4.5b. This suggests that the results had been skewed by the perception of staff in this group. The mean score for bacteriology laboratories similarly increased, although it remained below 3. This indicates that BMSs in bacteriology departments in teaching hospitals do not tend to experience a positive climate. There are several reasons for this, which could include high workload and the more rapid turnover of staff seen in city centre hospitals. However, the virology departments outside the PHLS would also be part of teaching hospitals and here BMSs report positive climates. Therefore there must be another influence on workplace experience. These bacteriology departments are sometimes very large and this could also be the important factor, as discussed below. It is clear from Figures 3.4.5.a and 3.4.5.b that BMSs in a multidisciplinary laboratory are most likely to report a positive climate. These laboratories are usually part of private institutions, which also appear to have a beneficial influence on workplace experience. This type of laboratory is usually run by a relatively small number of staff, which may also influence climate, as explored below.

The third category hypothesized to be important in climate was the number of staff in the laboratory. This was a strong negative predictor of climate (Table 3.4.2). There is a clear trend towards a negative perception of climate among BMSs in larger departments (Figure

3.4.6.a). Many of the very large laboratories were PHLs and as Figure 3.4.6.b illustrates, the mean climates were mostly negative in these laboratories. To investigate whether this effect of size was peculiar to the PHLS, data from these subjects was removed and the means re-calculated (as above). From Figure 3.4.6.c, it is clear that the majority of respondents employed in large laboratories perceived climate negatively. Payne and Pugh (1976) quoted the work of Indik between 1965 and 1968, who investigated the effect of size of the organisation on some aspects of the workplace experience. He found that in larger organisations (more than 100 staff), employees perceived poorer communication, a lack of coordination of activities and higher amounts of specialisation in their work than those in smaller firms. The results of the present study, although at departmental (i.e. microbiology laboratory) rather than organisational (i.e. hospital) level seem to agree with these earlier findings. However, West *et al.*, (1998) found that size of university department had no effect on climate scores among academic staff, although they do not give any indication of the numbers of people employed in those departments. The aspects of the climate scale which would probably be adversely experienced in relatively large laboratories are 'supervisory style', 'co-worker relations' and 'task characteristics'. Where there is a large number of staff, the manager would have less time for individuals and could seem quite remote to junior staff, rather than showing the support and encouragement which a positive perception of supervisory style requires (see items in Table 3.4.1). Interactions between staff members can be limited when there are many people in the department; it can be harder to be friendly and helpful to someone who is unfamiliar. In terms of task characteristics, a large department is likely to have a huge routine workload and an individual would be processing many samples of the same type using the same test. Therefore the variety and challenge of the tasks, which a positive score on this scale implies, would not be available. Taking the sections within PHLs separately might be expected to improve the climate scores, since the interactions are between smaller numbers of staff. However, this is not the case (Figure 3.4.6.d). Even in sections with three or four staff, the mean climate score is less than three. A comparison between PHL sections and other laboratories in the study (Figure 3.4.6.e), shows that in all departments with large numbers of staff, BMSs tend to experience climate negatively. This is illustrated by taking the example of bacteriology departments for both PHLs and NHS hospitals, which are of similar size (40-50 staff). The mean climate score for PHLS bacteriology departments is 2.88 (n=230) and for NHS bacteriology laboratories is 2.96 (n=69), which is not substantially different. However, in smaller laboratories there is a clear discrepancy between climate scores among the PHLS and non-PHLS staff. Using the example of PHLS and NHS virology laboratories, which tend to be smaller departments (10-20 staff), mean climate scores are 2.83

(n=84) for PHLS staff compared with 3.08 (n=35) for NHS employees. So there is a clear adverse effect on perception of climate among PHLS staff. Each PHL is effectively one large laboratory, in which the laboratory manger delegates day-to-day running of smaller sections. However, staff members would consider that their overall manager was the head of the laboratory rather than the section leader of, for example, the virology section. In the NHS, this would be quite different, as the virology department would usually be considered as a separate Pathology discipline and junior staff would not feel 'managed' or answerable to the pathology manager. So even in small sections of a PHL, individuals are likely to feel part of a larger whole. Since working in a 'food, water and environmental' laboratory (the smallest section, with usually less than 5 staff) is actually a negative predictor of climate, it seems that people in the smaller sections feel, for example, that the manager is remote and not taking an interest in them (poor 'supervisory style'), that they do not relate well to staff in larger sections (bad 'co-worker relations') and they are last to have new equipment (low score for equipment and supplies).

From the analysis of demographic data given here, it is clear that the person most likely to give a high Individual Climate score is a male, over 50, of grade 3 or above who works in a small, multidisciplinary laboratory in a private hospital. The person most likely to give a negative score is a female, in her thirties who works as a grade 1 BMS in a food water and environmental section of a large PHL. The results suggest that the optimal number of staff in a non-PHL microbiology department (including medical and support staff) is less than 30 (see Figure 3.4.6.b). Since this study is the first to investigate climate among UK BMSs, these results provide a baseline, to allow future research to enhance knowledge of how perceptions of climate develop in this group of professionals. It can also help laboratory managers to understand the importance of adopting management styles that will engender positive climates among their staff.

5.7 Relationships between Job Satisfaction, Commitment and Individual Climate

Job Satisfaction, Commitment and Individual Climate were expected to interact with each other. These relationships were considered important in influencing an individual BMS's experience within the laboratory, which could have a considerable effect on the quality of their work.

5.7.1 Job Satisfaction and Commitment

It is generally accepted that Job Satisfaction and Commitment strongly influence each other (e.g. Mathieu and Zajac, 1990; Meyer, 1997), but which variable is the cause and which the effect remains unclear (Meyer, 1997).

The relationship between Organisational Commitment, assessed using Mowday *et al.* 's (1979) OCQ (which is a broadly equivalent perception to Meyer and Allen' s (1991) AC-Org, see Section 1.9.2), and job satisfaction has been most extensively studied. Strong, significant correlations have been consistently found between the two variables (for a review see Mathieu and Zajac, 1990), particularly in studies involving healthcare workers (e.g. Ferris and Aranya, 1983; Bateman and Strasser; 1984; Curry *et al.*, 1986; Acorn *et al.*, 1997). Later studies involving Meyer and Allen's (1991) three-component model of Organisational Commitment have found strong positive correlations between job satisfaction and AC-Org, slightly weaker positive relationships with NC-Org and negative correlations with CC-Org (e.g. Meyer *et al.*, 1993; Hackett *et al.*, 1994; Allen and Meyer, 1996). The results of the present study showed the same pattern of correlations with Job Satisfaction (for AC-Org, $r = 0.593$, $p<0.01$; for NC-org, $r = 0.488$, $p<0.01$; for CC-Org, $r = -0.132$, $p<0.01$) (see Table 3.5.1) and are therefore consistent with previous findings. It would be expected that a BMS who feels a strong 'bonding' commitment to the NHS, PHLS or other employing organisation (AC-Org) would feel fulfilled in their work, which helps to provide the healthcare service. A person with high NC-Org, who feels an obligation to work in the public sector or healthcare, would also be likely to experience satisfaction in their role as a BMS. Conversely, someone who was happy with their job would be less worried about the possibilities for alternative employers (CC-Org), hence the negative correlation.

The few studies that have considered the components of Professional Commitment have reported the same pattern of relationships with job satisfaction, that is strong positive correlation with AC-Prof, slightly lower coefficient for NC-Prof and negative correlation with CC-Prof (e.g. Meyer *et al.*, 1993; Irving *et al.*, 1997). The findings presented here for BMSs generally concur with these previous reports (for AC-Prof, $r = 0.572$, $p<0.01$; for NC-Prof, $r = 0.428$, $p<0.01$), although the correlation between job satisfaction and CC-Prof ($r=0.013$) was not significant. A BMS with strong AC-Prof or NC-Prof might be expected to experience high Job Satisfaction for the reasons outlined above for Organisational Commitment.

Thus, the associations reported here between the components of commitment and Job Satisfaction were as expected from the literature. However, in this study, Job Satisfaction was considered as a possible predictor of commitment among BMSs. This was confirmed through MRA, where Job Satisfaction emerged as the strongest predictor of AC-Org ($\beta = 0.601$), NC-Org ($\beta = 0.480$), AC-Prof ($\beta = 0.554$) and NC-Prof ($\beta = 0.409$) (Table 3.3.9). Since the data was collected at a single time point, it is not possible to state definitively whether job satisfaction was a cause or consequence of commitment among BMSs. This has been an issue of debate in the literature for some years. For example, Bateman and Strasser (1984) concluded from a longitudinal study involving nurses in the USA, that Organisational Commitment predicted Job Satisfaction, while Curry *et al.* (1986) found the opposite in a similar investigation also using American nurses. Subsequent studies have failed to elucidate the problem of whether experiencing high Job Satisfaction influences a person to develop strong commitment or *vice versa*, which implies that there is not a simple linear relationship. Meyer (1997, p.190) suggested that "the relation between job satisfaction and commitment might be quite complex. It is not clear at this point whether we will ever be able to determine which, if either is causally prior".

Part of this complexity may be due to the influences of other perceptions within the workplace, which have not been accounted for. For example, this study has considered the interactions between Job Satisfaction, components of commitment and climate. As described in Section 5.7.3, climate was found here to have a moderating effect on the relationship between Job Satisfaction and components of commitment. Therefore, although a longitudinal study of job satisfaction and commitment among BMSs could be interesting, it must be carefully designed to include measurement of other potentially important variables in order to provide useful results. This is discussed in Section 5.7.4.

5.7.2 Job Satisfaction and Individual Climate

The correlation between Job Satisfaction and Individual Climate among BMSs, given in Table 3.5.1, was very strong ($r = 0.68$). This concurs with previous reports (e.g. Lawler *et al.*, 1974; Payne and Pugh, 1976; Hicks-Clark and Iles, 2000). Duxbury *et al.* (1982) also reported significant correlations between these two variables among Neonatal Intensive Care nurses, although they approached the problem differently to other reported studies. They used aggregated Organisational Climate and Job Satisfaction scores (see Section 2.4) for each of the Intensive Care Units.

Over half the variance in climate ($R^2 = 0.52$) is explained by the results of the MRA which included job satisfaction as a possible predictor of climate (Table 3.4.2). From this analysis, job satisfaction emerged as the most important predictor of climate ($\beta = 0.667$). This implies that the more satisfied a BMS is with their job, the better their experience of climate in their laboratory will be. However, the concept of climate as a 'moderating variable', places job satisfaction as an effect rather than a cause of positive climate (see Section 1.10.3). This was tested by taking the 8 dimensions of climate as independent variables against Job Satisfaction, which also gave a strong predictive equation ($R^2 = 0.55$), involving 5 of the climate dimensions, as shown in Table 3.5.2. This result implies that for BMSs, positive perceptions of climate, predict high Job Satisfaction, which is the relationship suggested by previous authors (e.g. Lawler *et al.*, 1974; Hicks-Clark and Iles, 2000). Although Supervisory style was the strongest predictor of Job Satisfaction ($\beta = 0.338$), the other important factors were Task characteristics (($\beta = 0.256$), Equipment and supplies ($\beta = 0.163$), Co-worker relations ($\beta = 0.180$) and Performance–reward relationships ($\beta = 0.081$), which could all be considered closely related to Job Satisfaction. Gunter and Furnham (1996) assessed Job Satisfaction and Climate among employees of four public sector organisations in the UK. Their climate measure comprised items under 14 headings, some of which were similar to those used in the present study (e.g. "Different people get on well" and "Rewards recognition" (Gunter and Furnham, 1996, p.199). However, they emphasised Climate at an organisational rather than departmental level, with items such as "Do different people in your organisation get on well?" (Gunter and Furnham, 1996, p.196) and as described in Section 1.8.3, they used a single item to assess Job Satisfaction. They reported that climate variables measuring 'job clarity', 'job challenge' and 'job variety' were the strongest predictors of Job Satisfaction and reached a similar conclusion to that described here that " Job satisfaction can be conceived of as a personal perception. Thus, climate categories relating to the perception of one's own job were the more powerful predictors of that variable" (Gunter and Furnham, 1996, p.206)

From the results presented here, it is not possible to be certain whether a positive climate in the laboratory leads to higher job satisfaction, or whether people who are fulfilled in their work have a more optimistic perception of their workplace. As the data was only collected at a single time point and the predictive equations for climate and Job Satisfaction were equally strong, the true direction of the relationship is not clear. To investigate this further would require a longitudinal study, such as that discussed in section 5.7.4. This did not form part of the present work, since investigation of the relationship between these two perceptions, while interesting, was not one of the aims of study.

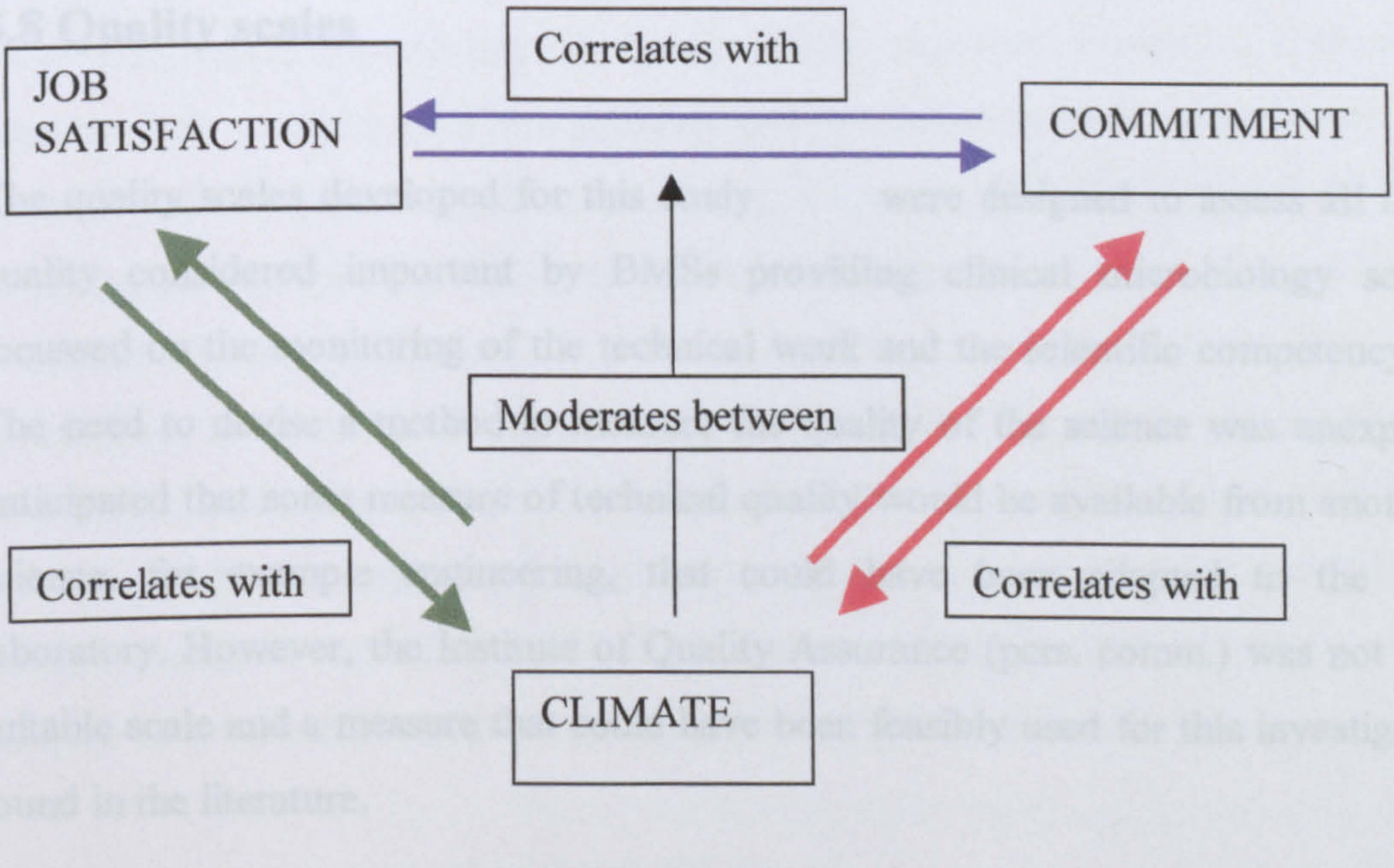
5.7.3 Commitment and Individual Climate

Since it is not usual to investigate factors affecting psychological Climate (see Section 5.6.2), no reports were found considering the relationship between an individual's perception of Climate and their Organisational or Professional Commitment to compare with the present results. The significant correlations ($p<0.01$) shown in Table 3.5.1 suggest that climate strongly influenced perceptions of the affective and normative components of both types of commitment among BMSs (for AC-Prof, r = 0.538; for NC-Org, r = 0.421; for AC-Prof, r = 0.416; for NC-Prof, r = 0.377). This implies that a BMS who experiences a positive Individual Climate is more likely to feel a sense of bonding and obligation to both their Organisation and Profession. As expected, no relationship was found between climate and continuance commitment to either the Organisation or Profession. The atmosphere in the laboratory would be unlikely to change the commitment that a BMS felt because of investments such as specialised professional training or payments into the organisational pension scheme (see Section 1.9). Affective commitment might be strengthened in a situation where one feels positive about such dimensions of climate as being supported by managers, having good relationships with colleagues and being fairly treated. It is equally possible that a BMS's strong sense of bonding with their Profession and Organisation could enhance their experience of Climate. Similarly, normative commitment could influence Climate and *vice versa* .As discussed in Section 5.7.2, the present study was not designed to investigate the direction of relationships between the psychological factors, so no firm conclusions can be drawn. However, as shown in Table 3.5.3, Climate actually accounted for at least 30% of the variance in the relationship between the affective and normative components of Commitment and the outcome of Job Satisfaction. The linear relationship between Commitment and Job Satisfaction is clear from the results of this study and has been well documented (see Section 5.7.1). Controlling for Climate reduced the strength of the correlations, which suggests that when a BMS experiences a positive Climate, they feel affective and normative commitments more strongly. Therefore, Climate perceptions influence components of Commitment. This is potentially interesting to occupational psychologists and managers, who wish to discover ways to enhance employees' commitment (see Section 1.9). It may be that this could be achieved in part by concentrating on aspects of Climate. Consideration of the direction of the relationships between the various component of Commitment and Climate was not one of the aims of this study. However, a longitudinal study, as described in Section 5.7.4, to investigate this would clearly be a useful subject for future research.

5.7.4 Future investigations of the relationships between Job Satisfaction, components of Commitment and Individual Climate

The results presented here for BMSs and previous reports suggest that the relationships between Job Satisfaction, components of Commitment and Climate are complex. The discussion in 5.7.1 showed that this study, in agreement with others, found clear, positive interactions between Job Satisfaction and the affective and normative components of commitment. Similarly, section 5.7.2 showed that there is a strong positive relationship between Job Satisfaction and climate, which concurred with the literature. In each case, it is not apparent whether Job Satisfaction is the cause of effect of commitment or climate. It seems likely that the interactions are dynamic, as illustrated in Figure 5.1. As discussed in Section 5.7.3, the strength of the relationships between Job Satisfaction and the components of Commitment are reduced when the moderating effect of Climate is taken into consideration, indicated by the thinner, blue lines in Figure 5.1.

Figure 5.1: The possible interactions between Job Satisfaction, Commitment and Climate among BMSs



In order to clarify the nature of the relationship between Job Satisfaction and commitment, it would be necessary to conduct a longitudinal study, measuring each perception at timed intervals (e.g. 6 months) over a period of several years. If the study were to proceed for 3 years, then 6 sets of Job Satisfaction and commitment data for each participating individual could be collected. The initial number of subjects should be at least 1000, to allow for attrition

during the data collection period, but still leaving a statistically viable data set. Then it could be determined whether an individual scoring high for job satisfaction at Time A would be more likely to have a positive commitment score at the later Time B (job satisfaction predicts commitment) or *vice versa*. It would also be possible to investigate whether for example job satisfaction does predict commitment, but the effect takes several years to become apparent. A study designed in exactly the same way would be required to understand the extent to which job satisfaction predicts climate or whether the relationship should be considered in the opposite direction. By combining the two studies and measuring Job Satisfaction, affective and normative commitment and climate at each of the 6 time points in the same subjects, it should be possible to examine how all three perceptions interact. Specifically, the effect of climate on the relationship between job satisfaction and commitment could be examined in detail, which may provide a useful contribution to the understanding of these variables. BMSs have been shown here to respond to occupational psychology questionnaires similarly to other professionals, so future studies involving this group could be extrapolated to other employees. However, since the aims of this investigation were to explore how these psychological factors affect quality in microbiology laboratories, such a study was not undertaken here.

5.8 Quality scales

The quality scales developed for this study were designed to assess all the aspects of quality considered important by BMSs providing clinical microbiology services. They focussed on the monitoring of the technical work and the scientific competency of the staff. The need to devise a method to measure the quality of the science was unexpected. It was anticipated that some measure of technical quality would be available from another branch of science, for example engineering, that could have been adapted to the microbiology laboratory. However, the Institute of Quality Assurance (pers. comm.) was not aware of any suitable scale and a measure that could have been feasibly used for this investigation was not found in the literature.

A reliable method to compare technical standards in pathology departments, without disclosing confidential information, has apparently not been required for other studies of laboratory quality. Published reports of surveys addressing quality have concentrated on the need for the laboratory to canvas the views of users in order to provide a better service at a

local level (e.g. Pedler and Bint, 1991; Phillips, *et al.,* 1992; Morgan 1995; Boyde *et al.,* 1997). These papers all described how the data collected helped the individual laboratory to change practices, but none recommended more widely–applicable methods of measurement. Similarly, while the UK government has recently strongly emphasised the importance of quality in healthcare in recent years, for example in the consultation document 'A first class service: quality in the new NHS' (Department of Health, 1998b), such initiatives from senior managers and healthcare planners have concentrated on 'quality of the service', apparently taking the 'quality of the science' for granted.

It was therefore necessary to write items specifically for BMSs considering quality from the BMSs' point of view, which was achieved through consultation with practising BMSs and a panel of expert advisors in Quality Assurance (see Section 2.3). The use of information from a range of professionals involved in ensuring quality in clinical microbiology strengthens the validity of the measures.

From the items in the questionnaire sent to all participants, three scales clearly emerged, which was not predicted. This shows that BMSs clearly distinguished between their contribution as individuals, their colleagues, the laboratory as a team and overall laboratory quality. The overall mean scores for QUALSELF, QUALCOLL and QUALLAB were all above 3.00, which showed that on average BMSs perceived a positive approach to quality issues in their workplaces. The significant positive correlations between scores for the three measures indicated that respondents considered them all to be important and related aspects of achieving and maintaining high quality in microbiology laboratories. The LABSCORE scale combined all the indicators of technical quality currently used in UK microbiology laboratories, to assess each department's performance. The significant positive correlation between LABSCORE and QUALLAB, both at the level of individual BMSs ($r = 0.101$, $p<0.05$) and the selected laboratories where scores were aggregated (for non-PHLs: $r = 0.409$, $p<0.05$), indicates that where staff perceive the standards in their laboratory as high, this is likely to be confirmed by objective measures of performance.

5.8.1 Use and limitations of the QUALSELF scale

This scale was devised to assess the quality of the individual's work, by considering their attitudes to work and conscientiousness. Although a rating by a supervisor was initially considered for collecting data on this scale, BMSs involved in the preliminary work generally

reported negative experiences of this exercise. Also, it would have been logistically difficult to arrange, given the large numbers of laboratories and the variable number of individual BMSs per department participating in the questionnaire survey. A supervisor might be objective in assessing junior staff, but they may be influenced by a personality clash or perhaps not take the process sufficiently seriously to provide an accurate and useful account (Meyer and Allen, 1997).

A self-report scale was chosen in this case partly for practical reasons, but primarily because strict maintenance of confidentiality was important and it was thought that anything likely to compromise this could have adversely affected response rates. Meyer and Allen (1997) reviewed studies investigating individual performance as a possible outcome of Commitment, which have used either supervisor or individual assessment. They did not explicitly make a judgement about the validity of either, but seemed to suggest that results with supervisor ratings are less consistent (Meyer and Allen, 1997). In their own study of the components of Organisational and Professional Commitment, these authors used single items to ask nurses about both the result of their latest supervisor appraisal and their own rating of their overall performance (Meyer *et al.*, 1993). Although these were not directly compared, both measures were assessed on a 7-point scale and the means are similar. For "Supervisor evaluation of performance", mean = 5.92, SD=1.10 and for "Own evaluation of performance", mean = 5.89, SD = 0.79 (Meyer *et al.*, 1993, p. 547).

Therefore, the use of a self-report scale was theoretically robust. However, the QUALSELF scale proved statistically to be internally unreliable. It is not clear why this should have occurred when the correlation coefficients for the factor loading were all above 0.6 (Table 3.6.1). It appears to be common for Occupational Psychology researchers to use annual employee appraisal data as a measure of individual performance. For example, Meyer *et al.* (1993) specifically asked nurses about the results of this, as described above. In an earlier study, a method of obtaining an appraisal rating in a particular company was developed in collaboration with the Human Resource Department (Meyer *et al.*, 1989). Self-appraisal is widely accepted by Human Resource Management personnel as an effective means of evaluating the quality of a person's performance at work (McKenna, 1994). The QUALSELF scale was intended to assess individuals' attitudes towards their work, but a more explicit request for a performance rating may have been a more sensitive measure. A self-appraisal system which has been approved for use among health service workers might be more suitable for future investigations of the relationships of the quality of individual BMSs' work.

QUALSELF related as expected to the other measures of perceived quality in this study. Overall mean scores correlated significantly with QUALCOLL ($r= 0.306$, $p<0.001$) and QUALLAB ($r=0.219$, $p<0.001$) (see Table 3.6.4). Since QUALSELF showed the anticipated relationships with the statistically reliable QUALCOLL and QUALLAB (see Section 3.6.1), this implies that QUALSELF did provide a useful indication of the quality of an individual BMSs work. Therefore, despite the limitations discussed above, results from the QUALSELF scale were used in subsequent analyses, in order to identify possible relationships between Job Satisfaction, components of Commitment or Climate.

5.8.2 Use and limitations of QUALCOLL

The emergence of the factor now labelled QUALCOLL was unexpected. Since all the items were originally part of the PWE, it is effectively a dimension of Climate. However, factor analysis distinguished it from another aspect of Climate concerning standards of work among colleagues, 'employee competence', which was previously identified using the PWE measure (Newman, 1977; Jackofsky and Slocum, 1988). 'Employee competence' assessed how well qualified and trained respondents considered their colleagues to be, and contained items such as 'Staff have the proper background and training to do the job' (see Table 3.4.1). In contrast, QUALCOLL addressed perceived attitudes of staff in their department towards the work, using for example 'Staff are interested and deeply involved in their work' (see Table 3.6.1). Therefore QUALCOLL is a measure of the attitudes that colleagues in the laboratory appeared to have that would enhance the quality of work. It correlated significantly with QUALLAB ($r=0.535$, $p<0.001$), which indicates that BMSs considered attitudes of staff towards quality issues as strongly related to the overall orientation of the department towards quality. As the QUALCOLL scale assesses an individual BMS's perceptions of their colleagues, it indicates how the staff in their department appear to them, which may not reflect the true situation. For example, one BMS interviewed for case study 4 (Laboratory F, see section 4.5) felt that the management style in their laboratory was unhelpful and that their colleagues' attitudes towards quality issues were unsatisfactory. However, the other interviewees and the users of the microbiology service provided by Laboratory F did not share this perception.

5.8.3 Use and limitations of QUALLAB

The items in QUALLAB were a mixture of items from the PWE and those written for this study. Again, it is therefore a dimension of Climate, but one that extends the scope of Newman's (1977) measure by specifically addressing quality issues. One item that unexpectedly loaded onto this factor was 'I usually get positive feedback from my supervisor', which was intended by the researcher to be part of QUALSELF, in place of a direct question about supervisor appraisal rating. BMSs replying to the questionnaire seemed to interpret this instead as a comment on whether their supervisor was generally supportive towards them, which is a feature of a laboratory where managers are striving to enhance the quality of work in all staff.

QUALLAB was significantly related to LABSCORE ($r=0.105$, $p<0.05$), which shows that when BMSs perceive that standards within their laboratory are good and the staff are working to enhance quality, the department is likely to score highly on objective measures of performance. West *et al.* (1998) found a similar relationship between the 'research effectiveness' of a department, as estimated by the academic staff employed there and the actual RAE rating. They compared the RAE rating in 1989 with respondents' opinion in 1992 and found a significant correlation ($r=0.776, p<0.01$) and had a similar finding when they repeated the exercise for 1992 RAE score and staff rating in 1994 ($r=0.758, p<0.01$), although they did not compare the staff and RAE scores for 1992 (West *et al.*, 1998, p.272). It is likely that most staff would have been aware of a department's most recent RAE rating, which would have enhanced the correlation. Unless an individual was very critical of their department, the knowledge that, for example, they were rated highly according to the RAE would have also encouraged them to give their research work a high rating. Despite the differences in study design between this report involving academics and the present work among BMSs, the positive correlation between QUALLAB and LABSCORE supports the previous finding that staff perceptions of a department's quality reflect the actual quality, as rated by external assessment.

5.8.4 Use and limitations of LABSCORE scale

This scale was designed to provide a method of discriminating between the quality in microbiology laboratories, using objective measures of technical performance, as opposed to the perceptions of BMSs used in the other three quality scales, discussed in Sections 5.8.1 –

5.8.3. LABSCORE addressed the key elements of quality assurance in the UK, which have been identified by authors in this field (e.g. Gray, 1999; Kilshaw, 2000a).

Its main limitation was that the laboratory manager was asked to report on his own department. Therefore, it is open to the criticism that was not an impartial measure. However, as discussed below, there is evidence to suggest that mangers were honest in their replies. This is likely to have been encouraged by the independence of the research establishment (from the Department of Health or NHS) and the guarantee of confidentiality. The range of questions provided an overall rating of technical quality for each laboratory, which allowed discrimination between departments on an approximately normal distribution. This implies that it was an effective measure.

The finding that the LABSCORE means for the specialised types of laboratory, such as virology and bacteriology departments were higher than for the general microbiology and multidisciplinary laboratories was expected. Since they are employed either by teaching hospitals or the PHLS, staff in virology and bacteriology departments would have easier access to information about latest developments in their field than their colleagues in district general hospitals (for example, through better library facilities and more opportunities to attend postgraduate teaching sessions). They would be likely to be involved in diagnosis of more unusual infections and have the resources to research and implement new techniques, including those designed to improve quality. As an illustration, most reports in the literature regarding implementation of internal quality assurance and audit in microbiology laboratories in the UK come from PHLs (Gray *et al.*, 1991 a and b; Constantine *et al.*, 1993; Mifsud and Shafi, 1995). Staff in teaching hospitals are often motivated to operate to the highest standards through pride in working for a hospital with a long history and international reputation (for example, see comments from Case study 2 (Section 4.3). Also, the PHLS has recently introduced nationwide 'Standard Operating Procedures' (SOPs) and disseminates 'best practice' guidelines, such as those recently advocated for virology and serology laboratories by Finlay and Gray (2000). However, as discussed in Section 5.6.2, PHL employees in this study reported that they experienced a significantly poorer Climate. The implications of this in the light of the relationship between LABSCORE and Climate will be examined in Section 5.10.

The rationale for including each item in the LABSCORE scale and possible future modifications to improve the measure are considered below:

i) Participation in the National External Quality Assurance scheme (NEQAS):

The scheme for Microbiology in the UK is run by the Quality Assurance Laboratory of the Central Public Health Laboratory (QAL). Although participation in an EQA scheme is currently voluntary in this country, it is considered to be an important aspect of monitoring laboratory practice (Gray, 1999). Indeed, Kilshaw, (2000a, p.726) states that it is "designed to provide objective evidence of the quality of individual investigations and analyses and is essential for clinical laboratories".

ii) Performance in NEQAS:

Each laboratory receives a cumulative NEQAS score for each category of specimen that it has elected to have evaluated, in addition to the results from the latest batch of tests (for details, see Section 1.5.4). Despite that fact that NEQAS specimens are often treated with more care than routine patient samples (Snell and Hurley, 1992; comments in Case study 3, Section 4.4, Table 4.4.3.a and Case study 4, Section 4.5, Table 4.5.3.a), the score is considered a good indication of a laboratory's general standards. These results are confidential since the NEQAS schemes were set up to support good laboratory practice (Kilshaw, 2000a) with a view to helping, rather than punishing, persistently poor performers. This was recognised in the development of the LABSCORE scale and thus the item asked about overall performance in the last 5 years. It was considered that this would indicate general standards, without being so intrusive that laboratory managers would decline to answer. However, most respondents replied that their laboratory scored 'above average'. Given the large number of participating laboratories, it seems unlikely that most did not report themselves as 'about average'. While this could have been due to a tendency among participants to exaggerate, since the replies were anonymous and confidential, there was no incentive to do this. Evidence from replies to other items in LABSCORE (particularly regarding Internal Quality Assurance) suggests that laboratory managers in this study were generally very honest in their answers (see below). There were two possible reasons for the unexpected proportion of 'above average' replies. The first concerns the wording of the question, which enquired about scores over the last 5 years. Most laboratories participate in a number of NEQAS schemes (for example, general bacteriology, antibiotic sensitivity, virology), testing several types of specimen for a range of pathogens (Quality Assurance Laboratory, 1998a, 1998b). If a department had performed badly on one or two of these during the five-year period, but very well on all others the manager could still, correctly, record the overall performance as 'above average'. Also, if the laboratory had obtained low scores for all NEQAS tests during the last two of the five years, due to mergers and staff changes, after previous exemplary performance, again the score over

5 years could be reported as 'above average'. The responses received to this item suggest that the time period of 5 years was too long. The cumulative NEQAS scores are provided for the last 6-12 months, so in the light of the results obtained here, it would seem that altering the item in LABSCORE to consider the last 12 months, would improve the ability to distinguish those laboratories who were performing well at the time of the survey. The second concerns the nature of the 'cumulative score', which is reported as the standard error and as such is within the range $\pm$ 1.96. A score of +0.01, although in practice 'about average', is statistically above 0 and therefore 'above average'. Thus, while the item was designed not to demand disclosure of confidential information, the scope was too wide to discriminate between 'average', 'good' and 'excellent' NEQAS performance. A possible refinement would be to give numerical bands, for example:

Please indicate the band which includes the majority of your cumulative NEQAS scores for the last 12 months:

NEQAS score from	Band	NEQAS score from	Band
-1.96 to - 1.50	A	0 to 0.50	E
-1.49 to -1.00	B	0.51 to 1.00	F
-0.99 to –0.50	C	1.01 to 1.50	G
-0.49 to 0	D	1.51 to 1.96	H

The respondent would be asked to indicate in which band the majority of the laboratory's NEQAS score in the last 12 months had fallen. This would allow the measure to separate laboratories more clearly on the basis of NEQAS ratings. This seems to be an effective way to improve this item and strengthen LABSCORE. However, since the information is confidential, some managers may be reluctant to disclose a numerical result. The opinions of the head BMSs consulted informally to discuss this issue were divided into those who considered confidentiality unbreachable and those who said that they would be happy to give the required information, but thought that other laboratory managers might not. Before using this alteration in LABSCORE for future nationwide studies, the views of a large number of laboratory managers should be canvassed and the modified scale tested as part of a pilot study.

iii) Internal Quality Assurance (IQA) control:

Although IQA is recognised as an important part of quality assurance (Gray, 1999; Wright, 2000), many respondents in this study reported that it was yet to be implemented in their

laboratory. This indicates that respondents felt comfortable about giving truthful replies to the items in LABSCORE. For this study, it was therefore a good way of determining which laboratories were totally committed to quality. Reports of dealing with the practicalities of IQA are increasing (For example, Farrington, 1999; Wright, 2000) and local arrangements between laboratories to check each other's work are being used to good effect (Wright, 2000). Thus BMSs recognise the value of IQA and it was an important component of LABSCORE.

vi) Making results available to all BMSs and medical staff:

Dissemination of information about standards to all staff involved in testing specimens indicates a laboratory focussed on enhancing quality (Gray, 1999) where the contribution from each member of the laboratory team is valued.

v) Audit of laboratory quality systems: This item was included in LABSCORE to identify laboratories where the use of clinical audit in the laboratory context was recognised as a key feature of quality assurance, as recently identified (e.g. Farrington, 1992; Mifsud and Shafi, 1995; Anon, 1997; Gray, 1999). Although the item in LABSCORE specifically asked about laboratory quality, clinical audit of processes such as specimen collection and transport and timing and relevance of results are also advocated (Anon, 1997; Gray, 1999), as part of a continual programme of quality management (Sharp, 1999).

vi) Occurrence of serious incidents, mistakes or breeches of safety:

Apart from the legal requirements in the UK, awareness of health and safety is an important indicator of high standards in a laboratory (Snell, 1991). Correct maintenance and regular monitoring of equipment are part of quality assurance (Snell, 1991; Gray, 1999). This is to ensure that incubators are operating safely and at the correct temperature, to ensure maximum isolation rates of bacteria and viruses. However, this item was included in LABSCORE because technical problems with equipment or mistakes in labelling specimens (resulting in erroneous results being released) would highlight departments where commitment to quality assurance was superficial.

vii) User complaints:

These were specified as complaints from users regarding standards, turnaround times or usefulness of results. Reports from the literature (e.g. Peddecord *et al.*, 1996) and comments from interviewees in the case studies described here suggest that users only complain when serious problems occur. According to Pedler and Bint (1991), clinicians take the technical

accuracy of test results for granted. In the case studies (Chapter 4), doctors and nurses who commented on the quality of their local microbiology service only made points relating to customer service. This implies that that since technical standards did not warrant mention they were considered satisfactory.

Although assessment of 'service quality' was not attempted through LABSCORE, it is a very important part of a clinical laboratory 's function. Laboratory staff are part of a team contributing to patient care. Therefore, as well as operating to the highest scientific standards, they must be able to communicate effectively with and meet the needs of colleagues requiring the results. This issue of 'customer service' has been widely addressed in recent years, in business (e.g. Parasuraman *et al.*, 1988; Schneider *et al.*, 1998), healthcare (e.g. Proctor and Wright, 1998) and in clinical pathology (e.g. O'Connor, 1989; Mason, 1996). It will be considered in detail for this discussion in Section 5.11.

Feedback from service users is important in evaluating and helping to improve the laboratory's work (Caruana and Rizzo, 1995; Mason, 1996). In the context of the LABSCORE scale, it was thought that complaints from the customers would indicate a serious problem with the quality monitoring systems. So this item was included to highlight laboratories where staff claimed to be following quality assurance procedures fully, but the monitoring system had failed.

viii) CPA accreditation:

This shows that a laboratory has met nationally agreed standards in many areas relating to quality (see Section 1.5.6), which was the reason for the item in LABSCORE. Accreditation is not yet mandatory for hospital laboratories in the UK as it is in the USA (Lunz, *et al.*, 1987, 1992), although one respected author on laboratory quality issues has recently suggested that it should be (Kilshaw, 2000b).

Therefore all the items in LABSCORE consider important aspects of laboratory quality. As described above, the combination of items was used to balance possible over- (or under-) estimation of performance in one aspect of quality assurance. A department which achieved a maximum score would be indicating that senior staff were focussed on improving internal laboratory quality, but also showed an awareness of the importance of working with users of the service to enhance the clinical relevance of the technical microbiology. The LABSCORE scale proved to be effective in discriminating between laboratories in this study and with the

modification to item 'ii', described above, could do so on any future research. Since microbiology is not specifically mentioned in any item, the scale would be applicable to other types of clinical laboratory.

5.9 Predictors of Quality

As expected, the aspects of quality measured in this study were positively related to Job Satisfaction, components of Commitment and Individual Climate. Dimensions of Climate emerged from MRA analyses as strong predictors of perceived laboratory quality, accounting for 73% of the variance in QUALLAB (R^2 = 0.727, Table 3.7.4). A combination of components of Commitment and dimensions of Climate explained 50% of the variance in QUALCOLL. (R^2 = 0.494, Table 3.7.3). Factors explored in this study only accounted for 10% of the variance in QUALSELF (R = 0.112, see Table 3.7.2). This may indicate that perceptions other than Commitment or Climate could be influencing an individual's assessment of the quality of their own work, although as discussed in Section 5.8.1, modifications to the QUALSELF scale might lead to a stronger relationship.

*5.9.1 Relationships between Job Satisfaction and perceptions of quality**

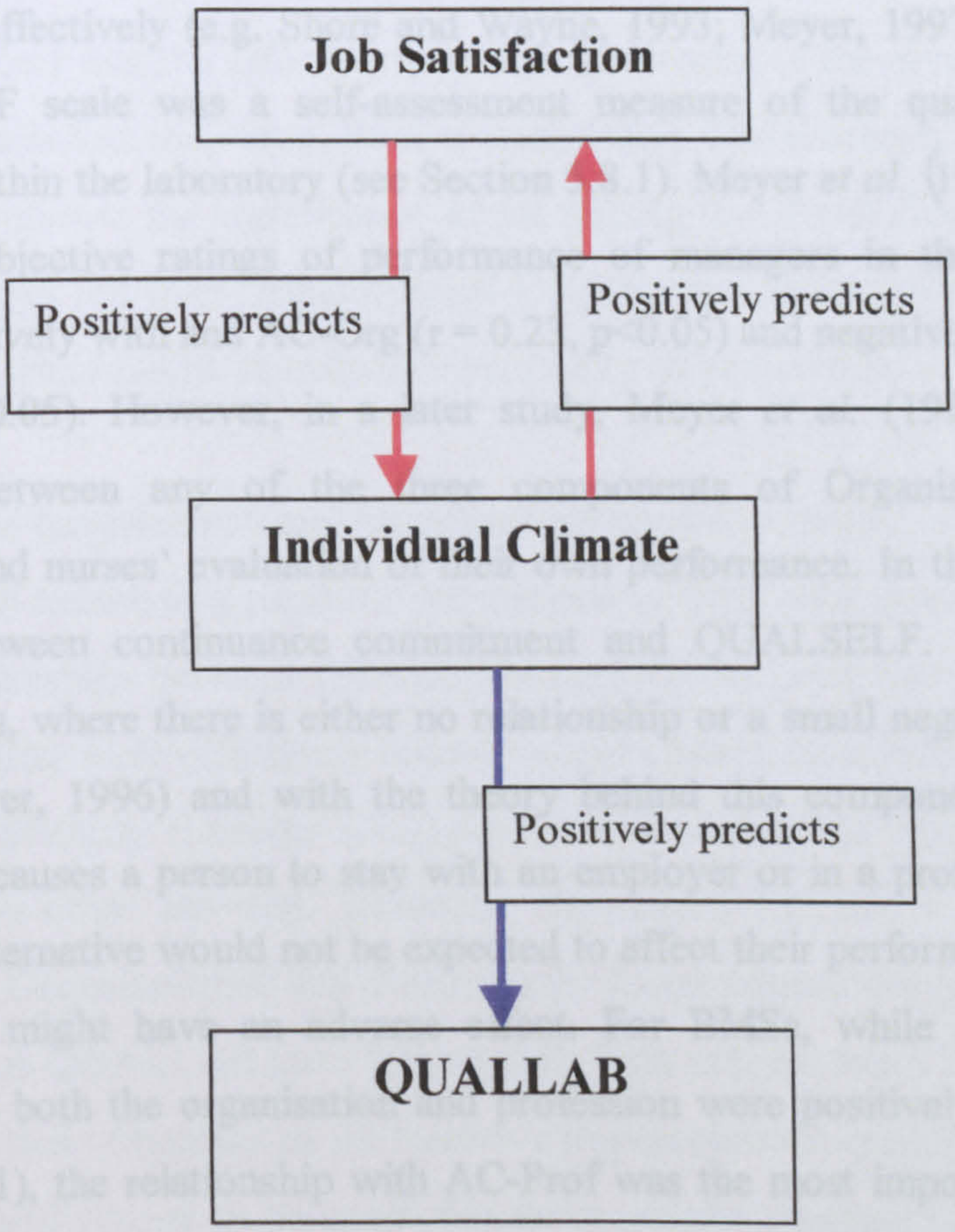
Job Satisfaction was conceived as an attitude which could affect performance at work, although there is no strong evidence for a positive relationship (Dipoye *et al.*, 1994; McKenna, 1994; Furnham, 1997). In this study, BMSs who perceived the standards of their own work to be high were more likely to have a positive Job Satisfaction score, as there was a significant correlation between QUALSELF and Job Satisfaction ($r = 0.144$, $p<0.01$, see Table 3.7.1). A BMS might experience high Job Satisfaction because they consider their work to be of good quality or the opposite may be true. However, both perceptions might have been influenced by a third factor, such as commitment (see Sections 5.7.1 and 5.9.2). As illustrated in Figure 3.7.1, QUALSELF was most strongly predicted by AC-Prof, which in turn was predicted mainly by Job Satisfaction. Therefore, although Job Satisfaction appeared to have some direct influence on QUALSELF, its main effect on individual BMSs' attitude to their own work was through AC-Prof.

* This discussion has been published as: Pitt (2000) "Benchmarks: The importance of staff Job Satisfaction in provision of a high quality microbiology service". *Communicable Disease and Public Health*, **3:** 313-314 (see Appendix F).

QUALCOLL and QUALLAB emerged during data analysis to be dimensions of Climate (see Sections 5.8.2 and 5.8.3). Job Satisfaction was strongly related to Individual Climate (see Section 5.7.2) and therefore the significant correlations with the quality measures (for QUALCOLL, $r = 0.436$, $p<0.01$; for QUALLAB, $r = 0.647$, $p< 0.01$) were expected. This study has shown that Job Satisfaction and Individual Climate among BMSs are likely to have a reciprocal effect on each other (see Section 5.7.2, Figure 3.5.1). Four out of the 8 dimensions of the PWE were involved in the MRA equation which predicted QUALCOLL, while 7 PWE factors combined to explain over 70% of the variance in QUALLAB (see Section 5.9.3). Thus, Job Satisfaction appears to influence QUALCOLL and QUALLAB via Climate. The most important relationship is that between Job Satisfaction, Individual Climate and QUALLAB, as illustrated in Figure 5.2.

Individual Climate and QUALLAB scores, taken at a departmental level, were shown to be related to laboratory quality, as measured by LABSCORE (see Section 5.10).

Figure 5.2: The relationship between Job Satisfaction, Individual Climate and QUALLAB for BMSs



Thus, Job Satisfaction among BMSs has a clear role in influencing quality in clinical microbiology laboratories at two levels:

i) Individual quality: Job Satisfaction predicted AC-Prof, which predicted QUALSELF
ii) Laboratory quality: Job Satisfaction strongly influenced Climate, which predicted QUALLAB.

5.9.2 Relationships between components of Commitment and perceptions of quality

Performance of individuals at work has not been conclusively shown to be related to commitment (Mathieu and Zajac, 1990, Meyer, 1997). This is because most studies have not been designed to investigate this relationship explicitly (Mathieu and Zajac, 1990). Also, the type of 'performance' measured does not appear to be consistent, which means that the overall amount of evidence is small. Some researchers have collected self-assessment or supervisor appraisal data (see Section 5.8.1) to rate an individual's abilities to do their job (e.g. Meyer *et al.*, 1989; Meyer *et al.*, 1993). Others have examined a person's attitudes towards tasks which are not part of their specific job description, but which help colleagues or the organisation to function more effectively (e.g. Shore and Wayne, 1993; Meyer, 1997). In the present study, the QUALSELF scale was a self-assessment measure of the quality of an individual's performance within the laboratory (see Section 5.8.1). Meyer *et al.* (1989, p.154) reported that supervisors' subjective ratings of performance of managers in the food service industry correlated positively with and AC-Org ($r = 0.23$, $p<0.05$) and negatively with CC-Org ($r = -0.25$, $p<0.05$). However, in a later study, Meyer *et al.* (1993) found no significant relationships between any of the three components of Organisational or Professional Commitment and nurses' evaluation of their own performance. In this study, no relationship was found between continuance commitment and QUALSELF. This is consistent with previous studies, where there is either no relationship or a small negative one (for review see Allen and Meyer, 1996) and with the theory behind this component of commitment. The attitude which causes a person to stay with an employer or in a profession because they feel they have no alternative would not be expected to affect their performance, although if the CC was strong, it might have an adverse effect. For BMSs, while affective and normative commitment to both the organisation and profession were positively related to QUALSELF (see Table 3.7.1), the relationship with AC-Prof was the most important. Not only was AC-

Prof the strongest correlate of QUALSELF ($r = 0.256$, $p<0.01$), it was also the main predictor in the MRA ($\beta = 0.244$) (see Table 3.7.2, Figure 3.7.1). Although this finding has not been widely reported in the literature, it seems to make intuitive sense. A BMS with a deep bonding commitment to their profession would be likely to work conscientiously within the laboratory. The results presented here suggest that this positive attitude towards work leads to a stronger commitment to the profession, although good performance is usually conceived as a consequence of commitment (Mathieu and Zajac, 1990; Meyer, 1997). This difference is because the aim of this study was to investigate factors which influence the quality of work in microbiology laboratories. Commitment was measured as one of the possible variables predicting quality, whereas most studies of commitment are designed to investigate the opposite. NCO emerged as a negative predictor of QUALSELF ($\beta = -0.099$), which may indicate that BMSs expressing the normative component of commitment are more likely to show a self-critical, conscientious attitude to their work. This relationship between NC and performance has not been previously reported (Allen and Meyer, 1996), which is also likely to be attributable to study design.

This study has shown that the type of commitment which had the most effect on QUALSELF, was AC-Prof, which is important for two reasons:

i) It shows that the affective type of commitment is the strongest determinant of the quality of an individual BMS's work within the laboratory.

ii) It reinforces the significance of the finding that Professional Commitment is more strongly felt than Organisational Commitment among this group, by showing that the former has more influence on quality of performance.

Commitment, its determinants and outcomes are usually assessed at an individual level, and studies of how it relates to a person's perceptions of their colleagues seem to be rare. In this study, the relationships between QUALCOLL and QUALLAB were investigated. These two measures of quality were effectively dimensions of climate (see Sections 5.8.2 and 5.8.3) and, as described previously (Section 5.7.3) studies considering the influences commitment and climate on each other are rare. However, the results for BMSs show that the affective components of Organisational and Professional Commitment are positively related to both QUALCOLL and QUALLAB (see Table 3.7.1). This implies that a BMS who feels a bonding commitment to their employer or profession will perceive the quality of their colleagues' and overall department's work to be good. Similarly, results presented here suggest that a BMS

who feels an obligation to their employer or profession has a positive attitude towards quality issues (Table 3.7.1). CC-Prof showed a positive correlation with QUALCOLL ($r = 0.112$, $p<0.01$), indicating that one of the considerations for BMSs who consider that they cannot leave the profession is that they would lose colleagues who work to high standards. The weak, but statistically significant, negative correlation between CC-Org and QUALLAB ($r= -0.074$, $p<0.05$) implies that BMSs who strongly feel that they have no alterative but to stay with their employer are slightly more likely to consider the attitudes towards quality of work in their laboratory to be poor.

Components of commitment made small contributions as predictors of QUALCOLL (NC-Prof, $\beta = 0.093$; AC-Prof, $\beta = 0.091$; CC-Org, $\beta = 0.073$, see Table 3.7.3), but were not important in predicting QUALLAB (Table 3.7.4, Figure 3.7.3). As described above, the aim of this study was to investigate whether commitment influenced the person's attitude to quality issues. To determine the direction of these relationships would require a longitudinal study, similar to that outlined in Section 5.8.4.

These results suggest that the aspect of quality most influenced by commitment is QUALSELF and that the most important component of commitment for BMSs is AC-Prof.

5.9.3 Relationships between Individual Climate and perceptions of quality

As discussed previously (Section 5.6.2), the effects of climate are usually investigated at a departmental or organisational level. Therefore detailed comparisons of the present findings of the relationship between Climate and the measures of quality with published data are not possible. The discussion in Section 5.10 shows that there is good evidence from the literature that climate has a positive influence on performance at a departmental level.

In this study, Individual Climate was the second most significant correlate of QUALSELF ($r = 0.227$, $p<0.01$, see Table 3.7.1) and two dimensions of Climate were predictors of individual BMSs' assessment of their own performance ('task characteristics' $\beta = 0.139$; 'employee competence' $\beta = 0.110$, see Table 3.7.2). This suggests that BMSs are more likely to assess themselves as performing well when they perceive their job to be sufficiently variable to be interesting, but that all colleagues are working within their capabilities. Therefore, these are

the aspects of Climate which BMSs consider to be important in supporting good practice in individuals.

A significant correlation was shown between Individual Climate and QUALCOLL ($r = 0.582$, $p<0.01$, see Table 3.7.1), which was expected because QUALCOLL is effectively a dimension of Climate (see Section 5.2). The most important predictor of QUALCOLL was Co-worker relations ($\beta = 0.414$, see Table 3.7.3), which was also anticipated, since BMSs who think highly of their colleagues as people, would be more likely to trust and respect them as professionals.

Climate showed the strongest relationship with QUALLAB, with a very high correlation ($r = 0.823$, $p<0.01$, see Table 3.7.1) and dimensions of Climate forming a strong predictive equation from MRA ($R^2 = 0.727$, see Table 3.7.4). It is interesting that 'supervisory style' was the strongest predictor of both QUALLAB ($\beta = 0.460$, see Table 3.7.4) and Job Satisfaction ($\beta = 0.388$, see Table 3.5.2). This implies that laboratory managers and section leaders attitudes are a very important influence on a BMS's perceptions of the quality of work in their department, while they also affect Job Satisfaction (see Section 5.7.2).

All dimensions of the PWE (see Table 3.4.1) except 'layout of laboratory' were predictors of QUALLAB (see Table 3.7.4, Figure 3.7.3). This indicates that when a BMS experiences a positive and supportive Climate with their department, they are more likely to consider that their laboratory has the right attitude towards quality issues. This relationship between the dimensions of the PWE and QUALLAB, and the consequences for laboratory performance are discussed in detail in Section 5.10.

5.10 A Climate for Laboratory Quality

Since interactions between people are considered to be important determinants of climate, it is often necessary to investigate the overall perceptions of a particular group of people within an organisation. The issue of 'organisational' climate was not addressed in this work, since while it could be argued that the prevailing culture of each hospital or PHL would be underpinning the climate in each department, the perceptions of the biomedical scientists in the microbiology laboratory are likely to be peculiar to them. Both climate and culture are visualised as complex, multidimensional and multilayered (Pettigrew, 1990). However, data

from this investigation cannot be extrapolated to the wider organisations (hospitals, NHS, PHLS), since only one group of staff (BMSs) participated in the study. Indeed, for non-PHLS laboratories, only a single department (usually microbiology) within the hospital was investigated. Organisational commitment has been shown here to be less important for BMSs than professional commitment (Section 5.5), which concurs with current academic thinking about commitment in professionals (Pitt *et al.*, 2000). The consideration of departmental rather than organisational climate in this same study group is therefore consistent with the findings for commitment and an accepted research perspective.

It is argued that it is valid to analyse psychological climate scores (referred to as 'Individual Climate' in this study) according to any meaningful group (Payne, 1990; Schneider, 1990). Thus, mean scores from people who work in a single department or are members of the same work team can be calculated, since these have practical relevance (e.g. Schneider *et al.*, 1998; Anderson and West, 1998; West *et al.*, 1998; Zohar, 2000). Another approach is to assess which staff in an organisation have similar perceptions, through cluster analysis (e.g. Jackosky and Slocum, 1988, Patterson *et al.*, 1996). Advocates of 'collective climates' (e.g. Jackofsky and Slocum, 1998,1990; Joyce and Slocum, 1990) suggest that investigation of how these occur within organisations enhances understanding of the formation of climates. However, their work has been criticised, notably by Payne (1990), who argued that it is not helpful to focus research on a grouping that does not make practical sense within the organisation. He considered that apparent clusters might have formed among staff who have similar levels of another factor, such as job satisfaction (Payne, 1990). This argument was supported by a study conducted by Payne and colleagues, involving employees of a UK construction company, who worked in either the office or on sites in two geographical areas (Patterson *et al.*, 1996). They failed to find evidence for formation of collective climates among participants in their study. The significance of grouping climate scores in different ways is clearly the subject of ongoing debate. In this study, results from colleagues in one laboratory, or section of a PHL, were aggregated, in order to investigate the effect of 'Laboratory Climate' on departmental performance in measures of quality.

Aggregation of climate scores to measure climate in a specific group of employees in an organisation is reported widely in the literature (for example, Kozlowski and Hults, 1987; Anderson and West, 1998; Schneider *et al.*, 1998; West *et al.*, 1998; Zohar, 2000). Where aggregate scores are used, it is necessary to confirm that the results from each individual are generally similar and the $r_{WG(J)}$ test (James *et al.*,1984) is an established method (Kozlowski

and Hults, 1987; Anderson and West, 1998; Schneider *et al.,* 1998; West *et al.,* 1998; Zohar, 2000). As the $r_{WG(J)}$ is a measure of the statistical validity of aggregating data sets and the interest in the results is whether they exceed the cut-off (0.7), actual figures are not usually reported in journal articles. For example, West *et al.* (1998) state that their results were satisfactory, but do not quote figures. Schneider *et al.* (1998) give average $r_{WG(J)}$ scores for each of their aggregated data sets, which were 0.75 in 1990 and 0.78 in 1992 for the climate scores of bank staff (Schneider *et al.*,1998, p.155). Anderson and West, (1998) provide mean results for 148 work teams broken down into 5 categories (NHS management, primary care, social services, psychiatric and oil company teams). These range from 0.67 through to 0.97 (Anderson and West, 1998, p.253). The $r_{WG(J)}$ scores for the aggregated Laboratory Climate and QUALLAB data presented here therefore appear to be higher than those reported from other studies. One reason for this could be the selection of only laboratories where 50% or more staff had returned climate results (or 9 people or greater for larger departments), which is more rigorous than in other cases where information has been provided. For example, West *et al.* (1998) set their criteria for an academic departments' inclusion in their study as questionnaire responses from 30% of staff or 5 people. The more stringent selection procedure was used in this study because it was considered that with results from half or more of the BMSs, the effects of one person's eccentrically high or low climate score would be less likely to skew a department's overall result. Although the overall climate scores were aggregated in this study, the $r_{WG(J)}$ test would not produce useful results on a 37 item scale. Therefore, the 12-item Supervisory style scale was used since this dimension of climate contained the largest number of items, had the strongest internal consistency ($\alpha = 0.92$) and was the most important predictor of quality.

The use of ANOVA to demonstrate that there were clear differences between mean climate scores from the selected departments also follows current research methods (Anderson and West, 1998; West *et al.,* 1998; Zohar, 2000). If at least some of the scores are significantly different, this indicates that the climate scale has measured perceptions within each department, rather than an overall organisational climate (West *et al.,* 1998). In the case of the microbiology departments considered here, the results from the non-PHL laboratories showed clear discrimination, which would not have occurred if the BMSs were reporting their experience of, for example, NHS climate. The ANOVA results for the PHL sections showed statistically weaker differences, suggesting that the perceptions of staff in regional laboratories are partly influenced by the organisational climate of the PHLS. While the result for

'supervisory style' was not statistically significant ($F_{11,84} = 1.463$, $p>0.1$), the F value does exceed 1.0, which is the cut-off suggested by Anderson and West (1998) to indicate an adequate level of difference between groups. Since the differences in mean scores for Laboratory Climate and QUALLAB were acceptable, the analysis of their relationships with LABSCORE was continued. However, in the light of the discrepancies between the ANOVA results for the PHL sections and those for the other departments, as well as the previous findings that PHLS employees reported Individual Climate scores which were quite different from those of other BMSs, the results from the 12 PHL sections were considered separately.

Schneider and his colleagues have studied in detail the relationship between bank customers' perceptions of service and the climate experienced by employees of the bank (Schneider, 1990; Schneider *et al.*, 1992; Schneider *et al.*, 1998). They suggest that when staff feel that they are supported by their managers, have adequate resources and training to do their job well they are free from internal difficulties to concentrate on providing a high quality service from the customers' point of view. They call these elements of general climate 'foundation issues' (Schneider *et al.*, 1998). Referring to their working definition of climate (see Section 1.10) they propose that for customers to feel that a company provides a good service there must be 'a climate for service' among staff. This is "employee perceptions of the practices, procedures and behaviors that get rewarded, supported and expected with regard to customer service quality" (Schneider *et al.*, 1998, p.151). They found that foundation issues must be in place, but alone are not enough to ensure excellence in bank service. There must be a conscious attitude towards providing a good service among bank staff, which is noticed by the customers.

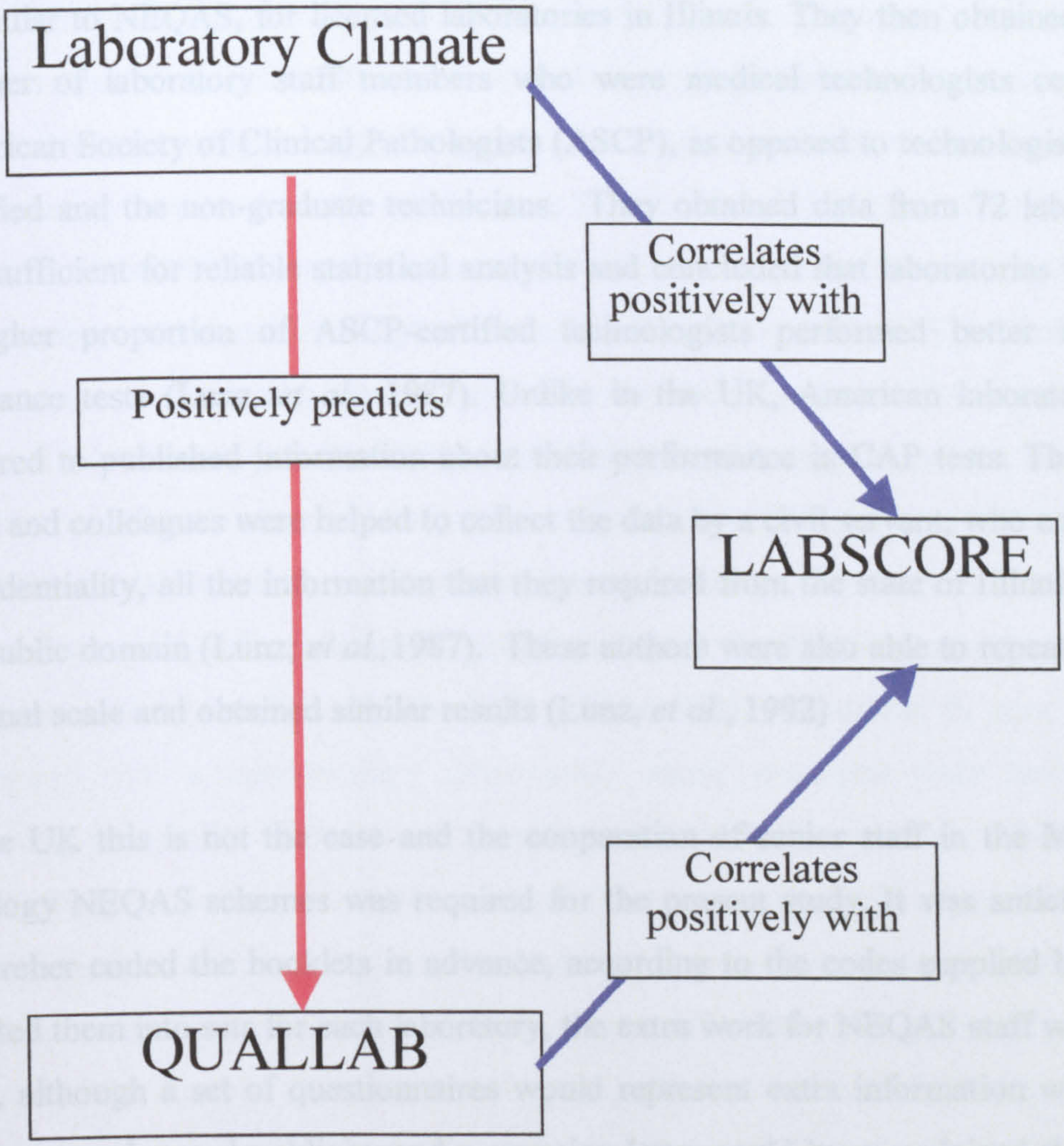
The results presented here consider the outcome of objectively measured technical standards (LABSCORE), rather than customer perceptions. However, by analogy with Schneider's work, this study has shown that there are 'foundation issues' of climate, for microbiology laboratories, which were described in Section 5.6. This work has also identified a further perception among BMSs regarding attitudes promoting quality, QUALLAB (see Section 5.8.3), which can be thought of as 'a Climate for Laboratory Quality'.

The effects of Laboratory Climate and QUALLAB on LABSCORE were investigated in detail for 29 non-PHL laboratories and 12 PHL sections. The results showed that, for a representative sample of the microbiology laboratories participating in this study, when the climate, which is perceived and moulded by the group of BMSs in a given laboratory is

positive, the standard of work in that laboratory is likely to be high. The opposite is also likely to be true. The positive correlation found between LABSCORE and Laboratory climate, indicates that where staff perceived the foundation issues of climate within their workplace, the technical standards are likely to be high. The finding that the positive correlation between LABSCORE and QUALLAB is slightly stronger suggests that the general laboratory climate can help to keep technical standards high, but where there is a conscious positive 'climate for laboratory quality', performance in these objective measures is better. Also, since Laboratory Climate so strongly predicts QUALLAB, this shows that in microbiology laboratories, the foundation issues must be in place to support 'Climate for Laboratory Quality'. These relationships are illustrated by the model shown in Figure 5.3. This finding is important because technical quality in pathology laboratories is a scientific measure that is usually thought of as assessing how well 'Standard Operating Procedures' (Bolton and Howe, 1999; Finlay and Gray, 20000 have been followed by man and machine. Thus managers might feel that quality is controllable at the level of quality assurance regardless of the attitudes of the laboratory staff. The work presented here has shown that BMSs' experiences in the workplace, particularly their perceptions towards quality have a very strong bearing on technical performance.

While results from the PHL sections showed the same trends, the spread of LABSCORE, Laboratory Quality and QUALLAB scores was much narrower, implying that there is a less clear distinction between departments within the PHLS than for the other laboratories in this study. Therefore a thorough investigation into the effects of the PHLS 'organisational climate' on individual departments and employees is required before further studies of Laboratory Climate and QUALLAB can provide useful results.

Figure 5.3: The relationships which determine the development of 'A Climate for Laboratory Quality'



5.11 Confirmation of the relationship between Laboratory Climate, QUALLAB and performance on NEQAS.

It was hoped that the link between a 'Climate for Laboratory Quality' and a departments' performance could be confirmed by using a nationally recognised measure to quantify technical quality. The study by West *et al.* (1998) of the relationship between University departmental Climate and performance, described above, took a similar approach to the one proposed here. Their measure of performance was the rating in the Research Assessment Exercise (RAE), which is made by external assessment and organised by the UK Higher

Education Funding Council. In contrast to the NEQAS scores, RAE ratings are published and the information is widely disseminated. Lunz *et al.,* (1987), also used an external rating of quality in their work, in clinical laboratories in the USA. These authors collected information about performance in the College of American Pathologists (CAP) 'proficiency tests', which is similar to NEQAS, for licensed laboratories in Illinois. They then obtained data about the number of laboratory staff members who were medical technologists certified with the American Society of Clinical Pathologists (ASCP), as opposed to technologists who were not certified and the non-graduate technicians. They obtained data from 72 laboratories, which was sufficient for reliable statistical analysis and concluded that laboratories which employed a higher proportion of ASCP-certified technologists performed better in CAP quality assurance tests (Lunz, *et al.,* 1987). Unlike in the UK, American laboratories are legally required to published information about their performance in CAP tests. Therefore although Lunz and colleagues were helped to collect the data by a civil servant, who ensured laboratory confidentiality, all the information that they required from the state of Illinois records was in the public domain (Lunz, *et al.*, 1987). These authors were also able to repeat their study on a national scale and obtained similar results (Lunz, *et al.*, 1992)

In the UK this is not the case and the cooperation of senior staff in the Microbiology and Virology NEQAS schemes was required for the present study. It was anticipated that if the researcher coded the booklets in advance, according to the codes supplied by the QAL, and collated them into sets for each laboratory, the extra work for NEQAS staff would be reduced. Also, although a set of questionnaires would represent extra information with the unknown specimens, advanced publicity and a covering letter could have explained the purpose of the survey to laboratory staff. However, it was considered that setting a precedent for enclosing more than the minimum paperwork required to report the results from the unknown specimens was not desirable. While participation in the NEQAS scheme is usual, it is voluntary in the UK and it would not have been justified to jeopardise the continued cooperation of clinical laboratories in this important quality assurance monitoring for the sake of the present study.

It was recognised that the issue of confidentiality is extremely important for the satisfactory operation of the NEQAS scheme. This is the reason that the LABSCORE measure, involving an assessment by each laboratory manager of their department's performance, was devised for the main national survey. However, it was expected that previous feedback to the participants in the study and publicity from published work, which had all strictly maintained individual confidentiality, would have helped allay any misgivings.

The NEQAS score was proposed as an indication of laboratory quality due to its nationwide implementation, thus allowing comparison between departments, using a measure widely accepted by BMSs. Also since the assessment is made through an external body and confidentiality in the scheme is carefully guarded, it was considered to be a more objective measure than the LABSCORE devised for this study. However, experience and discussions with laboratory managers suggest that a laboratory that performs well in this scheme may not be producing results of better quality than a laboratory that has an average score. It is well known that the NEQAS specimens are treated with more care than routine work, as most laboratories want to achieve a good score (Snell and Hawkins, 1992). These authors found that in some departments, quality assurance material is only handled by staff at BMS2 or higher. This is contrary to the NEQAS guidelines, which suggest that the specimens are used as a check of the laboratories' routine systems. Individual results are not published, but BMSs in different laboratories could exchange information about their respective NEQAS performances and make judgements about quality. In the PHLS, results from each laboratory are disseminated to staff in all other PHLs (Head BMS, Laboratory B, pers. comm.) It could be argued that a microbiology department whose managers were truly committed to improving the quality of their work would encourage staff to treat the NEQAS specimens in exactly the same fashion as routine samples. This would highlight any problems, which could be addressed, thus enhancing quality. However a laboratory which regarded NEQAS as a 'check of procedures' rather than a 'test to be passed' could score relatively poorly. Managers who take the former approach are increasingly worried that NEQAS scores might be published in future as 'league tables', with the potential consequence of being penalised for appearing to perform badly (Consultant Microbiologist, Laboratory C, pers. comm.).

Given the organisation and purposes of the NEQAS scheme, it does not seem likely that access to the information required will be granted for further work on the relationship with Laboratory Climate at present. However, Kilshaw (2000b) expressed the opinion that there is no justification for the strict confidentiality of NEQAS results. As he points out, performance is already disclosed to CPA inspectors as part of their assessment (see Section 1.5.5). It is therefore possible that views of laboratory managers and healthcare administrators might change, allowing easier access to the data for future researchers in 5-10 years time.

In the meantime, confirmation of the relationships between Laboratory Climate, Laboratory QUALLAB and technical Quality (illustrated in Figure 5.2) could be carried out using the

modified version of LABSCORE discussed in detail in Section 5.8.4. Questionnaires could he distributed to laboratory staff in the same way as described for the present study (see Section 2.3). Since the refined PWE (see Table 3.4.1) and QUALLAB (see Table 3.6.1) scales do not contain any items that would not be applicable to Medical Microbiologists, Clinical Scientists or Medical Laboratory Assistants, they would be suitable to assess perceptions of Climate in all staff in a given laboratory. Although BMSs perform the routine work and are the largest group of employees in microbiology laboratories, attitudes of other staff should also be taken into account to give an accurate indication of Climate. The reduced number of items on the questionnaire should make it seem less daunting and enhance response rates. This would provide more data for each individual department and should allow aggregation of scores from a greater number of laboratories, which would strengthen the analyses. The revised LABSCORE sheet, which should be able to discriminate more clearly between laboratories, could be sent to the laboratory managers in the same way as reported here. Since no items in any of the scales specifically mention microbiology, they could be used to assess Climate and technical quality among staff in other types of pathology laboratory.

5.12 Descriptions of Laboratory Climate in four microbiology laboratories

Newman (1977) designed the PWE (see Sections 3.4 and 5.6) for use in analysing climates in particular organisations or departments. This is useful for initial investigations of individual situations (for example, prior to implementing a change) or for providing a description of climate in a type of workplace, as in this study.

The four laboratories where staff participated in interviews were quite different in some respects. The two NHS laboratories that were part of hospitals in suburban areas (Laboratory C and Laboratory F) were in different parts of England, while Laboratory E provided a similar service to the local NHS hospital and general practitioners while being part of a private company. Laboratory D was located in an inner city hospital and provided a specialist diagnostic service.

However, staff in all four departments were similar in their supportive attitude towards the study. Most interviewees reacted positively to all the Laboratory Climate questions. In general, the responses described coherent perceptions of climate among all the staff in each individual laboratory, which supports the idea that a climate perceived by all members of a

microbiology department is meaningful (Payne, 1990; Schneider, 1990). The interview questions considered the dimensions of the PWE which appeared from the quantitative data analysis to be important for BMSs (see Sections 3.4 and 5.6). Since the interviewees raised no other issues relating to climate, this indicates that these dimensions of the PWE do provide a good description of Laboratory Climate for BMSs. Overall, the Climates within all the laboratories appeared to be positive.

A common feature of the four departments was the management style. The head BMSs were all trying to be fair in their dealings with personnel within the laboratory, support their staff when communicating with people outside of the laboratory and to encourage good relationships with colleagues. Climate theory suggests that members of a team will tend to form a coherent perception of their workplace (Schneider and Reichers, 1983) and someone who does not share this will either adapt or resign from the group (see Section 1.10.2). The staff in Laboratory C showed the least diversity in their replies. There was agreement among the interviewees that there was a good 'atmosphere' within the laboratory and indeed the hospital as a whole (Section 4.2.1). The reason which was repeatedly given for this was the small size of the department, helped by a strong, supportive management, which allowed the development of robust relationships between colleagues (Table 4.2.2). Although less than half of the staff in Laboratory D were available for interview, they made similar, positive comments about their colleagues and managers. The point was again raised that the relatively small number of staff in the department meant that everybody knew each other well, which was an advantage for good team work (Table 4.3.2). Most of the interviewees from Laboratory E were happy with their jobs, liked and respected their colleagues and were highly motivated to perform well (Table 4.4.2). This was also the case for Laboratory F (Table 4.5.2). In contrast to the first two laboratories visited, there was a single BMS among the study participants from both Laboratories E and F who consistently made negative comments about the management style in their departments. Although they were critical of the management and questioned the quality of their department's, both these interviewees appeared to have good relationships with their peers. It is likely that the teams in these departments were strong enough to support one or two dissenters.

The repetitive nature of their job was commented on by several BMS1s and acknowledged by their managers, who were conscious of the need to encourage variety within the necessary, routine tasks and also career progression. However, some interviewees clearly did not want to change. For example, Interviewee 16, a BMS 1 said

"I haven't done anything to improve my chances of doing that [being employed at a higher grade]"

It is interesting to note the similar sizes of the four laboratories. The number of staff (including medical and support staff) ranged from 11 (Laboratory C) to 18 (Laboratory E), which is within the optimal band for Individual Climate suggested by the questionnaire data (see Sections 3.4.4 and 5.6.2). The comments of interviewees also supported this, for example:

" I enjoy working here.....because it's not too big a laboratory"
Interviewee 15

The responses of staff in these four different laboratories supported the findings from the questionnaire data that positive Individual Climates are experienced by staff in relatively small laboratories. Since it was not possible to arrange detailed interviews of staff in any larger laboratories, it was not possible to investigate whether Climate was more likely to be negative in that situation.

5.13 Case studies of Service Quality

Service quality is a concept from retailing, devised to help companies understand and respond to customer needs (Parasuraman *et al,* 1998). However, it is also relevant to healthcare, since the clinical staff in one department of a hospital, using the services of another, can be thought of as 'customers' (O'Connor, 1989). Studies by staff in pathology laboratories in the UK have applied the idea of service quality to their local situation with good effect (for example, Pedler and Bint, 1991; Morgan, 1995; Boyde *et al,* 1997) and obtaining feedback from 'users' is a component of the 'evaluation' process for CPA accreditation (see Section 1.5.5).

The case studies described here investigated whether Climate for Laboratory Quality influenced service quality. The four laboratories who participated in this part of the study reported that they performed well in technical measures of quality and were highly regarded by most of their users (Sections 4.2 - 4.5). Staff in each department also described a positive Laboratory Climate (see Section 5.12). It was therefore not possible to examine the effect of negative perceptions of Climate on service quality.

In each of the four case studies, most laboratory staff interviewed considered that the quality of their department's work was at least 'good', if not 'very good' (75% Laboratory C, 100% for Laboratory D, 91% for Laboratory E and 88% for Laboratory F, see Sections 4.2 - 4.5 respectively). These perceptions indicate that 'A Climate for Laboratory Quality' (see Section 5.10) had been developed in the four departments investigated here.

It is interesting that 88% of all participating users perceived that their local microbiology department provided the service they needed. In contrast only about half (51%) of the laboratory staff believed that the users were satisfied, while most felt they could not make a true judgement, due to lack of feedback (Section 4.6). Parasuraman *et al* (1988) devised the SERVQUAL measure to help service providers obtain and respond to feedback from customers. This is an important part of providing a good service. The laboratory staff interviewed for this study clearly felt that they did not receive enough constructive feedback, which could have helped them to judge the standard of their service, although most perceived that quality of the microbiology within their department to be high. This confirms that, for laboratory staff, 'A Climate for Laboratory Quality' is not equivalent to service quality.

The number of users who responded to the study was small (n=17), but all groups of healthcare workers who might have an opinion about the microbiology service (i.e. hospital doctors, senior nurses, general practitioners and midwives) were represented among them. The users considered 'rapid turnaround time' to be the most important requirement for a pathology service (Table 4.6.2). This concurs with previous findings for clinical laboratories (Hilborne *et al*, 1989; Pedler and Bint, 1991; Phillips *et al,* 1992; Morgan, 1995; Peddecord *et al*, 1996; Boyde *et al,* 1997). Parasuraman *et al* (1988) also identified 'responsiveness' as one of the five dimensions in their SERVQUAL measure (see Section 1.6). The next priorities that users mentioned were reliable and accurate results, expert advice and high quality. These broadly correspond to the SERVQUAL dimensions of 'reliability', 'empathy' and 'assurance' (Parasuraman *et al,* 1998). This indicates that good 'service quality' in healthcare and retailing have features in common and that laboratory staff can learn from previous experiences in the field of marketing (O'Connor, 1989). Interestingly, when asked about the key issues for quality in healthcare in general, the most frequently cited points were again high quality, reliability and accuracy, but communication, team work and accessibility for patients were also mentioned (Table 4.6.1). The fact that communication and team work were not quoted by most users as important for the laboratory service, illustrates why BMSs perceive themselves as "backroom boys and girls ", operating in a "black box" (see for

example, Section 4.2.1). This also supports BMSs' perceptions that their profile is low among other healthcare professionals (see Sections 3.2.6.and 5.4).

It was expected that where microbiology staff received constructive feedback, they would feel valued as part of the team involved in patient care, which would motivate them to work conscientiously, thus enhancing technical quality. However, the experiences of the staff in these four case studies suggests that even when technical and service quality are good, the BMSs (and to some extent the medical staff) tend to operate in isolation from the rest of the hospital. This idea is supported by the perceptions that laboratory staff and users reported of each other's jobs. Although many of the interviewees from the laboratories acknowledged that staff on the wards and in general practice worked 'under pressure', they had little idea of their daily tasks and working practices. The same was also true for the users when they considered the laboratory staff. This again highlights the need for improved feedback and communication between laboratory staff and users. A better understanding of the life saving potential of a rapid diagnosis of bacterial meningitis in a child, could encourage a BMS to respond more quickly to an urgent request. Similarly, an appreciation that bacterial swabs are plated out and incubated overnight, would prevent a doctor from telephoning the laboratory to demand a result on the day the specimen was collected.

However, these case studies show that feedback does not reach most staff in the microbiology laboratory. Previous reports of surveys of users' opinions (for example, Pedler and Bint, 1991; Phillips *et al,* 1992; Morgan, 1995) have highlighted the value to the individual microbiology department of identifying problems, but only one author (Morgan, 1995) recommended follow-up surveys to examine the effects of any changes implemented. Feedback obtained from users as part of the CPA accreditation exercise could be helpful to microbiology staff (as reported by the consultant microbiologist in case study 4, Section 4.5). However, this is only collected every five years, immediately prior to an inspection.

The results presented here suggest that regular, constructive feedback would help BMSs and other laboratory staff to feel that their work was a valued part of healthcare provision and this could improve the technical quality of their work and the quality of the microbiology service they provide. Managers of microbiology departments clearly need to recognise this and to be encouraged to implement a system, suitable to their local situation, in which communications with service users are more effective and efficient.

CHAPTER 6: CONCLUSIONS

The findings of this study are summarised in three sections. Section 6.1 will present the main conclusions from the results discussed in Chapter 5. Recommendations for changes in professional practice for laboratory managers, in order to enhance and maintain quality within their laboratories are given in Section 6.2. Further investigations necessary to clarify and extend the findings of this study are outlined in Section 6.3.

6.1 Conclusions from the present study

The results of this study have shown that:

1. The occupational psychology factors Job Satisfaction, Commitment and Climate among BMSs had strong influences on the technical quality of the work in clinical microbiology laboratories in the UK.

2. Job Satisfaction had an indirect effect on technical quality, through its relationships with Commitment and Climate. A BMS with high Job Satisfaction was more likely to experience components of Commitment and Climate positively.

3. At the time of the survey, BMSs in the UK reported lower Job Satisfaction than their counterparts in the USA.

4. BMSs experienced Professional Commitment more strongly than Organisational Commitment.

5. Affective Commitment to the Profession was the most important component of Commitment with respect to technical quality. It had the strongest influence on the quality of an individual BMS's performance in the laboratory.

6. Positive Individual Climate was most likely to be experienced by a male BMS, over 50, of grade 3 or above who worked in a small, multidisciplinary laboratory in

a private hospital. A female, in her thirties who was employed as a BMS 1, in a food, water and environmental section of a large PHL was most likely to report a negative Individual Climate score.

7. The number of staff in a department was an important factor determining BMSs' perceptions of Individual Climate. The optimal number of staff in a microbiology laboratory (including medical and support staff) for BMSs to report a positive Individual Climate was less than 30 people.

8. A microbiology department was more likely to perform well in internal and external measures of technical quality where there was a positive Laboratory Climate. In particular, BMSs perceived that the laboratory was dedicated to enhancing quality. That is, there was 'A Climate for Laboratory Quality'.

9. Where laboratory staff experienced a positive Laboratory Climate, the advantage to users was twofold. They could have confidence in the scientific accuracy of the test results they received and the laboratory personnel responded well to their logistical requirements (for example, rapid turnaround times) and human needs (for example, helpful telephone manner).

10. Even in situations where the technical and service quality of a microbiology service was high, the laboratory staff often operated in ignorance of the true opinions of the service users.

6.2 Recommendations for laboratory and health service managers

1. Managers of BMSs and other laboratory staff must recognise that although their work is scientific and technical, they have an important role in caring for patients that they rarely meet. There is a human cost to the requirements to respond to pressure from users, while at the same time meeting the demands imposed by external bodies for quality assurance and accreditation. A BMS working in the NHS recently raised this issue, with the following statement: "Pathology was always good at focussing on quality; the focus now needs to shift to the workforce. The NHS Executive has recognised from its research that poor staff management

affects patient care delivery, which exacerbates staff turnover, low morale etc. There must be a visible demonstration that the quality of life for staff is improving to help turn the tide" (Gauntlett, 2000, p.1149).

2. Factors influencing Job Satisfaction for BMSs must be urgently addressed. The issue raised most regularly and strongly during this study was inadequate pay. This concern has recently been recognised by the UK Department of Health and the pay structure for BMSs has changed, with effect from April 2001. Adjustments to the pay scales mean that the minimum starting salary for a Trainee BMS has increased from £9,726 to £11,181.The BMS1 salary now also starts over £2,000 higher, at £15,244, with the possibility of rising to £20,859 (Anon, 2001a). The second point identified by BMSs here was the lack of recognition, both locally, within their laboratories and hospitals and at national level. This was discussed in the previous paragraph. The third factor which emerged as negatively influencing Job Satisfaction was the lack of opportunities for job enhancement. Many BMSs participating in this study would have liked more time for research and professional development activities and more junior staff were finding few chances for promotion, due to lack of posts. Recently announced changes to the work of scientists within the NHS (Department of Health, 2001), may alter these experiences. The scientific nature of BMSs' training will be recognised through increased support for project work. The current problems with the career structure will be tackled through alterations to the grading system, as well as allowing for career breaks and BMSs wishing to work part-time. The IBMS recently expressed strong approval for this strategy (Anon, 2001b).

3. Laboratory managers should be educated about the importance of enhancing BMSs' perceptions of Climate. The investments necessary to improve Climate, such as making time for departmental meetings and interviews with individuals, budgeting for staff training and buying new equipment, would be cost effective because of the potential positive consequences for the quality of their laboratory's work. As such, it would be balanced favourably against the possible cost of litigation for a serious error in diagnosis. Some of the laboratory managers who participated in the present study clearly recognised their role in supporting and valuing their staff. Therefore, laboratories where management does engender a positive Climate could be identified and used as a model for others. It should then

be possible to describe 'best practice' for Laboratory Climate in UK microbiology departments, which could be adapted for other workplaces.

4. The results presented here showed that even laboratory managers are sometimes unaware of the true opinions of their service users. BMSs could be helped to feel valued as part of the patient care team by receiving positive, as well as negative feedback. This could be introduced as part of quality assurance, since knowing whether the laboratory was providing a high quality service is clearly part of 'A Climate for Laboratory Quality', as well as service quality. A senior member of staff could be allocated the responsibility for contacting a representative group of users regularly (for example, monthly), for feedback. Many microbiology laboratories already have a quality control manager (Bolton and Howe, 1999), who could organise this and in future, there is likely to be a specific grade of 'Quality Assurance Scientists' in the NHS (Anon, 2001b). A short, tick-box questionnaire, on which the respondent could indicate their satisfaction with the standards of service and quality of results, would be suitable. Each department may have particular local problems (for example, transport of specimens or the computer reporting system), which could be addressed in the questionnaire, but it should contain less than ten questions (to maximise response rates) and give users the opportunity to express their opinions in their own words. This could be sent to senior consultants, directorate managers, senior partners in general practices and midwifery managers, who use the microbiology service. The laboratory quality control manager could collate the replies and then be able to report back to the laboratory staff that, for example "95% of our users were very satisfied with the telephone manner of microbiology staff this month". Results from a small number of focussed questions would lend themselves to graphical representation, for example as a bar chart, which could be displayed on the staff notice board and in the tea room, so that the feedback would reach everyone in the department.

6.3 Further investigations arising from this study

1. The changes to BMSs' pay and conditions, described in Section 6.2, would be expected to enhance Job Satisfaction. This could be tested by measuring Job Satisfaction among microbiology BMSs in 12 - 15 months from April 2001. This

would allow the new arrangements time to take effect. The possible influence on Job Satisfaction could be assessed with the 15-item scale used for the present study and by conducting a postal questionnaire survey in the same way as described here. The results from the two surveys could then be directly compared and the influence of the changes on BMSs' perceptions analysed.

2. The positive association between Affective Commitment to the Profession and individual BMSs' performance, suggested from the present finding, could be confirmed. It would be necessary to identify a standard measure of appraisal, which is widely used by NHS managers. Copies of this could be sent to head BMSs of participating laboratories to be completed for all staff members. Each individual BMS would be allocated a code number, which would be their only identification for the appraisal score. A separate questionnaire, containing the 36 items of the Professional and Organisational Commitment scales would be sent to each person, using the same identification code. Although this would require participating BMSs to trust the researcher with personal information, the exercise would be entirely anonymous and therefore should be acceptable to them. This type of study would require careful organisation, but could feasibly be conducted among staff in 50 laboratories, which should provide a strong data set for analysis.

3. The investigation of the relationship between Laboratory Climate, Laboratory QUALLAB and a technical measure of Laboratory Quality, proposed as part of the present study (see Section 2.6) could be achieved using the revised version of LABSCORE (see Section 5.8.4) instead of the NEQAS result. Questionnaires containing the 37 items of the PWE and the 10 items of the QUALLAB scale could be sent to all staff (including medical and support staff) in participating laboratories. One copy of the LABSCORE scale could be completed for each laboratory by the head BMS, as in the present study. With advanced publicity for the project, it should be possible to recruit 50 non-PHL laboratories, covering all the disciplines within microbiology and a range of sizes. As the questionnaire for individuals would be short and clearly focussed, the response rates should exceed 50% of staff for most participating laboratories. This would allow calculation of the aggregate Laboratory Climate and Laboratory QUALLAB scores and test their relationship with LABSCORE. The results for Climate discussed here, clearly suggest that the situation in PHLs is different from other UK microbiology

laboratories. For a detailed study of this, the exercise described above could be repeated for all sections of 20 PHLs, which would represent 45% of all PHLs in England and Wales. The data would allow comparison between results for all staff from each laboratory, as well as test how strongly the size of a particular section affects Climate perception.

4. The methods of conducting a questionnaire survey of BMSs and the measurement scales developed during this study for microbiology departments could be extended to assess perceptions among BMSs in other types of clinical laboratory. It would be particularly interesting to compare Job Satisfaction scores for BMSs in haematology, biochemistry, immunology and histopathology departments with those in microbiology. The investigation of Laboratory Climate and Laboratory Quality, outlined in paragraph 3, could also be extended to other areas of pathology, since no items are specific to microbiology or to BMSs. It should be noted that relationships between staff groups in other disciplines are different to those described here for microbiology laboratories. For example, about 40% of the scientific staff in biochemistry laboratories are Clinical Scientists, while there are employed in small numbers in a few microbiology departments. In histopathology departments, medical staff examine slides, which have been prepared for them by BMSs, as well as providing clinical interpretation of results. These differences should be recognised, as they may affect the results.

The conclusions and recommendations for improving professional practice described here should be noted by BMSs and their managers. They highlight areas which are important for the quality of microbiology laboratory services. The suggestions for further investigations could help enhance that quality and therefore improve patient care.

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GLOSSARY

ABBREVIATION USED	FULL NAME OF TERM	DEFINITION
AC-Org	Affective Commitment to the Organisation	The psychological attachment to an organisation which causes individuals to continue working there because they want to (Meyer and Allen, 1991).
AC-Prof	Affective Commitment to the Profession	The psychological attachment to a profession which causes individuals to continue working in it because they want to (Meyer *et al.*, 1993).
BMS	Biomedical Scientist	Professional name for scientists in clinical pathology laboratories in the United Kingdom.
CarComm	Career Commitment	The psychological attachment that a person feels towards their career (Blau, 1985).
CC-Org	Continuance Commitment to the Organisation	The situation in which the individual perceives the costs involved in leaving the organization to be too great to leave (Meyer and Allen, 1991).
CC-Prof	Continuance Commitment to the Profession	The situation in which the individual perceives the costs involved in a leaving the profession be too great to leave (Meyer *et al.*, 1993).
CPA	Clinical Pathology Accreditation (Ltd)	Company, independent of government, set up to provide guidelines for standards in clinical pathology laboratories. Laboratories are inspected before given accreditation and subsequently monitored regularly.
CPHL	Central Public Health Laboratory	Refers to the headquarters of the Public Health Laboratory Service.

CPSM	Council for Professions Supplementary to Medicine	United Kingdom government body, which regulates entry to and retention in professions including biomedical science, by setting registration requirements and monitoring the professional practice of registrants. The Act of Parliament, under which the CPSM was set up, is currently under review.
EQA	External Quality Assessment	This is the challenge of the quality control procedures by specimens of known (but undisclosed) content from an external source (Snell and Hawkins, 1992).
FDA	Food and Drug Administration	Government organisation in the United States which regulates standards in a wide range of consumable goods, including test kits for clinical laboratories.
IQA	Internal Quality Assessment	The blind re-introduction of previously tested samples into the routine system, under the control of a Quality Control officer (Kilshaw, 1991).
LABSCORE		A scale developed during this study to compare standards in laboratories through performance on a series of recognised indicators of quality.
MLSO	Medical Laboratory Scientific Officer	Previous name for biomedical scientist.
MLT	Medical Laboratory Technologist	Equivalent profession to biomedical scientist in United States.
NEQAS	National External Quality Assessment	A series of schemes within the United Kingdom to organise the challenge of the quality control procedures by specimens of known (but undisclosed) content from an external source (Snell and Hawkins, 1992). The microbiology scheme is operated by the Quality Assurance Laboratory of the Central Public Health Laboratory.

NC-Org	Normative Commitment to the Organisation	The situation in which an individual stays with a given organization because they feel they ought to (Meyer and Allen, 1991).
NC-Prof	Normative Commitment to the Profession	The situation in which an individual stays within a given profession because they feel they ought to (Meyer *et al.*, 1993).
NHS	National Health Service	Organisation providing healthcare, free at the point of delivery, at all levels throughout the United Kingdom. The largest employer of biomedical scientists in the United Kingdom.
OC	Organisational Commitment	Occupational psychology concept of an individual's feeling towards their employing organisation.
OCQ	Organisational Commitment Questionnaire	Scale developed by Mowday *et al.* (1979) to measure Organisational Commitment.
PHL	Public Health Laboratory	Refers to a single regional laboratory within the Public Health Laboratory Service.
PHLS	Public Health Laboratory Service	Organisation comprising one central and 43 regional laboratories responsible for clinical diagnosis and surveillance of infectious disease in England and Wales.
PWE	Perceived Work Environment	Scale developed by Newman (1977) to measure (psychological) Climate within an organisation.
QC	Quality Control	These are the specific technical procedures carried out in the laboratory to achieve reliable and credible results (Snell and Hawkins, 1992).
QA	Quality Assurance	This is the process whereby the quality of laboratory reports and of microbiological practice is guaranteed within defined limits (Snell and Hurley, 1993).

QAL	Quality Assurance Laboratory	Laboratory within Central Public Health Laboratory responsible for operating the United Kingdom National Quality Assurance Scheme for microbiology.
QUALCOLL		A scale developed during this study to assess an individual biomedical scientist's perception of the quality of their colleagues' work.
QUALLAB		A scale developed during this study to assess an individual biomedical scientist's perception of the quality of their laboratory's work.
QUALSELF		A scale developed during this study to assess an individual biomedical scientist's perception of the quality of their own work.
SERVQUAL		A scale developed by Parasuraman *et al.*, (1988) to measure customers' attitudes towards a particular firm's service.
SOP	Standard Operating Procedure	Written protocol for a laboratory test.
TQM	Total Quality Management	Concept from industry through which managers aim for the best quality at every stage of the manufacturing process (McKenna, 1994).

APPENDIX A

Summaries of preliminary interviews

Questions used for preliminary interviews

1. What do you think of the quality of the work done in your department? How do you assess this?
2. How do you see your contribution to quality?
3. Do you feel that your work in the department is valued? By whom?
4. Do you feel that anyone does not value your work? Who?
5. How do you see the role of your work with respect to patient care?
6. Do you enjoy your job? Why?
7. What do you think of this department as a place to work?
8. What do you think of this hospital as a place to work?
9. Would you recommend them to a friend or a young person?
10. Why did you become a Medical Laboratory Scientific Officer (Biomedical Scientist)
11. Do you still feel the same about the profession now? Why ?
12. Would you recommend the profession to a young person today?
13. How would you assess the performance of your department?
14. How would you assess your own performance?

Summaries of Preliminary Interviews held with staff from Laboratory A (Bacteriology laboratory) and Laboratory B (Virology laboratory) between 30th March and 2nd April 1998.

Interview 1: (Male, BMS 1, Laboratory A)

He considered that Quality would be assessed by: Performance in External Quality Assurance (EQA) exercises, existence of an Internal Quality Control (IQC) scheme and by the importance given to staff Training. Role of senior staff. The performance of a department would be assessed by EQA, IQA.
He evaluated his own performance by self appraisal -self assessment, self selection for courses, re-check results by follow-up tests. He considered that appraisal for an individual can highlight weaknesses & allow areas of training to be requested.
The work of the laboratory is important to the patients and is valued by them but is not usually understood.
Pay is not commensurate with required responsibility and qualifications, especially when compared with other graduate entry professions; get more in industry etc There is an issue of value (not feeling valued) in pay.
Commitment to department because of teamwork; not always 100% happy, but generally good atmosphere. Breadth and depth of training. Trust no better or worse than any other. Doesn't always do best for staff, but has own agenda-it has survived because of the commitment of staff despite lack of resources.
Became MLSO because attracted to lab work-interested in science. Still enjoy it and feel it was the right career choice.

Interview 2: (Female, BMS 1, Laboratory A)

Quality-awareness-bench for unusual organisms. Staff meetings. Remember there is a patient at the end and do your best
Performance: EQA false because everybody knows it is QC specimen and treats it differently. IQC false because seniors can make mistakes too. Individual: listen to feedback
Should be valued by managers (sent on courses) and colleagues (positive feedback).
Role important in some cases only-treatment occurs anyway!
Enjoy job because nice atmosphere, companionship in department -nights out together etc builds communication. Building airy and bright-interesting organisms.
Starting salary low for graduates.
Commitment to department -yes. Trust do crazy things sometimes, but trying to do best for patients. Too big. Became MLSO because interest in biology -sick person in family. Not recommend it because get more money in other professions and high risk-if you are going to study that hard and take those risks, you should get more money.
Appraisal: haven't had one, but expect to be told if not doing well.
AOB: provision for breaks for children, sexism, racism, social functions by management-slush fund by management for nights out etc

Interview 3: (Female, BMS 1, Laboratory A)

Quality: lab meetings
Public don't appreciate laboratories-other departments in the hospital do, but don't appreciate the level of work-wards should see our side. Patient care -feel more linked to it 'on call'- during the day, you just want to get through the work.
Training. Enjoy job because interested in science, like microbiology-studying keeps up interest.
Pay -disgraceful for a profession-graduates, M.Sc-prospects for earning not good. Make up pay by 'on call'; enjoy the job, so accept it.

Commitment to department -cliques. Trust-large so job security.
Became MLSO because interest in medical sciences, liked microbiology. Less interested now, but still enthusiastic. Would not recommend job to young person unless their heart was set on it.
Performance: Range of tests, experienced staff, IQC monitoring internally. Self-from feedback-if no feedback, assume work is good. Appraisal not helpful.

Interview 4 (Male , BMS 2, Laboratory A)

Quality: IQC highlights more problems that EQA because less obvious that speci mens are QA. Value: Appraisal from line manager. Changes you help instigate. Medical staff appreciate work in lab.
Patient care: Always realise that there is a patient at the end -easy to lose sight - think it was your relative's specimen and try to do your best.
Enjoy the job because wide range of responsibilities, management experience. Conditions OK , but pay is awful especially starting salary for graduates and responsibility of lab managers compared to pay in industry. MLSOs-- SOs in civil service
Commitment to department: Proud to work here-do a lot of work mostly get it right. Production line mentality. Not friendly. Trust; no opinion-lab running handled internally -trust sets budget-overall don't feel influence of trust. Wouldn't recommend it.
MLSO sandwich degree with year out in laboratory so enjoyed it and was offered job in same lab after graduation. Level of enjoyment kept up with new challenges. Would not recommend as a career as opportunities for promotion not there, but educational requirements high.
Performance of lab: Audit, turnaround times, EQA, range of services compared with similar sized labs. staff ratio. Individual performance: appraisal from line manager feedback and job satisfaction.
AOB: Ask questions about applications for promotion.

Interview 5 (Female, BMS 2, Laboratory A)

Quality: EQA, IQC, checking reports
Value: manager's feedback - consultant doesn't give feedback- no opinion about wider hospital
Patient care: in some areas work is important to patients. Enjoy flexihours, social atmosphere. Actual work is interesting -full time getting a bit bored-coming back from maternity leave have renewed interest.
Pay -f or what I do, not bad.
Commitment to department -enjoy it, people get on well. I would recommend it. Trust-yes.
MLSO degree-first job applied for. Same enjoyment now -period in middle when didn't (ie prior to maternity leave) she had break and department had change of management style. Recommend-don't know. Performance; department-don't know; self: care, double check-especially because part time so hand over. Never had appraisal.

Interview 6 (Male, BMS 1, Laboratory B)

Quality: team work (because stable team over many years). Good, rapid service. IQC, EQA
Self-development of tests.
Value: manager delegates responsibility, so you feel valued and trusted. Consultant doesn't feedback about patients etc.
Performance- morale would have influence. Self-rushing, sloppy technique.
Patient care: Clinicians don't realise how important lab is -not covered in medical training-so MLSO input is important. eg Rapid early result for for CMV-diagnostic, monitoring, leading to diagnosis and thus early treatment. Training academic / on the bench
Pay : Bad for amount of knowledge we are expected to have. Graduate profession compare with industry low profile in public perception
Commitment to department-sad to leave. down to good management would recommend department
Trust; rubbish trust-money orientated treats staff badly-food rubbish and expensive, nursery expensive and same price for consultant as cleaner.

MLSO: student placement in hospital-applied for jobs in micro. enjoyment/interest decreased because of external factors. Also stayed without promotion he thinks he deserves because of personal circumstances.

Interview 7 (Male, BMS 2, Laboratory B)

Quality EQA, IQC, experience. Performance: turnover of staff
self-quality : training performance - don' t know how to answer
value from manager. The few people on wards who know what labs do appreciate the work. In general, medical training -limited exposure to pathology .
Patient care: we produce correct results. if significance is not appreciated on wards...should be understanding between wards spec/result.
enjoy -sometimes monotony, people in bad mood. Computers
Pay reasonable at senior MLSO2, but does not compare favourably with medics given level of training and responsibility.
Commitment to department: good place to work, stable team, good manager, happy staff. Recommend place if person was established in job. Trust: more staff in smaller spaces and more work per staff member. OK if training and automation but otherwise people can get stressed.
MLSO-science 'A' levels -didn't want to go to University. First job offered. Found it interesting (rotated through all labs except Chemistry). Still in job because still enjoy it, but also personal circumstances.
Recommend -don't know-changed a lot -prob. not could do better for the qualifications .Don't get true/credit /worth for qualifications.

Interview 8 (Female, BMS 1, Laboratory B)

Quality: EQA, IQC. Value: manager
Patient care: essential-hospital wouldn't function properly without pathology. Enjoy job-yes, not boring.
Pay: undervalued, responsible job no less important than nurses, but lower profile.
Commitment to department: nice atmosphere, some equipment bit old, good atmosphere, would recommend. Trust OK
MLSO careers at school -sounded interesting. still interesting. Recommend as career- not sure-things have changed -wouldn't say it was awful, but promotion prospects not good.

Interview 9 (Male, Laboratory manager, BMS 3+3, Laboratory B)

Quality: Results go out that are good. IQC, EQA TAT customer complaints rare.
Performance: courses, retraining-sometimes young keen ones in first. Appraisal:OK but people's own self-assessment may be unrealistic.
Keep staff updated with financial information, but not involved.
Value: projects within hospital, writing papers, sent to conferences-valued by consultant, but he is no good at expressing it.
Customers: CPA gives opportunity for them to feedback to accreditors. Impressed with customers remarks .Managers don't always remember to pass on positive feedback from customers to staff.
Picked good people in clerical department to man phones. Departments in hospital supported new expensive tests, so Trust prepared to outlay money.
Not value: Consultant (just his way) Staff feel taken advantage of sometimes, (eg can your just do one more HIV test)on bench, don't always have wider perspective. Actually consultant doesn't feedback much because he is confident lab is OK
Responsibility versus authority- 'on call' pressures -sense of value-all alone
Hospital could have got rid of us-instead of that endorsed major investments and contracted out service elsewhere.
own performance: meeting deadlines, correction, disciplining, advice
everyone happy-good telephone manner , so atmosphere passed on through telephone manner-getting people to accept change.

enjoy: totally absorbing while he is at work-interested in technical side.can reach heights of perfection-doing something the best you can. Training-maybe not.
Pay -major deterrent to recruitment. More recent recruits-take on people who really want to do the subject-low starting salary-offer MScs projects, to compensate. Techniques sued, qualifications required high calibre graduates value of BMS should be reappraised -biomedical scientists undervalued-individual departmental managers try to get round it-degrees, 'on call', educational fund (some people don't want to go on courses). MLSO 2 pay OK but of managers is not.
Wouldn't recommend profession-because aspiration does not match possibilities if talented and qualified. Career possibilities not what they used to be dead man's shoes unless prepared to travel-do extra qualifications to keep occupied.

Interview 10 (Female, BMS 2, Laboratory A)

Quality: expertise, experience people, good training, check up to catch errors before results go out.SOPs
Performance: good reputation-throughout country.
Value: manager feedback encouraged to write papers, medics good.
Patient care: patients don't know lab exists most of the time. Consultant informed patients of MLSO role recently, so recognition. In background, but very valuable.
Enjoy because always wanted to do it. Time when plateaued-been here a few years ago qualifications, no promotion chances-wanted to get out of NHS. Had as appraisal which boosted morale and worked harder, did extra things, leading to promotion.
Pay-poor conditions OK -if any problems with environment sorted out quickly. Job changing-need more qualifications and more senior you go, more managerial skills you need. Compare head MLSOs' pay to industry-not good! Trainees are graduates now called 'biomedical scientists' but not paid as scientists
Commitment:loyal to department know it is good-defended it during merger. good reputation, good people, keen staff, good managers, comes from top down. Trust: big and powerful -job security
Recommend department if they really wanted to do it-few promotion prospects.
MLSO- school careers booklet-wanted to work in lab-did HND. Still interested -get excited about bugs – buzz. Down period of being stuck-still interested in bugs depressed about career prospects-working towards new challenges-got to have both. Recommend? no -do something else unless you are desperate. Industry-less rewarding but better promotion and pay prospects.
Performance: training others positive feedback, be approachable. try to do too much instead of delegating. Appraisal: subsequent ones not as good; appraisals only good if done properly
AOB : mergers, have you experience d a merger staff relations, cliques.

Interview 11 (Female, BMS 1, Laboratory A)

Quality: techniques, training. Self: do your best in your work
Performance: lab: QC self: feedback, appraisal one-to -one training for deficiencies, makes you think.
Value: isolating unusual organisms. outside lab-people think doctors do lab tests. would notice of we weren't here suddenly. Patient care-important .CSF -early diagnosis could save a life. UTIs maybe not.
Enjoy- must do -stuck it a long time-interesting -can be monotonous, but come across unusual organisms sometimes. times changing, new tests, new organisms.
Pay-bad for job you do-training and qualifications, at entry and ongoing. Conditions OK.
Commitment to department OK Trust-not really though about it.
MLSO open day at hospital lab friend who was an MLSO-uncle anatomy technician, so interested. Did office work for a while but soon got bored stuck as desk all the time. Enthusiasm still good -but after a long time hard to leave. Recommend? Yes.

Interview 12 (Male, BMS1, Laboratory A)

Quality :training. Performance:speed of results, IQC,EQA
Self:rushing due to workload, send for repeats if not sure (protocols too strict!)

Appraisal-not useful, only good in situation where there are so many people that the manager cannot possibly know what juniors are up to. His appraisals have been criticising other people. Problems from merger.
Value: not by managers-yes by Prof-others are jealous. Papers published, helps lab, but others don't appreciate that. Not chance for that in smaller labs. Some people happy not to do research and development etc. Patient care: could get rid of microbiology-because treat regardless.
enjoy: yes-different every day. Don't enjoy NHS, low pay, working atmosphere (worked in lots of different labs).
Pay-friends who left university at same time now on at least 2X money (including 'on call').Pharmacist with no 'on call', no weekends 2x salary. Teachers have equivalent training and responsibilities
Commitment: poor management, generates poor atmosphere. Would not recommend, but good question.
MLSO paid most at time of application. Interest different every day, still learning, still stuff to learn, subject changing all the time. Locuming in different labs.

Interview 13 (Female, Trainee BMS, Laboratory A)

Quality: identify organisms fully. own contribution: concentrate and learn -be confident.
Performance: QC . Value: don't know- lab taken for granted, inadequate specimens taken with poor clinical details. MLSOs used to take samples, so they knew what to do. Public should know what MLSOs do-don't get enough credit for their work. Patient care: sometimes hard to remember because don't see patients and have any feedback or follow up. Enjoy-yes: interesting, office work would be boring
pay-trainees pay should reflect today's circumstances (1/2 average graduate pay)
Commitment: Yes OK to recommend. Trust :no problems, holidays etc.
MLSO: related to degree, challenging-other friends have more money for less work-wouldn't recommend because of money.

No interview 14

Interview 15 (Male, BMS 2, Laboratory A)

Quality: Knowledge of staff, checks, IQC, EQA. Encourage learning 'on bench'. Own contribution- keep up with changes scientifically and technically. Performance: logistics of merger specimen collection and transport. Value: no -wards, public don't know what we do and qualifications and experience you need
yes management -particularly people who want to get on are encouraged.
Enjoy job couldn't be a rep -did it for 6 months and missed job :management and microbiology
Pay -related to value in commercial world get more money, company car, incentives in terms of education at discretion of management. Becomes vocation rather than job-don't do it for the money.
department-OK place to work. People don't like change Trust-not much experience so no opinion.
MLSO: school careers presentation. Interest: enjoy job therefore enthusiasm-new challenges keep interest-study and management
recommend; Think seriously-why are you doing it? good for training- not good for career progression.
AOB : out of hours provision -now do more things 'on call'-also social activity

Interview 16 (Male, BMS 3, Laboratory A)

Quality: training-encouraged to go on courses, CPD, EQA, IQC
Performance: appraisal, CPA accreditation, try to be at leading edge of technology-computers -legible reports -draw out statistical information. Own performance: how do my colleagues / appraisers see me? Have I accomplished what I set out to do?
Value: some people say thankyou peer groups and downwards. Medical staff tend not to appreciate MLSOs People on wards: do nurses know there are MLSOs in lab?! Send specimen-get report some time later: Some wards see doctors or IC nurses ring up for results -most likely get a secretary.

Enjoy computers-sometimes don't feel you have time to give 100%.lab meetings -good because democratic forum for all
Pay: nurses' pay has shot up at expense of MLSOs: 30 years ago we were better paid.-if kept that differential we would have £10,000 more and MLSO 1s £5,000.
MLSO-school careers sent him to Pathology because a job was going there.liked it , so stayed.
interest-lucky enough to get promotion at right times-progressing up career ladder kept interest-going into computers. Recommend? Tell them what job was about.....

Interview 17 (Female, BMS 1, Laboratory A)

Quality: everything is standardized, results can be trusted. Self: further tests of organisms to double check. Performance: EQA, make sure staff update-send on courses
Self: thoroughness-any queries, check out with someone else. Just passed training
Value: listened to by manager and colleagues -ideas for improving taken into account-some of my suggestions already put into practice. Nurses-don't have appreciation of how work is done and how you can't hurry up results. Patients don't notice MLSOs, but don't expect them to.
Enjoy, because it is all new and it is all still interesting like to be involved-like being in team
Pay bad -normally enter a profession as a graduate at £15,000-she started on half that!
Commitment to department: OK sociable (although little groups)-new technology, constantly updating techniques. Recommend? yes Trust-no thought about it .
MLSO: placement in sandwich degree, liked microbiology and liked this place. Recommend: yes-satisfying and interesting job.

Interview 18 (Female, BMS 1, Laboratory A)

Quality: rigid protocol for every bench. Problems discussed immediately. Competent.
Self: as good as I can be. If I don't know, I ask. Try to think patient could be my relative.
Performance: accreditation implies certain standard. QC keeping staff up to date -encouraged to attend courses-possible because big department, lunchtime meetings
Value: feel needed because people phone up for results which obviously affect patient management and colleagues. Enjoy: interest in medical matters. Self-performance: time keeping, bench clean, not slap dash, conscientious, own up if mess up. Appraisals have gone well for me.
Pay : disappointing with respect to study and compared with doctors. Undervalued in sense of pay- if don't do on call-pay very bad.
Commitment to department: happy, no problem approaching people when have problems. If people are happy, get best work out of them. Seniors approachable and keen to help. Recommend: yes, but beware of combination problems because of merger. Trust-alright as far as I know.
MLSO: friend became one before I left school and sounded interesting-wanted hospital job and it sounded like me. Never regretted it. Enthusiasm-at first committed to training and becoming a senior 6 years after becoming senior-had a baby-so gave up senior job to be part time 1. Did not have job satisfaction, so left altogether and had own business. Walked back into job here and pleased to be back, but computerisation etc changes.
Recommend: good choice for me-but no good if you want to earn lots of money-placement gives you feel for it -good career. Other people very frustrated. A lot of MLSOs seem to undervalue themselves. All other professions in hospital -nurses, radiographers etc-wear their qualification badges
why come in and then stay?

Interview 19 (Male, BMS 3, Laboratory A)

Quality: \EQA, IQC specimens and media. Performance: clerical side should be tested too.
Self: feedback. As a manager, people might resent you for correcting them. People suspicious of QC schemes initially, but constructive approach has helped -people more relaxed.
Appraisal :useful if done properly -can be destructive if not done properly.

Value: bosses tell me my work is worthwhile -feedback from staff on bench. Lower grades might be valued less and value 3s less because do not appreciate my work. Enjoy : yes, but not enough bench work
Pay: starting salary is poor -no reason why now, as is all graduate entry-should be same as OTs, radiographers at least. Should be £ 15,000 with same differentials. We do a valuable job and salary should reflect that. There is a link between value and money you earn.
Commitment to department: big, tensions, good facilities, offer staff courses, seminars etc .Believe in personal development and allow people to do higher degrees. Recommend? yes-wide range of work and potential to do other things. Trust-no worse or better than other trusts.
MLSO-interest in Biology-but too lazy to do 'A' levels . by accident.
Interest: ups and downs but kept interested by looking for new challenges. Always new things to do in microbiology.
Recommend? no -if they have ability to get necessary qualifications, the frustration and hierarchy would be too much. Should go for another profession if intellectually you can do better.Career progress is not good -not many opportunities these days-tough competition, poor money. He has achieved quite a lot, but not so easy now. Interesting work if you don't mind about pay and lack of career prospects.
AOB:skill mix with respect to MLAs, job security and satisfaction. medical staff in lab should give MLSOs more responsibility -will you work until you are 65? -is job secure or interesting enough?

Interview 20 (Female, BMS 1, Laboratory A)

Quality: treatment of specimens and QC. Performance: QC, training-senior person should be supervising on bench. QC specimens ,media, written regimes. Clear pathway for staff to discuss problems openly.
Self; remember there is a patient at end of specimen-so always do my best. Difficult with high workload.
Value: not by Trust-they are only interested in finances and lab is good place to make savings
Feel respected by and for colleagues and don't take criticism personally. Enjoy job: yes-always something new and interesting.
MLSO: liked biology -didn't want to go to University -school careers teacher suggested lab work
Enthusiasm kept up same level-feel I am helping a person and doing worthwhile job for community in small way. Always something new and different. Bacteria change -change shape and different names, new technology
Recommend: no because starting salary is low, prospects for promotion are poor-so many exams -dead man's shoes
Commitment to department: excellent-worked in four other places.Go ahead out look for investing in department QCs, meetings. Recommend: yes, but with proviso about difficulties
Trust-not good for nursing staff compared with others.

APPENDIX B

Pilot, Final and Follow-up questionnaires

Appendix B1: First Pilot questionnaire.

In order to minimise the number of pages, the response format is shown for the first question in each section only.

Thankyou for taking the time to fill in this questionnaire. Please take as long as necessary to consider each question and answer as honestly as possible. Your answer sheet will remain anonymous and will be analysed by a machine, thus ensuring complete confidentiality.

The questionnaire is divided into three sections (A -C). The method of answering the questions is slightly different in each section, so new instructions are given at the beginning of each. Please read them carefully before attempting any answers. Please use a black or blue biro to fill in the questionnaire.

SECTION A. In this section, I would like you to tell me how you feel about being a Medical Laboratory Scientific Officer (we have used the term 'Biomedical Scientist') and being part of the Trust that you work for.
Please read the following statements carefully and indicate whether you agree or disagree with each of them on a scale of 1 (strongly disagree) to 7 (strongly agree), by ticking the appropriate box

1. Being a biomedical scientist is important to my self-image

1 strongly disagree	2 moderately disagree	3 disagree	4 neither agree nor disagree	5 agree	6 moderately agree	7 strongly agree
☐	☐	☐	☐	☐	☐	☐

2. I am enthusiastic about the biomedical scientist profession
3. I would feel guilty if I were to leave my Hospital Trust now
4. I feel a responsibility to the biomedical scientist profession to remain in it
5. Too much of my life would be disrupted if I were to change my profession
6. At the moment, staying with my Hospital Trust is a matter of necessity as much as desire
7. It would be very hard for me to leave my Hospital Trust now even if I wanted to
8. Changing professions now would require considerable sacrifice
9. I am proud to be a biomedical scientist
10. I do not feel like part of the family at my Hospital Trust
11. I have put too much into my career as a biomedical scientist to consider changing now
12. If I had not already put so much of myself into this Hospital Trust, I might consider working elsewhere
13. I do not feel any obligation to remain as a biomedical scientist
14. I do not feel any obligation to remain with my current employer
15. Changing professions would be a difficult thing for me to do now
16. I regret having become a biomedical scientist
17. I would not leave my Hospital Trust now because I have a sense of obligation to the people in it
18. Even if it were to my advantage, I do not feel that it would be right to leave the profession now

19. One of the negative consequences of leaving this Hospital Trust would be the scarcity of available alternatives
20. I do not feel emotionally attached to this Hospital Trust
21. Too much of my life would be disrupted if I decided to leave my Hospital Trust now
22. This Hospital Trust deserves my loyalty
23. I am a biomedical scientist because I have a sense of loyalty to the profession
24. I dislike being a biomedical scientist
25. I would be happy to spend the rest of my career working for this Hospital Trust
26. I owe a great deal to my Hospital Trust
27. If asked, I would advise an intelligent young person to consider other professions (medicine, pharmacy, scientific civil service, industrial science), where the salary and promotion prospects are better
28. I feel that I have too few options to consider leaving this Hospital Trust
29. I believe that people who have been trained in a profession have a responsibility to stay in that profession for a reasonable period of time
30. I would feel guilty if I left the profession
31. I do not feel a strong sense of belonging to my Hospital Trust
32. If asked, I would recommend the profession to an interested young person
33. It would be costly for me to change my profession now
34. I do not identify with the biomedical scientist profession
35. There are no pressures to keep me from changing professions
36. This Hospital Trust has a great deal of personal meaning for me
37. Even if it were to my advantage, I do not feel that it would be right to leave my Hospital Trust now
38. I really feel that this Hospital Trust's problems are my own
39. I cannot see myself working as a biomedical scientist until I retire

SECTION B. In this section, I would like you to tell me how you feel about your job and the atmosphere in the laboratory that you currently work in. .Please read the following statements carefully and indicate whether you agree or disagree with each of them on a scale of 1(strongly disagree) to 5 (strongly agree)

Notes:
a) when asked about your 'manager', please think about the person that you consider to be 'the boss' (ie head MLSO or consultant) ;
b) when asked about your 'line manager', please think about your immediate supervisor;
c) when asked about 'the staff' please think of everyone in your department including clerical and medical staff.

1. I am still fascinated by microbiology/virology
1 strongly disagree 2 disagree 3 neither agree nor disagree 4 agree 5 strongly agree
☐ ☐ ☐ ☐ ☐
2. There are enough staff and supplies to do my job
3. I would say that the standard of staff training in my department is high
4. There are no aspects of my job which I find challenging
5. Pay increases are related to how well I do on the job
6.There are sufficient well motivated and experienced biomedical scientists in my department to keep the quality of work high
7. There is serious conflict among staff members
8. My boss is flexible when needed

9. Biomedical scientists' salary is a fair reflection of the training required to qualify and the responsibility that members of the profession have
11. There is a chance for staff to take part in deciding what the work methods, activities and goals are
12. There are always deadlines and tight schedules
13. My salary is about right for the work that I do
14. There are high standards in my laboratory
15. Important decisions are made by the staff members closest to the action
16. I find my line manager approachable
17. Staff trust one another and offer to help eachother
18. Staff try hard to get ahead
19. I feel that my line manager is sincere
20. Most staff take part in making the decisions that affect their jobs
21. The equipment in our laboratory is up to date
22. The salary for biomedical scientists is low
23. My line manager is not very friendly
24. I think that my line manager is sufficiently qualified for the job that he/she does
25. Staff in our laboratory get along well with eachother and enjoy their work
26 Staff members are rewarded on the basis of how much work they do
27. My colleagues usually work conscientiously
28.My role in the department is clear
29. The work area is crowded
30. Staff know what their manager expects of them
31. In most cases, when any of my colleagues have a problem with my work or my attitude, they talk to me about it before going to another person or the manager
32.People in this laboratory are proud of their work
33. Staff have the proper background and training to do the job
34. Most of my colleagues are pleasant to work with
35. Promotions are based on how well the job is done
36 Staff are interested and deeply involved in their work
37. I feel that I am 'on the same wavelength' as most other microbiology biomedical scientists
38. The manager takes personal interest in the staff
39. Staff compete with eachother for awards and recognition
40. My work in the laboratory is vital to patient care
41. Staff are rewarded on the basis of how well they do their work
42. Everyone knows how to do his/her job
43. If the virology/ microbiology laboratory was closed tomorrow, other staff in the hospital would not notice
44. If a colleague points out a mistake that I have made, I take the criticism personally
45. The laboratory is laid out so staff can do their job well
46. Patients are generally aware of the work that biomedical scientists do in microbiology/virology laboratories
47. Rewards are based not so much on how you do your work, but on 'who you know'
48. The manager gives recognition for work well done
49. I feel that my colleagues appreciate the work that I do
50. A properly conducted appraisal can turn someone's career around
51 the physical presence or nearness of other employees hurts how I DO MY JOB
52. There is a strong pressure to please users of the laboratory service
53. Staff feel free to talk openly with the manager, especially when they have a problem
54. The right type and amount of equipment and supplies are available

55. Staff are asked to make suggestions when decisions are being made that will affect them
56. Staff have lots of work space and freedom to move about
57. The manager stresses doing the job well
58. There is a friendly feeling among colleagues
59. There is a chance to do challenging work
60. Everyone is granted enough power to do his/her job
61. The work requires a lot of technical training
62. Promotions are given on the basis of 'who you know' rather than on how well you do your job
63. There is a chance to do a number of different things
64. Praise is given for doing a good job
65. All work that is done is necessary for the successful operation of the laboratory
66. Staff have variety in their tasks at work
67. There are opportunities to use my skills and abilities
68. The best way to get along with the manager is to not 'rock the boat'
69. I am responsible for doing my job right the first time
70. There is a chance to do better than one is doing now
71. Individuals are told about how well they are doing at their job
72. The manager stresses good human relations among the staff
73. Staff are given a good idea of what to expect
74. There is a chance to do something worthwhile
75. There is teamwork
76.I usually check my own work thoroughly
77. Staff are able to speak openly and honestly with the manager
78. I usually get positive feedback from my line manager about my work
79. Staff stick to the rules
80. There is a chance for personal growth
81. Staff receive sufficient training to do their jobs
82. New staff have problems because they do not get enough training
83. After basic qualification, I decided to stay in the job because I enjoyed it
84. The staff try to do their best
85. Individuals are able to count on their manager to back them up
86. I do not find appraisal helpful
87. When considering how well I do my job, I am my own strongest critic
88. There is a chance to develop power and use it

SECTION C. Thankyou for taking the time and trouble to complete this questionnaire. It will help me to analyse the results if you would provide some very basic details about your laboratory and yourself. Please answer the questions as honestly as possible remembering that ALL the information that you give will remain entirely anonymous.
All the questions in this section require 'yes', 'no' or 'don't know' answers or specific facts. Please tick the appropriate box.

1. Does your department take part in the NEQAS scheme?

yes ☐
no ☐
don't know ☐

If your answer is 'NO', or 'DON'T KNOW' then go to question 2

1a. How would you say your laboratory has scored on EQAs in the last five years?

above the national average ☐
about average ☐
below average ☐

2. Do you have internal quality control schemes operating in your department?

yes ☐
no ☐
don't know ☐

3.Did any serious incidents, mistakes or breaches of safety occur in your lab during the last five years?

no ☐
yes ☐ DO **NOT** GIVE DETAILS
don't know ☐

4. Are you aware of any customer complaints about standards, turnaround times or usefulness of the results provided by your laboratory?

no ☐
yes ☐ DO **NOT** GIVE DETAILS
don't know ☐

5. Is your department currently CPA Accredited?

yes ☐
no ☐
don't know ☐

6. Are you currently employed by :
a) NHS Trust ☐ b) University ☐ c) PHLS ☐ d) Other ☐ please specify.....
7. How long have you worked for your current employer?
.....Years

8. How long have you worked as a Medical Laboratory Scientific Officer/ Biomedical scientist (all grades including training grades but NOT full time student) .....Years

9. How many members of staff are there in your department altogether?.....staff

10. How many biomedical scientists are there?.....biomedical scientists

11. Would you say that you became a biomedical scientist more by accident than deliberate career choice?

yes ☐
no ☐

12.What is your age group?

21or under ☐
22-29 ☐
30-39 ☐
40-49 ☐
50-59 ☐
60 or above ☐

13. What is your gender?

male ☐
female ☐

14.What is your current grade?

Trainee ☐
biomedical scientist 1 ☐
biomedical scientist 2 ☐
biomedical scientist 3 ☐
biomedical scientist 4 ☐

15.How long have you been employed at that grade?.....years

16. Have you ever had an appraisal at work? yes ☐ no ☐

THANKYOU AGAIN FOR COMPLETING THIS QUESTIONNAIRE. NOW PLEASE TELL ME WHAT YOU THOUGHT OF IT ON THE 'FEEDBACK' FORM.

APPENDIX B2: Second Pilot Questionnaire

In order to minimise the number of pages, the response format is shown for the first question in each section only.

This booklet contains questions in three sections. The style of answer is slightly different in each, so please read the instructions carefully. Please complete the questionnaire using a blue or black biro.

SECTION A: In this section, I would like you to tell me about your level of satisfaction with various aspects of your current job and career. Please consider each question carefully and answer as appropriate.

a) For questions 1 to 15 , please indicate how **satisfied** you feel with the stated category, on a scale of **1** (very dissatisfied) to **4** (very satisfied) .

1. Current level of job security

very dissatisfied	**quite dissatisfied**	**quite satisfied**	**very satisfied**
□	□	□	□

2. Fringe benefits
3. Number of personal growth options
4. Colleagues
5. The degree of respect and fair treatment received from your supervisor
6. The feeling of worthwhile accomplishment
7. The chance to get to know other people while at work
8. The amount of support and guidance received from your supervisor
9. Salary
10. Ability to contribute to the organisation
11. The amount of independent thought and action you can exercise in your job
12. Future job security
13. The chance to help other people
14. The challenge in your job
15. Shift requirement

b) For questions 16 to 20, please indicate whether you **agree** or **disagree** with the statement, on a scale of **1** (strongly disagree) to **4** (strongly agree).

16. If I could get another job, other than being a biomedical scientist, and get paid the same amount of money, I would probably take it.

strongly disagree	**disagree**	**agree**	**strongly agree**
□	□	□	□

17. I definitely want a career for myself in biomedical science
18. If I could do it all over again, I would choose to work in the biomedical science profession
19. I would recommend a career in biomedical science to others
20. I am disappointed that I ever entered the biomedical science profession

SECTION B: In this section, I would like you to tell me about your assessment of the standards in the laboratory you currently work in. Please read each statement carefully and indicate whether you **agree** or **disagree** with it, on scale of **1** (strongly disagree) to **5** (strongly agree).

1. The standard of staff training in my department is low.

strongly disagree	**disagree**	**neither agree nor disagree**	**agree**	**strongly agree**
□	□	□	□	□

2. There are sufficient well motivated and experienced people in my department to keep the quality of the work high.
3. I usually get positive feedback from my supervisor about my work.
4. There are regular departmental meetings to discuss issues including quality and standards in which all staff working 'on the bench' participate.
5. If a colleague points out a mistake that I have made, I take the criticism personally.
6. The senior managers (i.e. head MLSO, consultant) in our department are committed to quality.
7. When technical problems occur in our laboratory, senior managers are not always aware of them.
8. When considering how well I do my job, I am my own strongest critic.
9. I try to keep myself up to date in my discipline, by discussions with colleagues, attending scientific meetings and reading journals whenever possible.

SECTION C: This section asks for a few very basic details about yourself, which will help me to analyse the results.

1. Are you currently employed by:
a) NHS Trust □ b) University □ c) PHLS □ d) Other □ please specify……

2. How long have you worked for your current employer?…….years
3. How long have you worked as a Medical Laboratory Scientific Officer/Biomedical Scientist (all grades including training grades, but NOT full time student) ……years

4. What is your current grade?

Trainee	BMS1	BMS2	BMS3	BMS4
□	□	□	□	□

5.How long have you been employed at that grade?…….years
6.What is the speciality of the laboratory you currently work in?……..
7. What is your age group?

21 or under	22-29	30-39	49-49	50-59	60 or above
□	□	□	□	□	□

8. What is your gender?

Male	Female
□	□

Thankyou for taking the time to complete this questionnaire. Your cooperation is greatly appreciated. The purpose of this exercise is to test the suitability of the questions for biomedical scientists. If you have any comments to make about them, it would be helpful if you could write them in the spaced provided on the next page. Your answers will remain entirely anonymous and it will never be possible to identify you as the person who filled in this booklet.

SECTION D (for head biomedical scientist only) : The questions in this section are about your department. It would help if you could answer as honestly as possible. Please be assured of the complete confidentiality of this exercise. Noone will ever be able to trace the answers in this booklet to your laboratory.

1. Does your department take part in the National External Quality Assurance Scheme(NEQAS)?

yes ☐
no ☐
don't know ☐

2. How would you say your laboratory has scored on NEQAS in the last five years?

above the national average ☐
about average ☐
below average ☐

3. Do you have Internal Quality Assurance (IQA) schemes operating in your department?

yes ☐
no ☐
don't know ☐

4. Are the results of IQA made available to all biomedical scientists and medical staff in the department?

yes ☐
no ☐
don't know ☐

5. Is the quality system in operation in your department audited?

yes ☐
no ☐
don't know ☐

6.Did any serious incidents, mistakes or breaches of safety occur in your lab during the last five years?

no ☐
yes ☐ DO **NOT** GIVE DETAILS
don't know ☐

7. Did you have any customer complaints about standards, turnaround times or usefulness of the results provided by your laboratory in the last 12 months?

no ☐
yes ☐ DO **NOT** GIVE DETAILS
don't know ☐

8. Is your department currently CPA Accredited?

yes ☐
no ☐
don't know ☐

9. How many staff are employed in your department (including MLAs, medical and clerical staff)
.....staff

10. How many biomedical scientists are there?.....biomedical scientists

11. What is the speciality of your laboratory?.....

Appendix B3: Final questionnaire

SECTION A: In this section, I would like you to tell me how you feel about being a Medical Laboratory Scientific Officer (we have used the term Biomedical Scientist) and being part of the Organization (for example NHS Trust, Public Health Laboratory Service, Private Hospital) that you work for.

Please read the following statements carefully and indicate whether you agree or disagree with each of them on a scale of 1 (strongly disagree) to 7 (strongly agree), by marking the appropriate box.

	Strongly disagree	Moderately disagree	Disagree	Neither agree nor disagree	Agree	Moderately agree	Strongly agree
Being a biomedical scientist is important to my self-image	☐	☐	☐	☐	☐	☐	☐
I am enthusiastic about the biomedical scientist profession	☐	☐	☐	☐	☐	☐	☐
I would feel guilty if I were to leave my organization now	☐	☐	☐	☐	☐	☐	☐
I feel a responsibility to the biomedical scientist profession to remain in it	☐	☐	☐	☐	☐	☐	☐
Too much of my life would be disrupted if I were to change my profession	☐	☐	☐	☐	☐	☐	☐
At the moment, staying with my organization is a matter of necessity as much as desire	☐	☐	☐	☐	☐	☐	☐
It would be very hard for me to leave my organization now even if I wanted to	☐	☐	☐	☐	☐	☐	☐
Changing professions now would require considerable sacrifice	☐	☐	☐	☐	☐	☐	☐
I am proud to be a biomedical scientist	☐	☐	☐	☐	☐	☐	☐
I do not feel like part of the family at my organization	☐	☐	☐	☐	☐	☐	☐
I have put too much into my career as a biomedical scientist to consider changing now	☐	☐	☐	☐	☐	☐	☐
If I had not already put so much of myself into this organization, I might consider working elsewhere	☐	☐	☐	☐	☐	☐	☐
I do not feel any obligation to remain as a biomedical scientist	☐	☐	☐	☐	☐	☐	☐
I do not feel emotionally attached to this organization	☐	☐	☐	☐	☐	☐	☐
Changing professions would be a difficult thing for me to do now	☐	☐	☐	☐	☐	☐	☐
I regret having become a biomedical scientist	☐	☐	☐	☐	☐	☐	☐
I would not leave my organization now because I have a sense of obligation to the people in it	☐	☐	☐	☐	☐	☐	☐

Strongly agree
Moderately agree
Agree
Disagree
Neither agree nor disagree
Moderately disagree
Strongly disagree

Even if it were to my advantage , I do not feel that it would be right to leave the profession now.....

One of the negative consequences of leaving this organization would be the scarcity of available alternatives.....

I do not feel any obligation to remain with my current employer.....

Too much of my life would be disrupted if I decided to leave my organization now.....

This organization deserves my loyalty.....

I am a biomedical scientist because I have a sense of loyalty to the profession.....

I dislike being a biomedical scientist.....

I would be happy to spend the rest of my career working for this organization.....

I owe a great deal to my organization.....

I feel that I have too few options to consider leaving this organization.....

I believe that people who have been trained in a profession have a responsibility to stay in that profession for a reasonable period of time.....

I would feel guilty if I left the profession.....

I do not feel a strong sense of belonging to my organization.....

It would be costly for me to change my profession now.....

I do not identify with the biomedical scientist profession.....

There are no pressures to keep me from changing professions.....

This organization has a great deal of personal meaning for me.....

Even if it were to my advantage, I do not feel that it would be right to leave my organization now.....

I really feel that this organizations problems are my own.....

SECTION B: In this section, I would like you to tell me about your level of satisfaction with various aspects of your current job and career.

a) For questions 1-15 , please indicate how satisfied you feel with the stated category on a scale of 1 (very dissatisfied) to **4** (very satisfied) .

	Very dissatisfied	Quite dissatisfied	Quite satisfied	Very satisfied
Current level of job security	☐	☐	☐	☐
Fringe benefits	☐	☐	☐	☐
Number of personal growth options	☐	☐	☐	☐
Colleagues	☐	☐	☐	☐
The degree of respect and fair treatment received from your supervisor	☐	☐	☐	☐
The feeling of worthwhile accomplishment	☐	☐	☐	☐
The chance to get to know other people while at work	☐	☐	☐	☐
The amount of support and guidance received from your supervisor	☐	☐	☐	☐
Salary	☐	☐	☐	☐
Ability to contribute to the organization	☐	☐	☐	☐
The amount of independent thought and action you can exercise in your job	☐	☐	☐	☐
Future job security	☐	☐	☐	☐
The chance to help other people	☐	☐	☐	☐
The challenge in your job	☐	☐	☐	☐
Shift requirement	☐	☐	☐	☐

	Strongly disagree	Disagree	Agree	Strongly agree
I could get another job, other than being a biomedical scientist, and get paid the same amount of money, I would probably take it.....	☐	☐	☐	☐
definitely want a career for myself in biomedical science.....	☐	☐	☐	☐
If I could do it all over again, I would chose to work in the biomedical science profession.....	☐	☐	☐	☐
would recommend a career in biomedical science to others.....	☐	☐	☐	☐
am disappointed that I ever entered the biomedical science profession.....	☐	☐	☐	☐

SECTION C: In this section, I would like you to tell me how you feel about the atmosphere and standards in the laboratory that you currently work in. Please read the following statements carefully and indicate whether you agree or disagree with each of them on a scale of **1** (strongly disagree) to **5** (strongly agree)

Notes:
1) when asked about your manager, please think about the person that you consider to be the boss (ie head MLSO or consultant) ;
2) when asked about your supervisor, please think about the person you are immediately answerable to on a day -to -day basis;
3) when asked about the staff please think of everyone in your department including clerical and medical staff.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
There are enough staff and supplies to do my job.....	☐	☐	☐	☐	☐
I would say that the standard of staff training in my department is low.....	☐	☐	☐	☐	☐
My increases are related to how well I do on the job.....	☐	☐	☐	☐	☐
There are sufficient well motivated and experienced biomedical scientists in my department to keep the quality of work high.....	☐	☐	☐	☐	☐
There is serious conflict among staff members.....	☐	☐	☐	☐	☐
My boss is flexible when needed.....	☐	☐	☐	☐	☐

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
he senior managers (ie head MLSO, consultant) in our department are ommitted to quality assurance.....	☐	☐	☐	☐	☐
here is a chance for staff to take part in deciding what the work methods, tivities and goals are.....	☐	☐	☐	☐	☐
here are always deadlines and tight schedules.....	☐	☐	☐	☐	☐
here are high standards in my laboratory.....	☐	☐	☐	☐	☐
nportant decisions are made by the staff members closest to the action.....	☐	☐	☐	☐	☐
taff trust one another and offer to help each other.....	☐	☐	☐	☐	☐
taff try hard to get ahead.....	☐	☐	☐	☐	☐
lost staff take part in making the decisions that affect their jobs.....	☐	☐	☐	☐	☐
he equipment in our laboratory is up to date.....	☐	☐	☐	☐	☐
taff in our laboratory get along well with each other and enjoy their work.....	☐	☐	☐	☐	☐
aff members are rewarded on the basis of how much work they do.....	☐	☐	☐	☐	☐
he work area is crowded.....	☐	☐	☐	☐	☐
taff know what their manager expects of them.....	☐	☐	☐	☐	☐
eople in this laboratory are proud of their work.....	☐	☐	☐	☐	☐
here are regular departmental meetings to discuss issues including quality and andards in which staff working on the bench participate.....	☐	☐	☐	☐	☐
taff have the proper background and training to do the job.....	☐	☐	☐	☐	☐
romotions are based on how well the job is done.....	☐	☐	☐	☐	☐
taff are interested and deeply involved in their work.....	☐	☐	☐	☐	☐
he manager takes personal interest in the staff.....	☐	☐	☐	☐	☐
taff compete with each other for awards and recognition.....	☐	☐	☐	☐	☐

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
taff are rewarded on the basis of how well they do their work.....	☐	☐	☐	☐	☐
veryone knows how to do his/her job.....	☐	☐	☐	☐	☐
a colleague points out a mistake that I have made, I take the criticism personally.	☐	☐	☐	☐	☐
he laboratory is laid out so staff can do their job well.....	☐	☐	☐	☐	☐
tients are generally aware of the work that biomedical scientists do in icrobiology/virology laboratories.....	☐	☐	☐	☐	☐
ewards are based not so much on how you do your work, but on who you know..	☐	☐	☐	☐	☐
e manager gives recognition for work well done.....	☐	☐	☐	☐	☐
e physical presence or nearness of other employees hurts how I do my job.....	☐	☐	☐	☐	☐
ere is a strong pressure to please users of the laboratory service.....	☐	☐	☐	☐	☐
aff feel free to talk openly with the manager, especially when they have problem.....	☐	☐	☐	☐	☐
hen technical problems occur in our laboratory, senior managers are not ways aware of them	☐	☐	☐	☐	☐
he right type and amount of equipment and supplies are available.....	☐	☐	☐	☐	☐
taff are asked to make suggestions when decisions are being made that ill affect them.....	☐	☐	☐	☐	☐
taff have lots of work space and freedom to move about.....	☐	☐	☐	☐	☐
he manager stresses doing the job well.....	☐	☐	☐	☐	☐
here is a friendly feeling among colleagues.....	☐	☐	☐	☐	☐
here is a chance to do challenging work.....	☐	☐	☐	☐	☐
veryone is granted enough power to do his/her job.....	☐	☐	☐	☐	☐
he work requires a lot of technical training	☐	☐	☐	☐	☐

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
romotions are given on the basis of who you know rather than on how well ou do your job.....	☐	☐	☐	☐	☐
here is a chance to do a number of different things.....	☐	☐	☐	☐	☐
aise is given for doing a good job.....	☐	☐	☐	☐	☐
ll work that is done is necessary for the successful operation of the laboratory...	☐	☐	☐	☐	☐
taff have variety in their tasks at work.....	☐	☐	☐	☐	☐
here are opportunities to use my skills and abilities.....	☐	☐	☐	☐	☐
he best way to get along with the manager is to not rock the boat.....	☐	☐	☐	☐	☐
am responsible for doing my job right the first time.....	☐	☐	☐	☐	☐
here is a chance to do better than one is doing now.....	☐	☐	☐	☐	☐
dividuals are told about how well they are doing at their job.....	☐	☐	☐	☐	☐
he manager stresses good human relations among the staff.....	☐	☐	☐	☐	☐
taff are given a good idea of what to expect.....	☐	☐	☐	☐	☐
here is a chance to do something worthwhile.....	☐	☐	☐	☐	☐
here is teamwork.....	☐	☐	☐	☐	☐
usually check my own work thoroughly.....	☐	☐	☐	☐	☐
taff are able to speak openly and honestly with the manager.....	☐	☐	☐	☐	☐
usually get positive feedback from my supervisor about my work.....	☐	☐	☐	☐	☐
taff stick to the rules.....	☐	☐	☐	☐	☐
here is a chance for personal growth.....	☐	☐	☐	☐	☐
taff receive sufficient training to do their jobs.....	☐	☐	☐	☐	☐
ew staff have problems because they do not get enough training.....	☐	☐	☐	☐	☐

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The staff try to do their best	☐	☐	☐	☐	☐
Individuals are able to count on their manager to back them up	☐	☐	☐	☐	☐
When considering how well I do my job, I am my own strongest critic	☐	☐	☐	☐	☐
There is a chance to develop power and use it	☐	☐	☐	☐	☐
I try to keep myself up to date in my discipline by discussions with colleagues, attending scientific meetings and reading journals whenever possible	☐	☐	☐	☐	☐

Please answer the next two questions in your own words, using the space provided.

Please describe whether you feel valued as a professional biomedical scientist and how you come to this conclusion.

Can you think of any ways in which this could be improved?

SECTION D : It will help me to analyse the results if you would provide some very basic details about your laboratory and yourself. Please answer the questions as honestly as possible, remembering that ALL the information that you give will remain entirely anonymous. All the answers to the questions in this section require specific facts.

Please mark the appropriate box. ☒

1 Are you currently employed by :
- ☐ NHS Trust
- ☐ PHLS
- ☐ University
- ☐ Other please specify .....

2 How long have you worked for your current employer? ☐☐ years

3 How long have you worked as a Medical Laboratory Scientific Officer/ Biomedical scientist (all grades including training grades but NOT full time student) ☐☐ years

4 How many members of staff are there in your department altogether? (please think of everyone, including part-time, medical and clerical staff) ☐☐ staff

5 How many biomedical scientists are there? ☐☐ biomedical scientists

6 Would you say that you became a biomedical scientist more by accident than deliberate career choice?
- ☐ yes
- ☐ no

7 What is your age group?
- ☐ 21or under
- ☐ 22-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60 or above

8 What is your gender?
- ☐ male
- ☐ female

9 What is your current grade?
- ☐ trainee
- ☐ biomedical scientist 1
- ☐ biomedical scientist 2
- ☐ biomedical scientist 3
- ☐ biomedical scientist 4

10 How long have you been employed at that grade? ☐☐ years

11 What discipline are you currently working in?
- ☐ bacteriology
- ☐ parasitology
- ☐ virology
- ☐ general microbiology
- ☐ mycology
- ☐ multidisciplinary laboratory

12 Has your current employing organization been involved in any mergers in the last 10 years?
- ☐ yes
- ☐ no

13 Were you personally involved in this merger or any others (eg while employed somewhere else)?
- ☐ yes
- ☐ no

HANKYOU AGAIN FOR COMPLETING THIS QUESTIONNAIRE. PLEASE BE ASSURED THAT YOUR REPLIES WILL BE TREATED IN STRICT CONFIDENCE.

YOU WOULD LIKE TO MAKE ANY COMMENTS ABOUT THE QUESTIONNAIRE, OR ANY OF THE TOPICS RAISED IN IT, PLEASE DO SO IN THE SPACE BELOW.

QUESTIONS FOR HEAD BIOMEDICAL SCIENTIST

It would be very helpful to the study if you could answer the following set of questions. They are designed to ask you to make a rough assessment of the quality of the work in your laboratory. As no one will ever be able to identify your laboratory from this answer, please be as honest as possible.

Please read the following questions carefully. Then answer by marking the appropriate box, using a blue or black biro.

Thankyou very much for your cooperation. ☒

Q1 Does your department take part in the National External Quality Assurance Scheme (NEQAS)?

☐yes ☐no ☐don't know

If your answer is no or don't know here, please proceed to question Q3.

Q2 How would you say your laboratory has scored on NEQAS tests in the last five years?

☐above the national average ☐about average ☐below average

Q3 Do you have Internal Quality Assurance (IQA) schemes operating in your department?

☐yes ☐no ☐don't know

Q4 Are the results of IQA made available to all biomedical scientists and medical staff in the department?

☐yes ☐no ☐don't know

Q5 Is the quality system in operation in your department audited?

☐yes ☐no ☐don't know

Q6 Did any serious incidents, mistakes or breaches of safety occur in your lab during the last five years

☐yes (DO **NOT** GIVE DETAILS) ☐no ☐don't know

Q7 Did you have any customer complaints about standards, turnaround times or usefulness of the results provided by your laboratory in the last year?

☐yes (DO **NOT** GIVE DETAILS) ☐no ☐don't know

Q8 Is your department currently CPA Accredited?

☐yes ☐no ☐don't know

Q9 How many members of staff are there in your department altogether? (including part-time, medical and clerical staff) ☐☐ staff

Q10 How many biomedical scientists are there? ☐☐☐ biomedical scientists

Q11 Has your organization (eg NHS Trust, private company) been merged with any other organization(s) in the last 10 years?

☐yes ☐no ☐don't know

Q12 Did this involve integration of microbiology / virology laboratory staff from two or more sites?

☐yes ☐no ☐don't know

JMU **Liverpool** John Moores University

Dear Colleague,

Thankyou very much for taking the time to help with my project, 'Quality and Value in Clinical Microbiology Services', by filling out the enclosed questionnaire.
As I hope you are aware by now, I am conducting a nationwide survey into how biomedical scientists feel about their profession, their work and their colleagues and whether these affect their perceptions of the quality of work in their laboratory. I am a biomedical scientist with over 10 years' experience. I have worked in several different Virology laboratories in the UK, in one Microbiology laboratory in England and in general laboratories in Zimbabwe and Tajikistan. The subject of my research was entirely my own idea, based on some of my experiences and is only financially supported by a bursary from Liverpool John Moores University. I have no 'hidden agenda', except to highlight some of the good and bad things about our profession and raise the profile of biomedical scientists in the eyes of other healthcare workers and the general public. Before Christmas, I sent copies of the questionnaire to biomedical scientists working in over 100 National Health Service and private clinical microbiology and virology laboratories throughout the United Kingdom. At least 40 Public Health Laboratories have now generously agreed to participate as well.

It would be very helpful if you would attempt the questionnaire by giving your first 'gut' reaction to each question. Please do not feel daunted by the number of questions, it should only take about 20 minutes to complete. It is not necessary to do it in one session. You can do it in short bursts if you prefer, but please do not spend too much time pondering each question and do not consult with anyone while you are filling in the questionnaire. If you do not feel comfortable with any of the questions, please miss them out, but return the booklet. Your answers will still be useful in the analysis of the results. The questionnaire is exactly the same as used for other participants and the pages have been formatted so that they can be recognised by the reader. This means that it has not been possible to alter the questions at the end of Section D, which are not completely satisfactory for the Public Health Laboratory setting. Please read the slip attached to page 9 for guidance when answering this section. **Please use a blue or black biro and put crosses in the boxes, as illustrated.**

I would like to assure you again that your answers will be treated in the strictest confidence. The questionnaire is to be completed anonymously. I have organized the distribution of booklets so that I can group responses from people working in the same laboratory for some of the questions. However, I will not know the identity of that laboratory and it will never be possible to trace the answers back to a particular department or individual. No one else will ever be shown the replies.

It would be helpful if you could return the completed booklet to me, in the Freepost envelope provided, by Friday 26th February 1999. The results should then be available before Easter. Each department taking part in the study will be sent a copy of the final report.
If you have any comments to make about the questionnaire or the project, I would like to hear them. Please write in the space provided in the questionnaire booklet or contact me at the address below.

Thankyou very much for your help and support with this project.

Sarah Pitt

Sarah Pitt
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APPENDIX B4: Proposed follow-up questionnaire

Only the items are given here. The response format would be a 5-point Likert-style and the layout of the questionnaire would be similar to that of the Final questionnaire (Appendix B3)

In this questionnaire, I would like you to tell me about what it is like to work in your department, how you find your manager and colleagues and how you rate the quality of the work in your laboratory.

1. My boss is flexible when needed
2. The senior managers (i.e. head BMS, consultant) in our department are committed to quality assurance
3. Staff trust one another and offer to help each other
4. Staff receive sufficient training to do their jobs
5. The manager gives recognition for work well done
6. Staff feel free to talk openly with the manager, especially when they have a problem
7. Staff are asked to make suggestions when decisions are being made that will affect them
8. Praise is given for doing a good job
9. The best way to get along with the manager is to not rock the boat
10. Individuals are told about how well they are doing at their job
11. I would say that the standards of staff training in my department is low
12. There is a chance to do a number of different things
13. The manager takes a personal interest in the staff
14. Staff have the proper background and training to do the job
15. Staff are given a good idea of what to expect
16. Staff are able to speak openly and honestly with the manager
17. When technical problems occur in our laboratory, senior managers are not always aware of them
18. There is serious conflict among staff members
19. There is a chance for staff to take part in deciding what the work methods, activities and goals are
20. The laboratory is laid out so staff can do their job well
21. Staff in our laboratory get along well with each other and enjoy their work
22. There is a friendly feeling among colleagues
23. I usually get positive feedback from my supervisor
24. Staff know what their manager expects of them
25. There are sufficient well motivated and experienced biomedical scientists in my department to keep the quality of the work high
26. Staff have variety in their tasks at work
27. There is a chance to do something worthwhile
28. The manager stresses good human relations among the staff
29. Everyone knows how to do his/her job
30. New staff have problems because they do not get enough training
31. The work area is crowded
32. Important decisions are made by staff members closest to the action
33. There is teamwork
34. Individuals are able to count on their manager to back them up
35. Staff have lots of space and freedom to move about
36. Pay increases are related to how well I do on the job
37. Staff members are rewarded on the basis of how much work they do

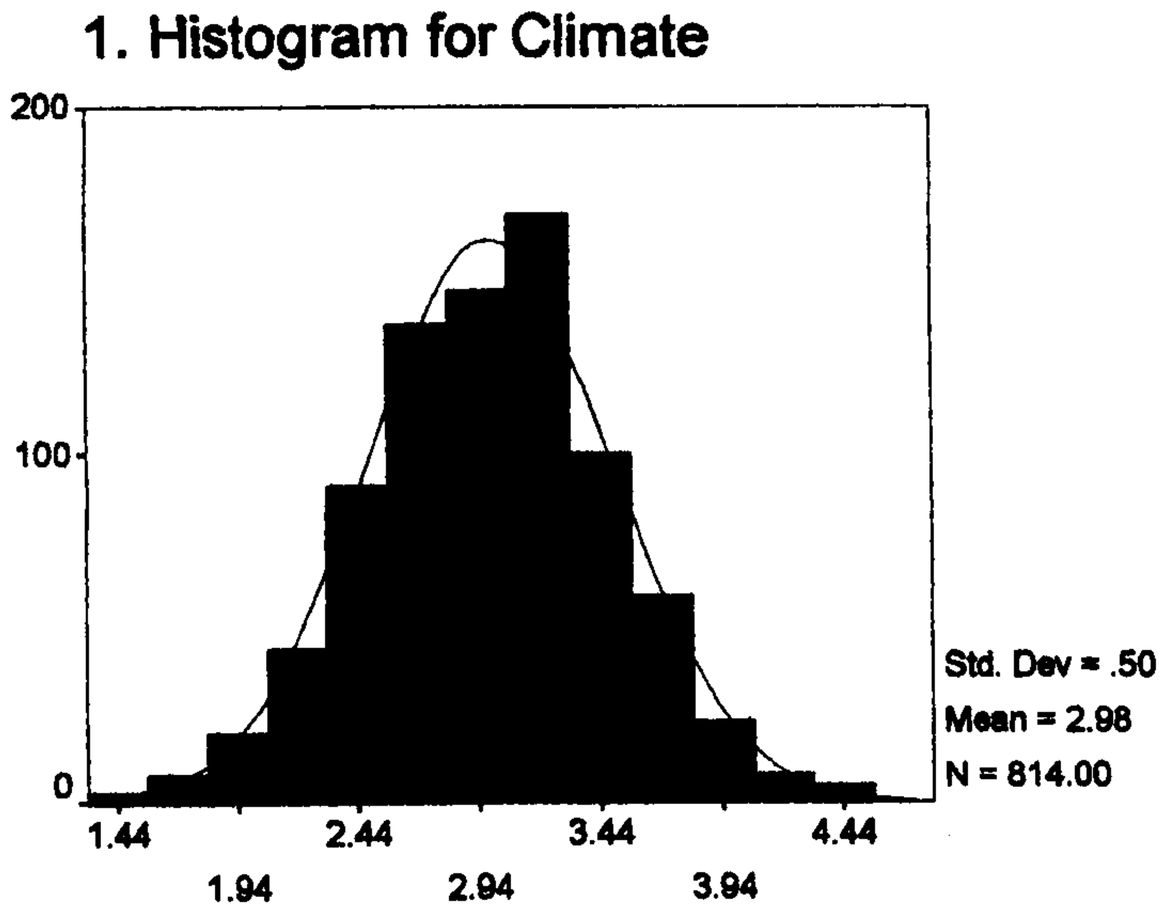
38. Promotions are based on how well the job is done
39. Everyone is granted enough power to do his/her job
40. There are opportunities to use my skills and abilities
41. Staff are rewarded on the basis of how well they do their work
42. There are enough staff and supplies to do my job
43. The right type and amount of supplies are available
44. The equipment in our laboratory is up to date
45. Rewards are based not so much on how you do your work but who you know
46. Promotions are given on who you know rather than how well you do your job
47. There are regular departmental meetings to discuss issues including quality and standards in which all staff working on the bench participate

APPENDIX C

Numerical data and items in 'quality' factor analysis

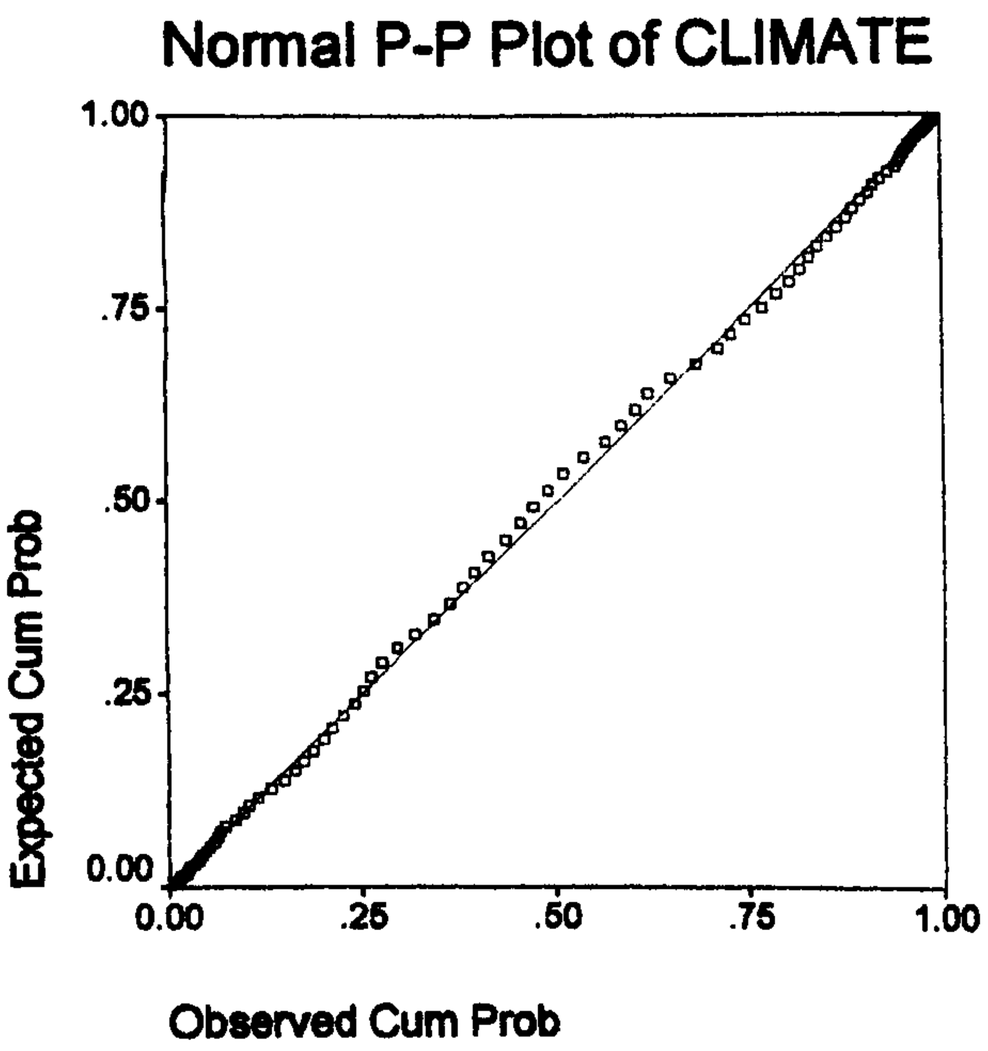
APPENDIX C1: Confirmation of Normal distribution of scores obtained from occupational psychology and quality scales in final questionnaire

Histograms of mean scores for occupational psychology and quality measures (including LABSCORE) are shown, with normal distribution curve superimposed, to illustrate closeness to normal distribution in each case. PP-Plots are also shown for each measure. The Expected Normal Quantiles were calculated in each case, using Tukey's proportional estimation formula. (Cramer, 1998). Where the observed points (bars on chart) follow the expected curve (line on graph), the distribution is approximately normal. All the sets of scores were calculated to be approximately normal, thus justifying the use of parametric statistical tests.

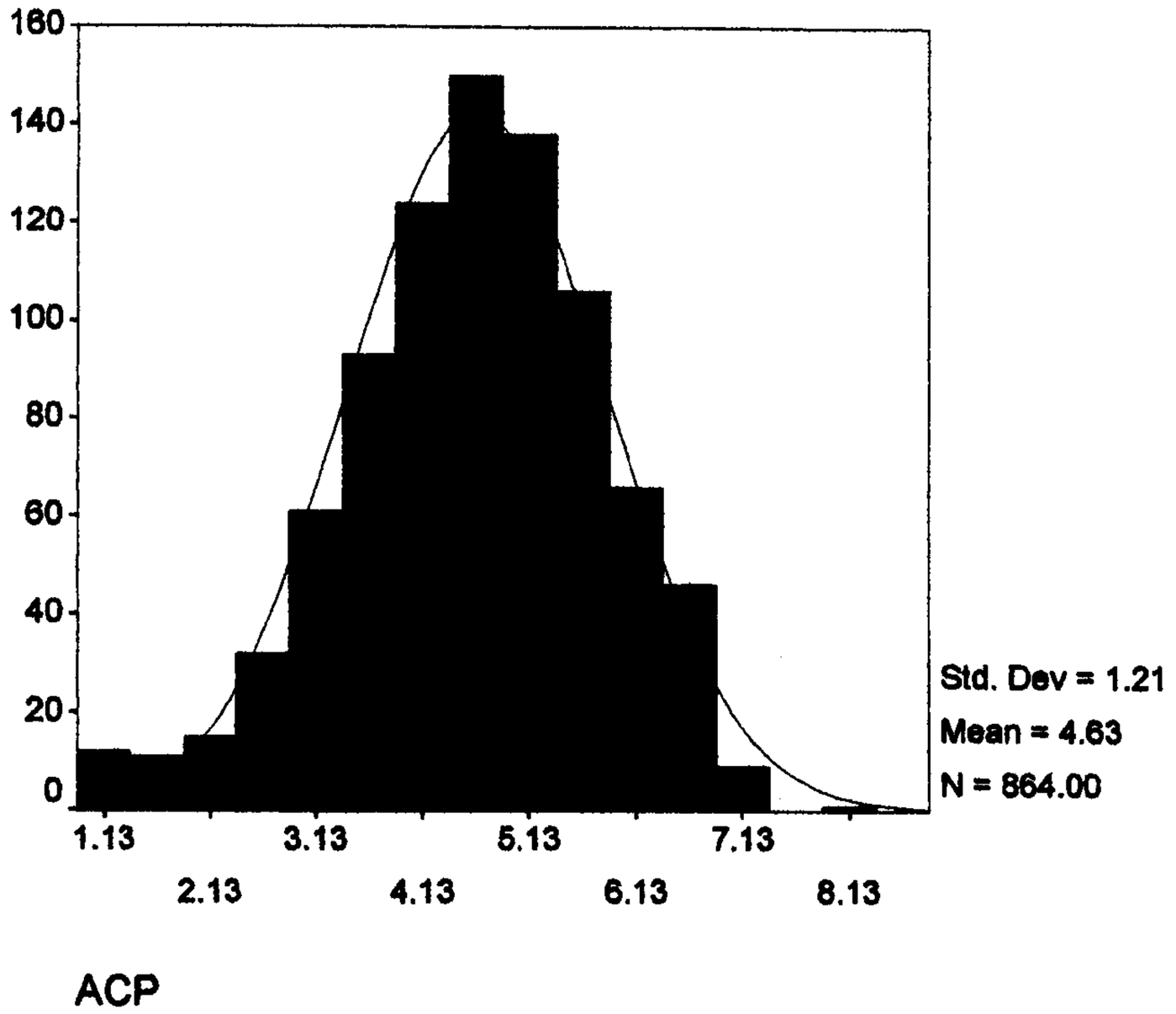


P-Plot for Climate

Normal distribution parameters estimated: location=2.9803812 scale=.50197616

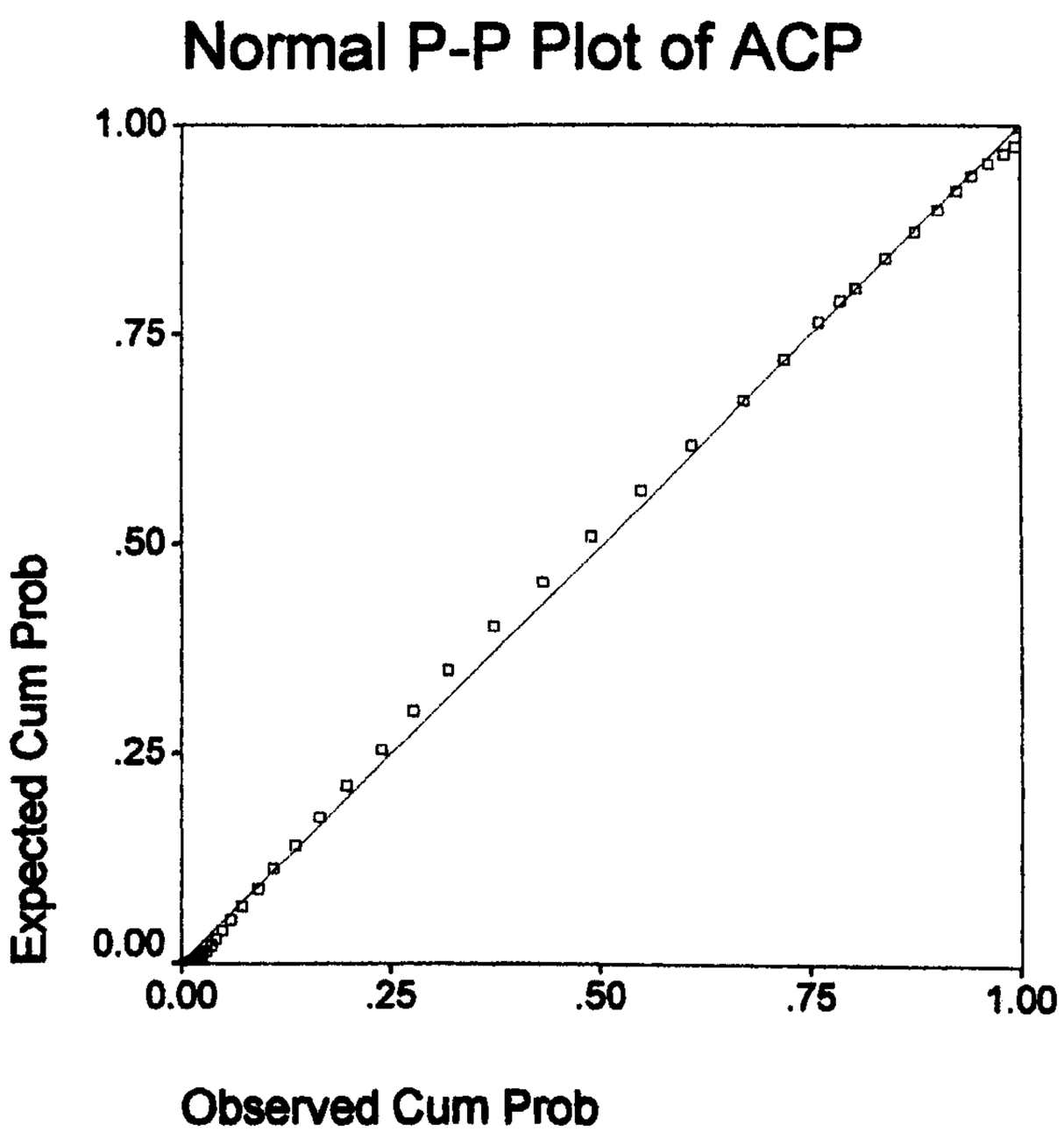


2. Histogram for Affective Commitment to Profession

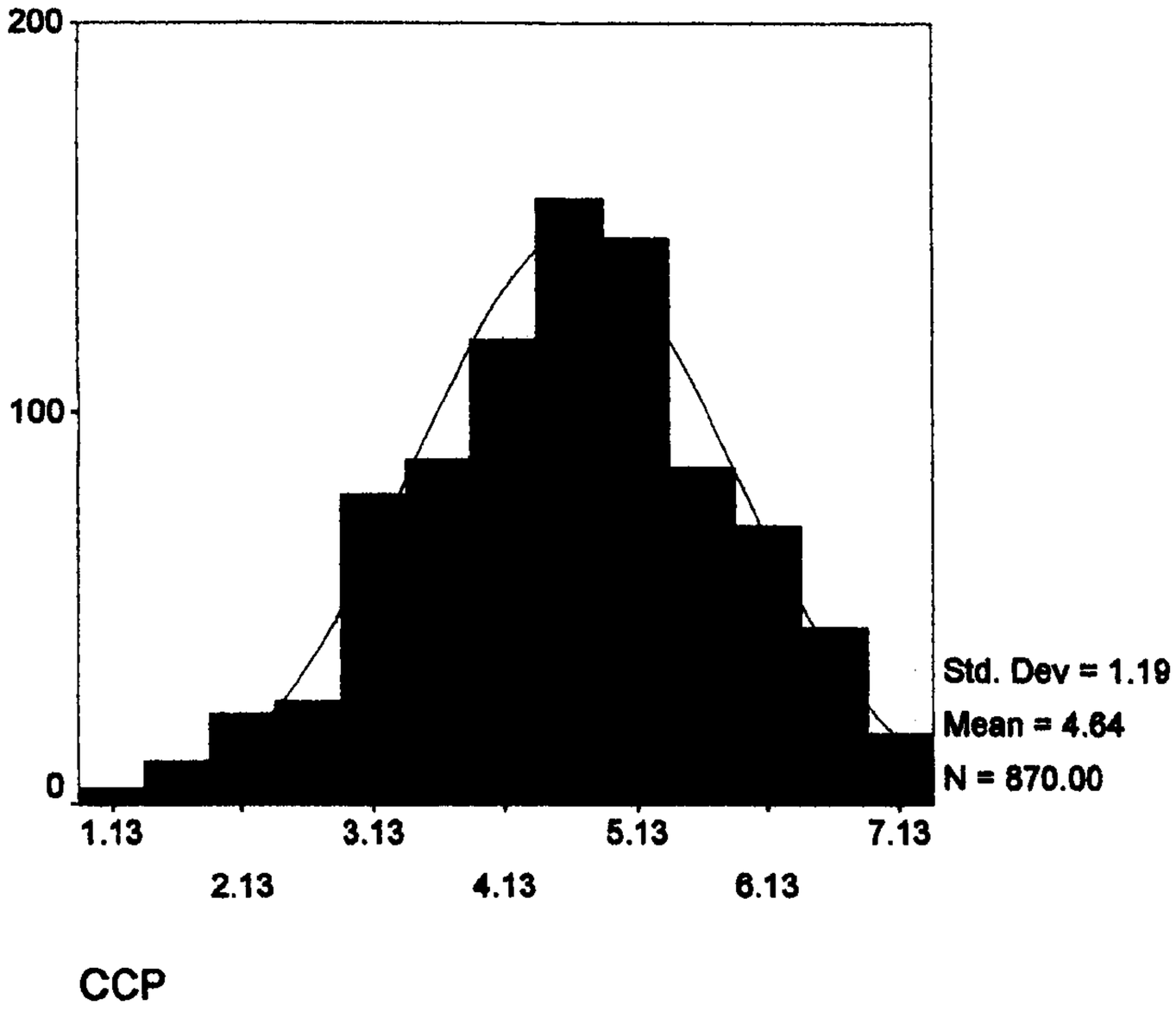


Plot for Affective Commitment to Profession

ormal distribution parameters estimated: location=4.6291667 scale=1.2066297

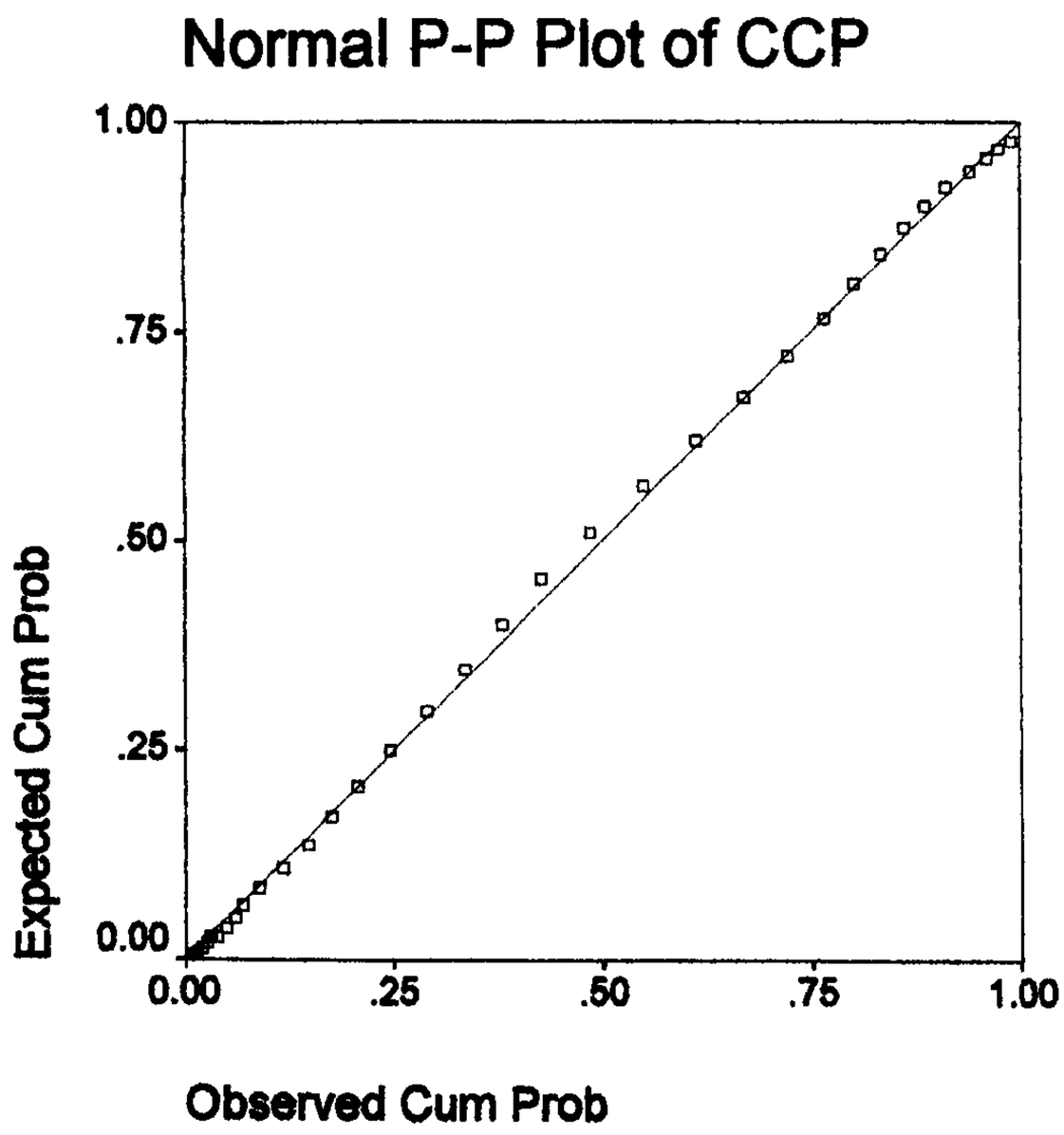


3. Histogram for Continuance Commitment to Profession

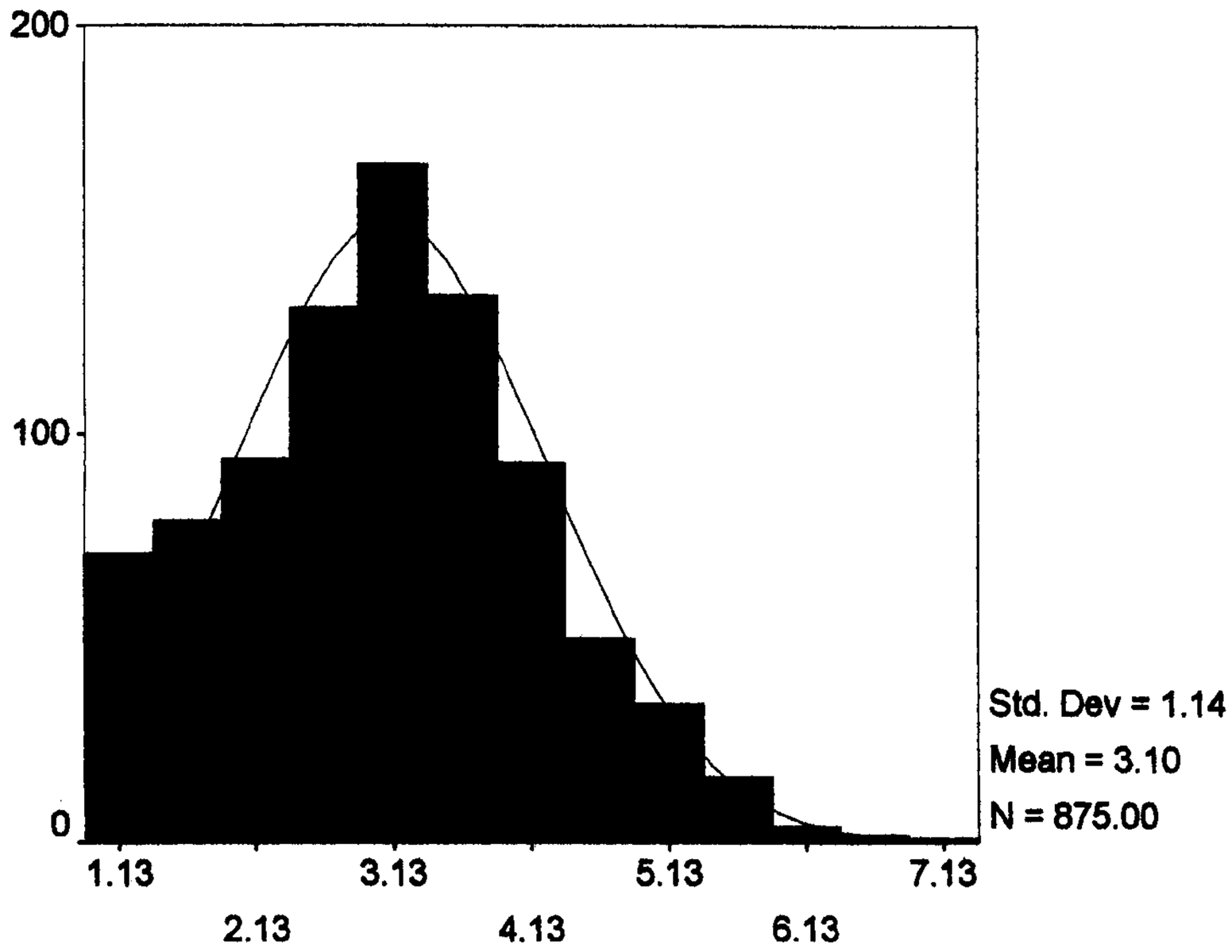


Plot for Continuance Commitment to Profession

ormal distribution parameters estimated: location=4.6385057 scale=1.1929898

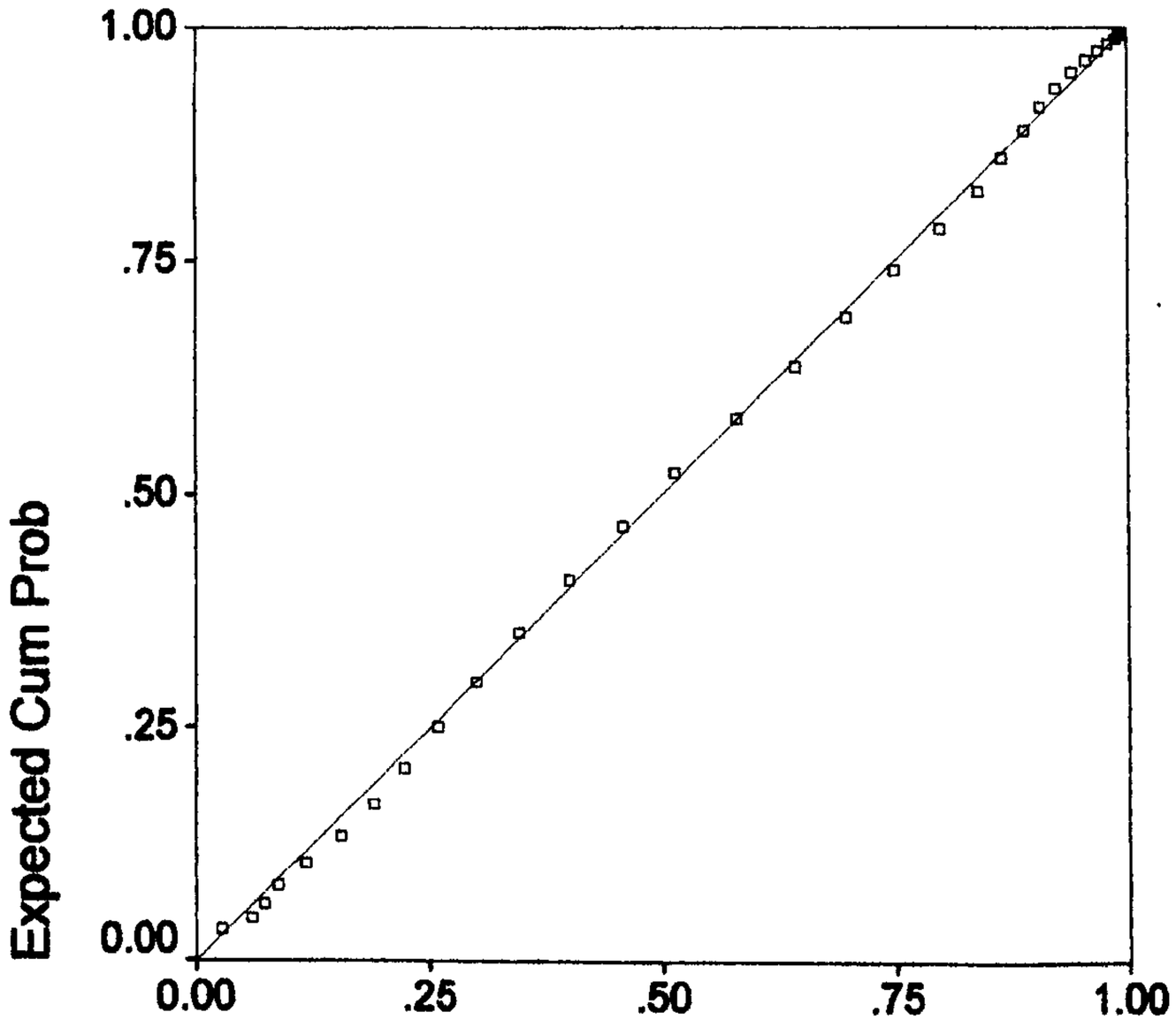


4. Histogram for Normative Commitment to Profession

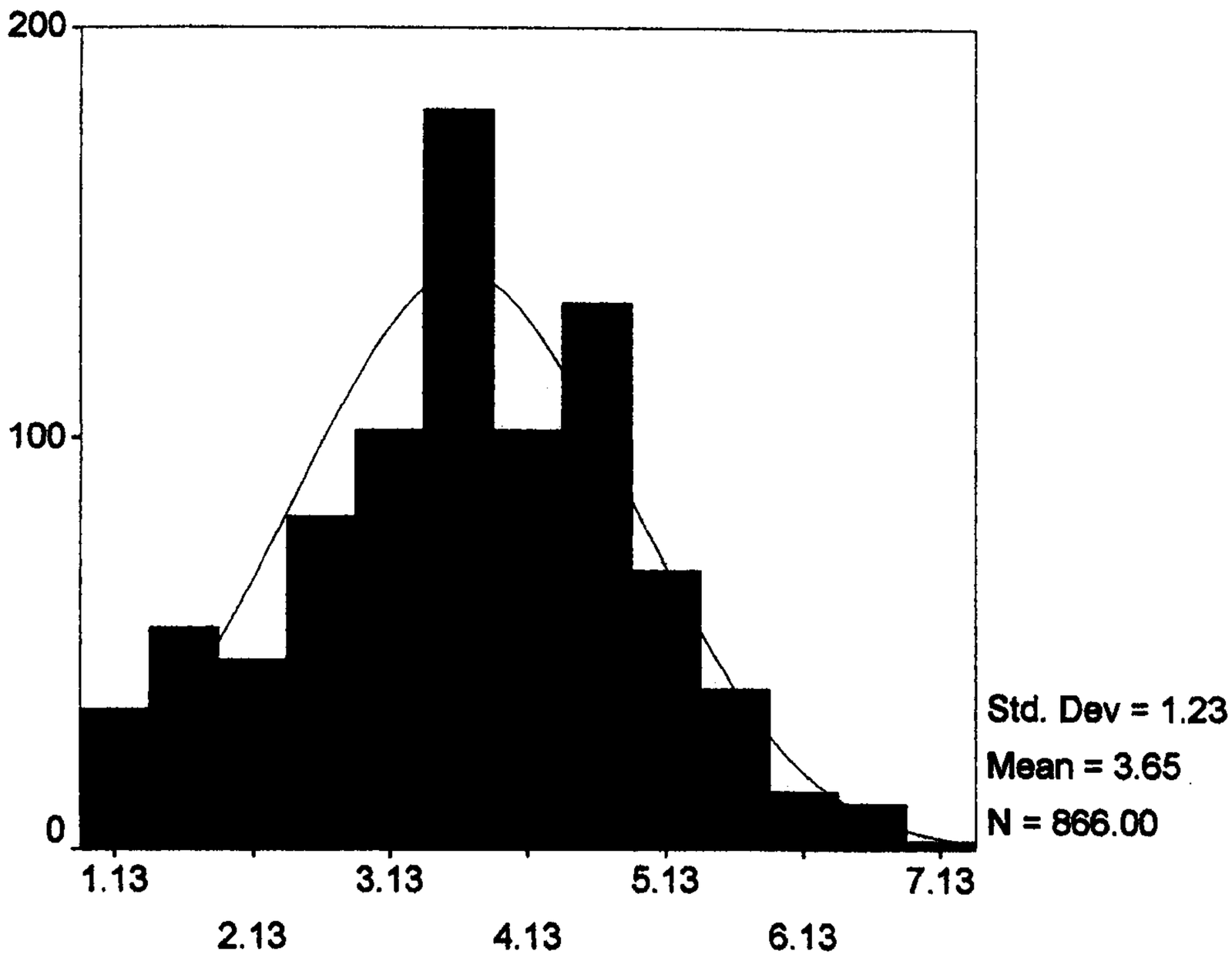


Plot for Normative Commitment to Profession

ormal distribution parameters estimated: location=3.1007619 scale=1.1442377



5. Histogram for Affective Commitment to Organisation



Plot for Affective Commitment to Organisation

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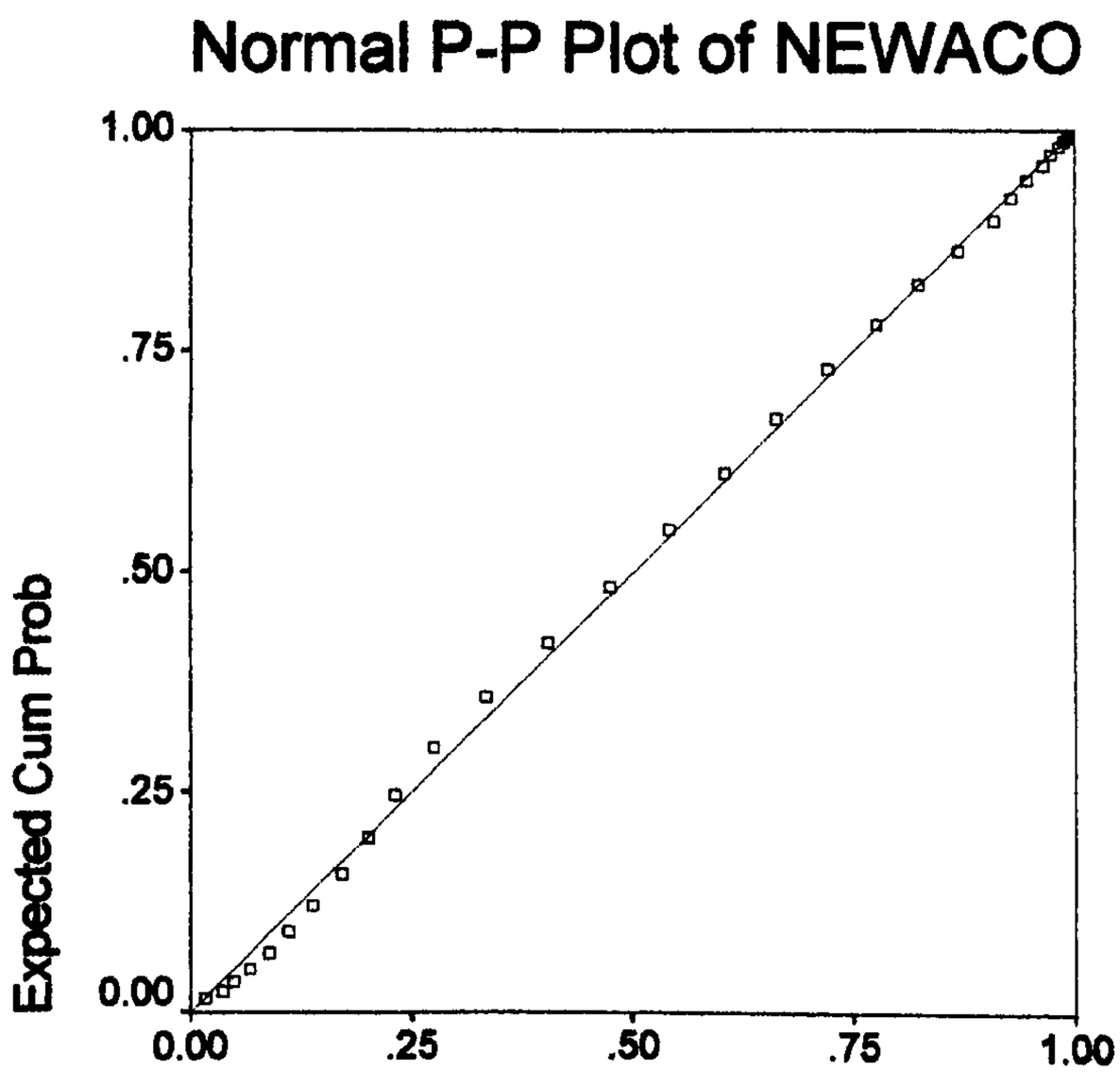
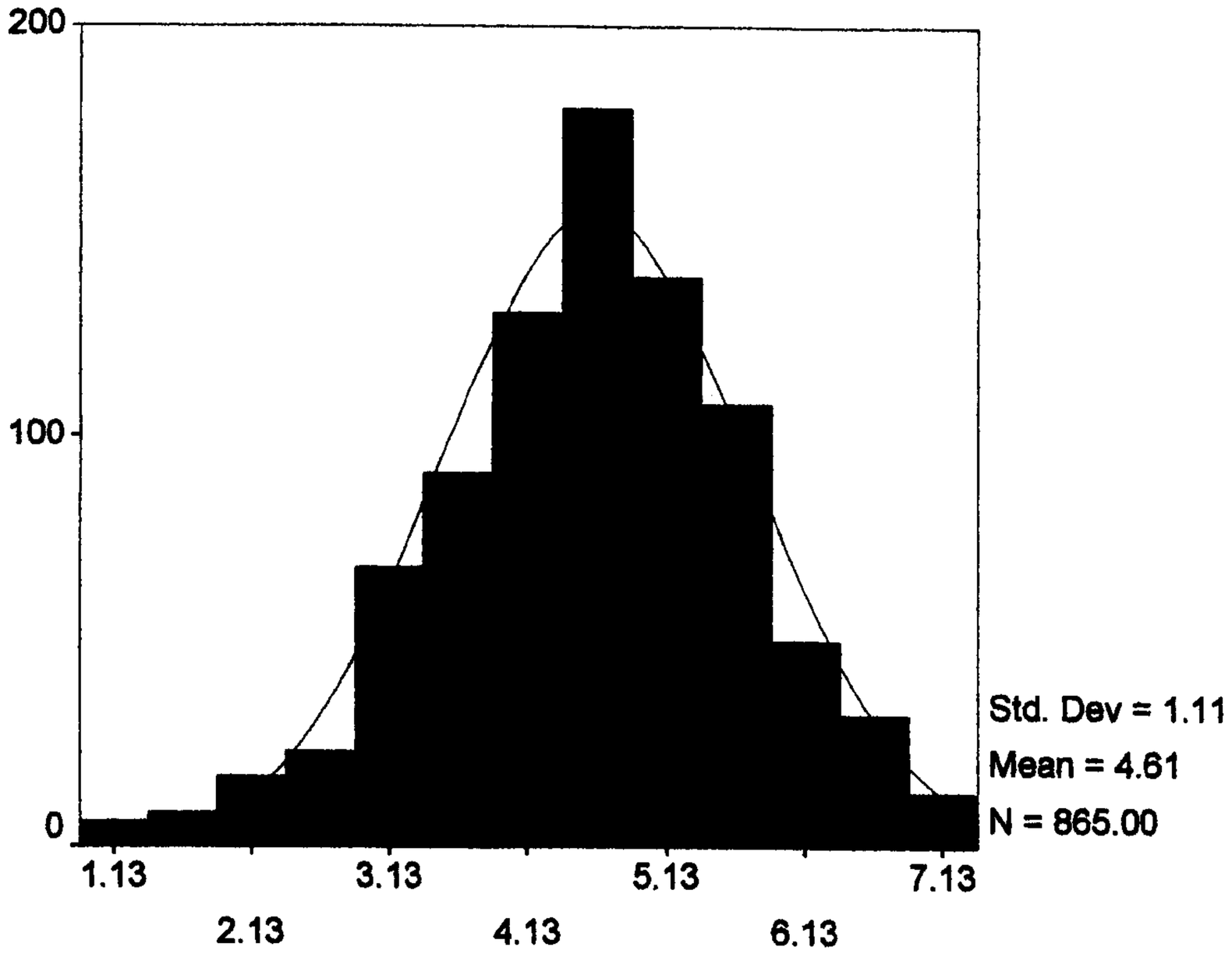
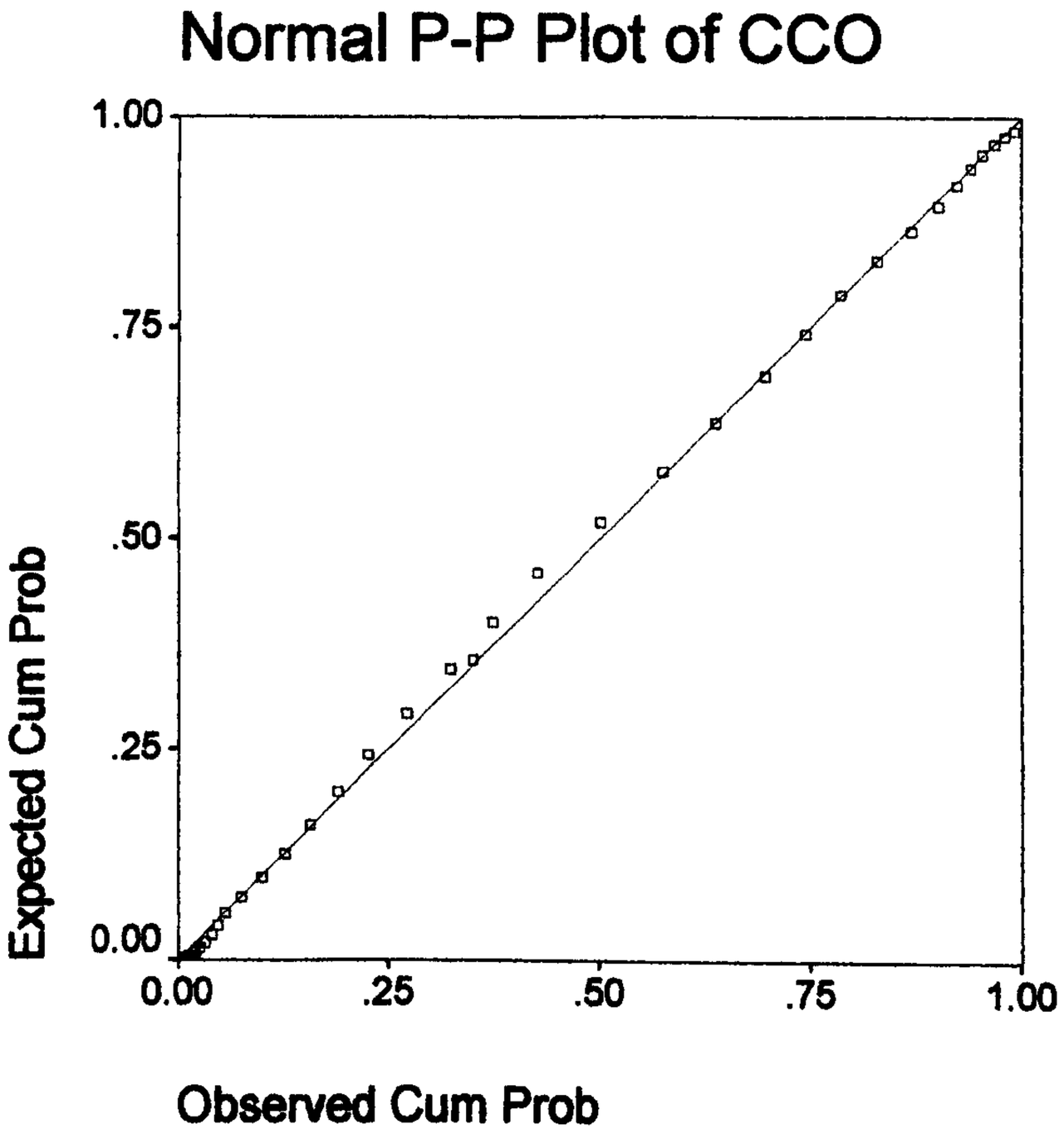


6. Histogram for Continuance Commitment to Organisation

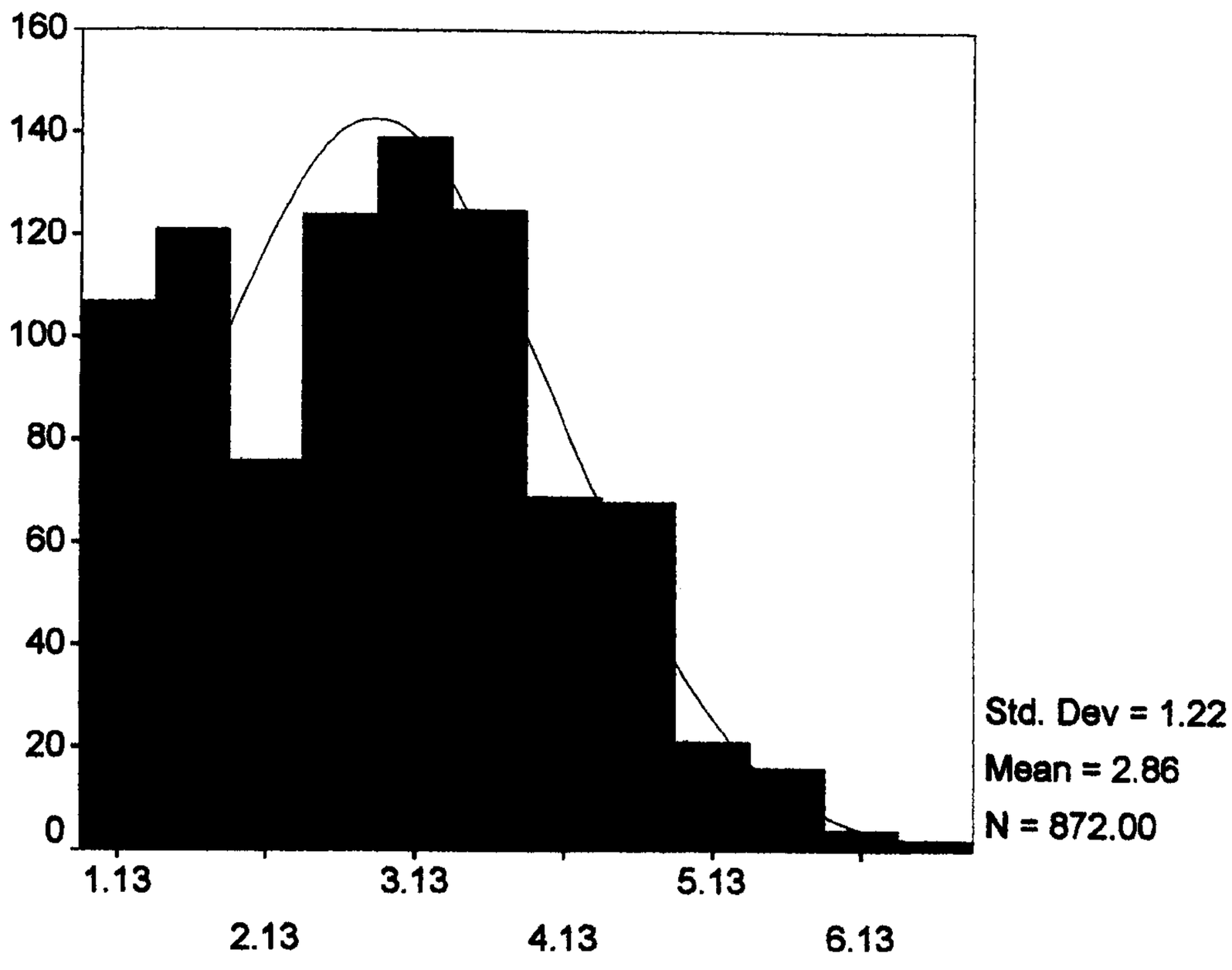


Plot for Continuance Commitment to Organisation

ormal distribution parameters estimated: location=4.6094798 scale=1.113972

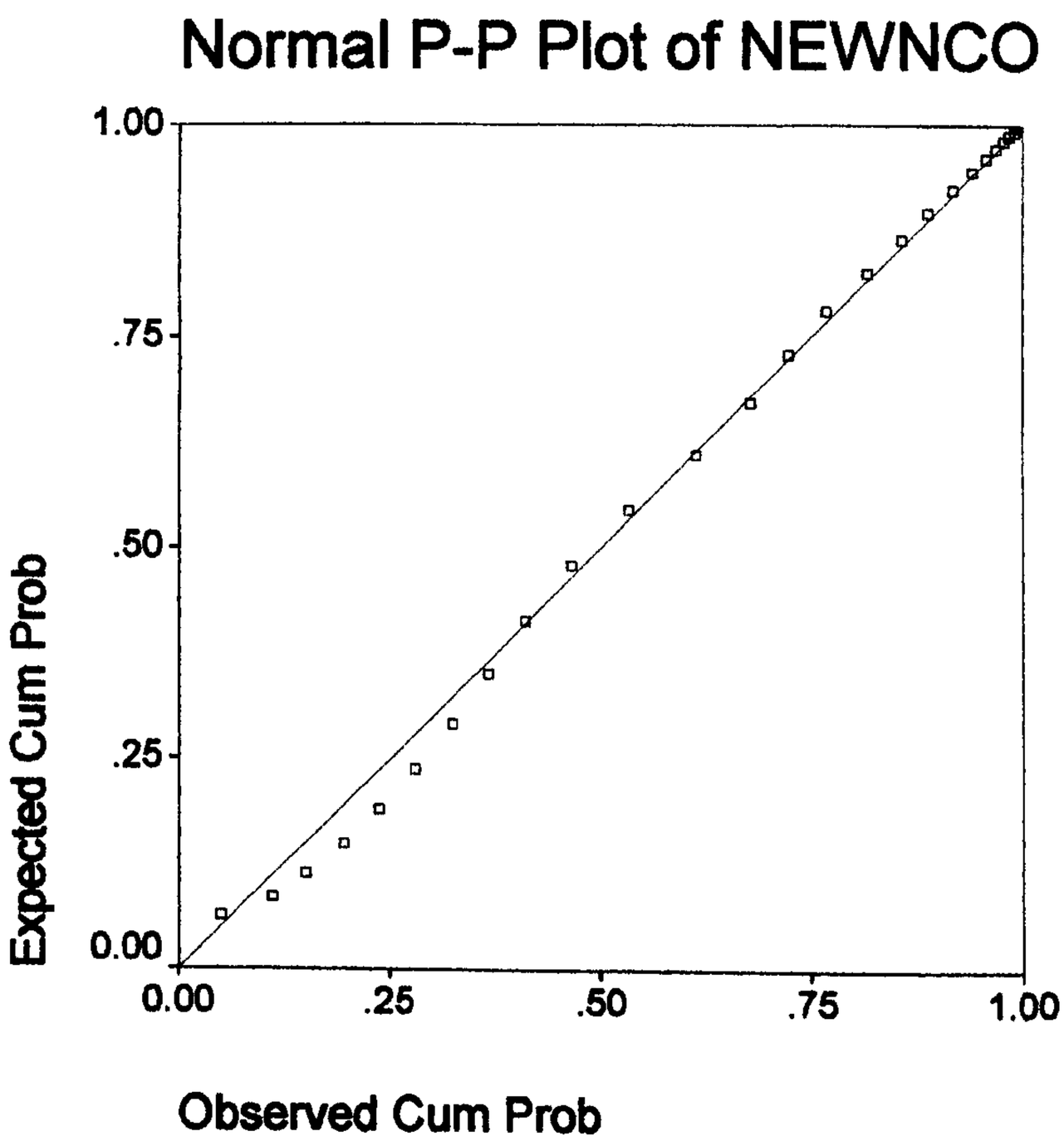


7. Histogram for Normative Commitment to Organisation

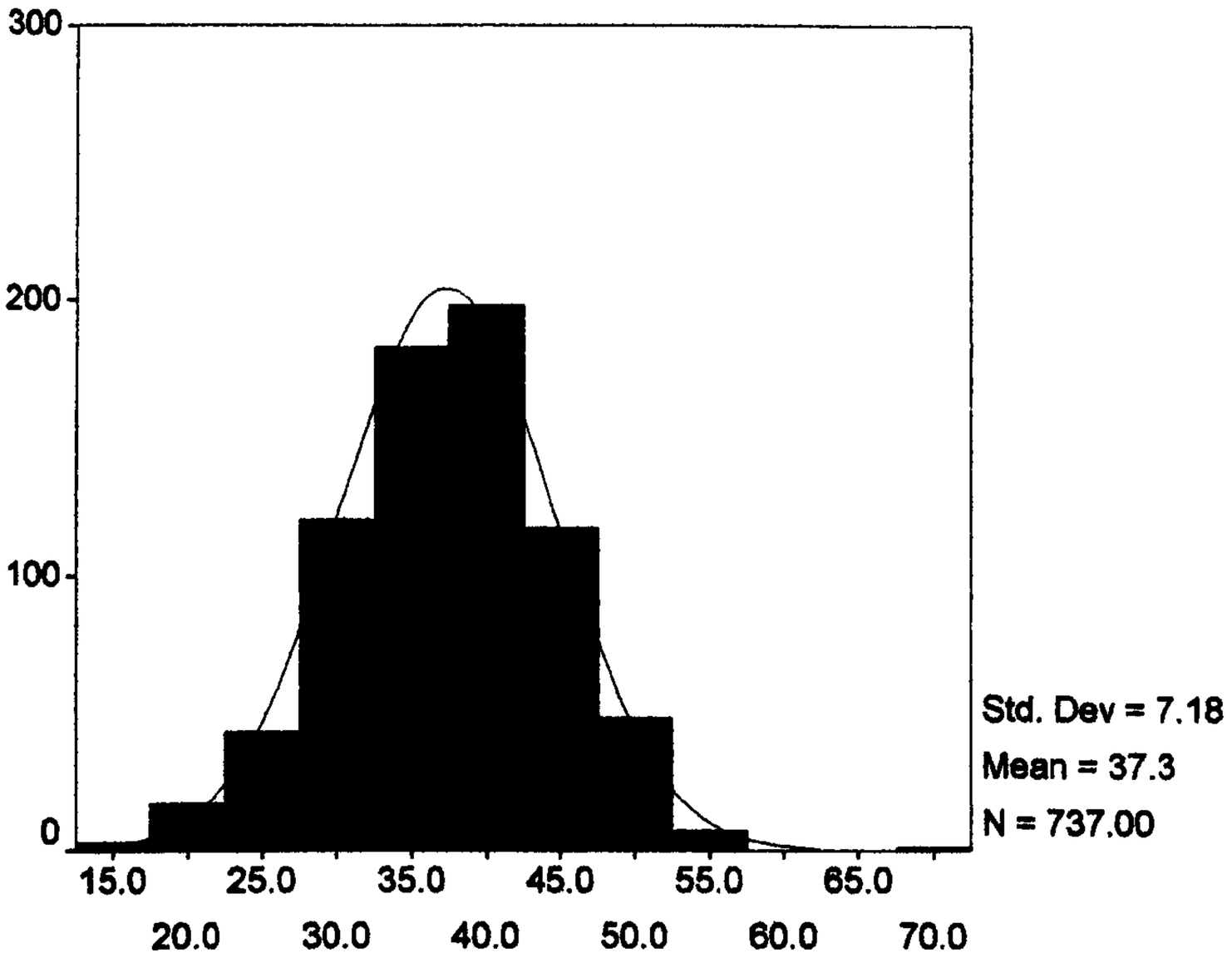


Plot for Normative Commitment to Organisation

ormal distribution parameters estimated: location=2.8623853 scale=1.2168574

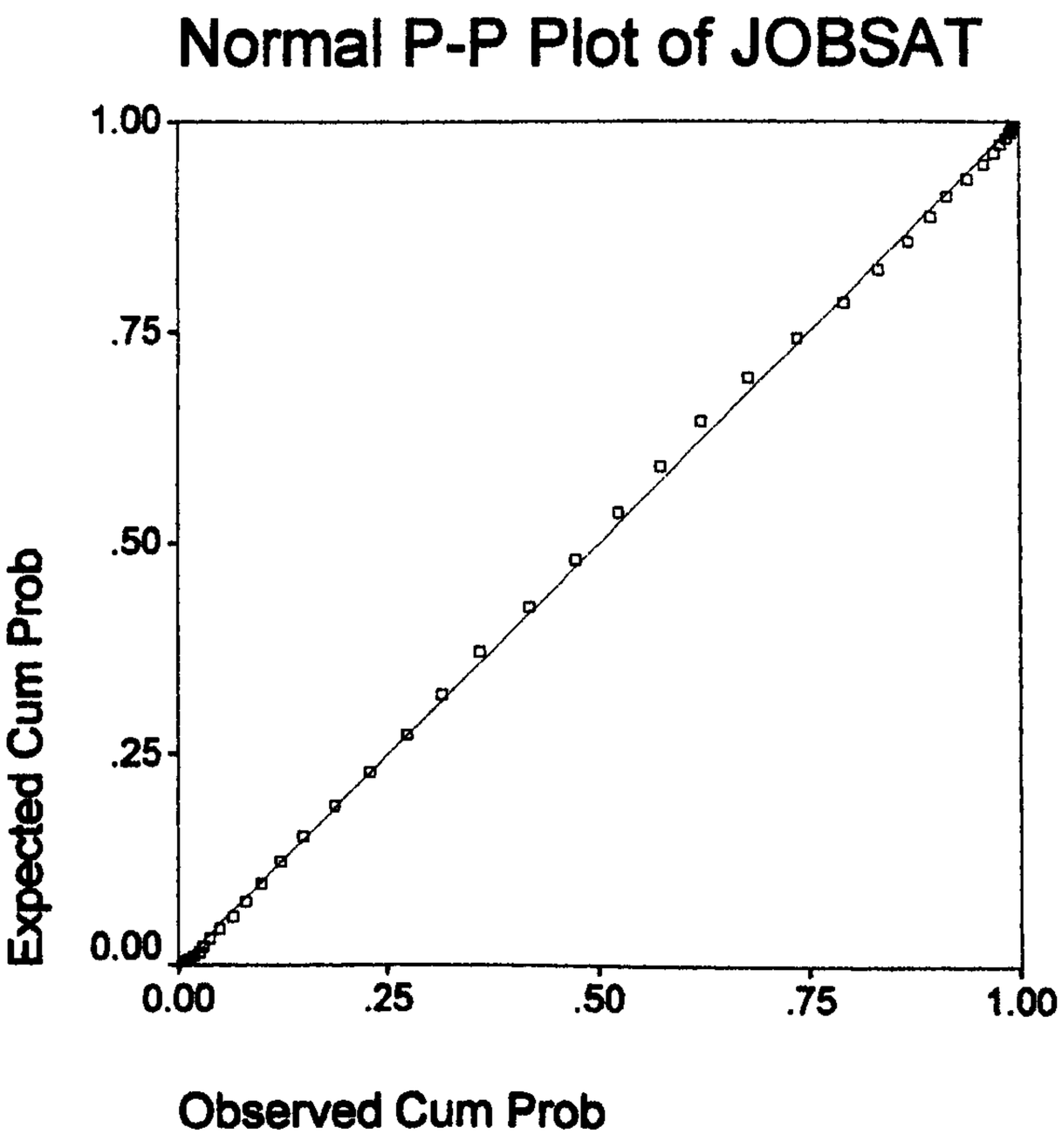


8. Histogram for Job Satisfaction

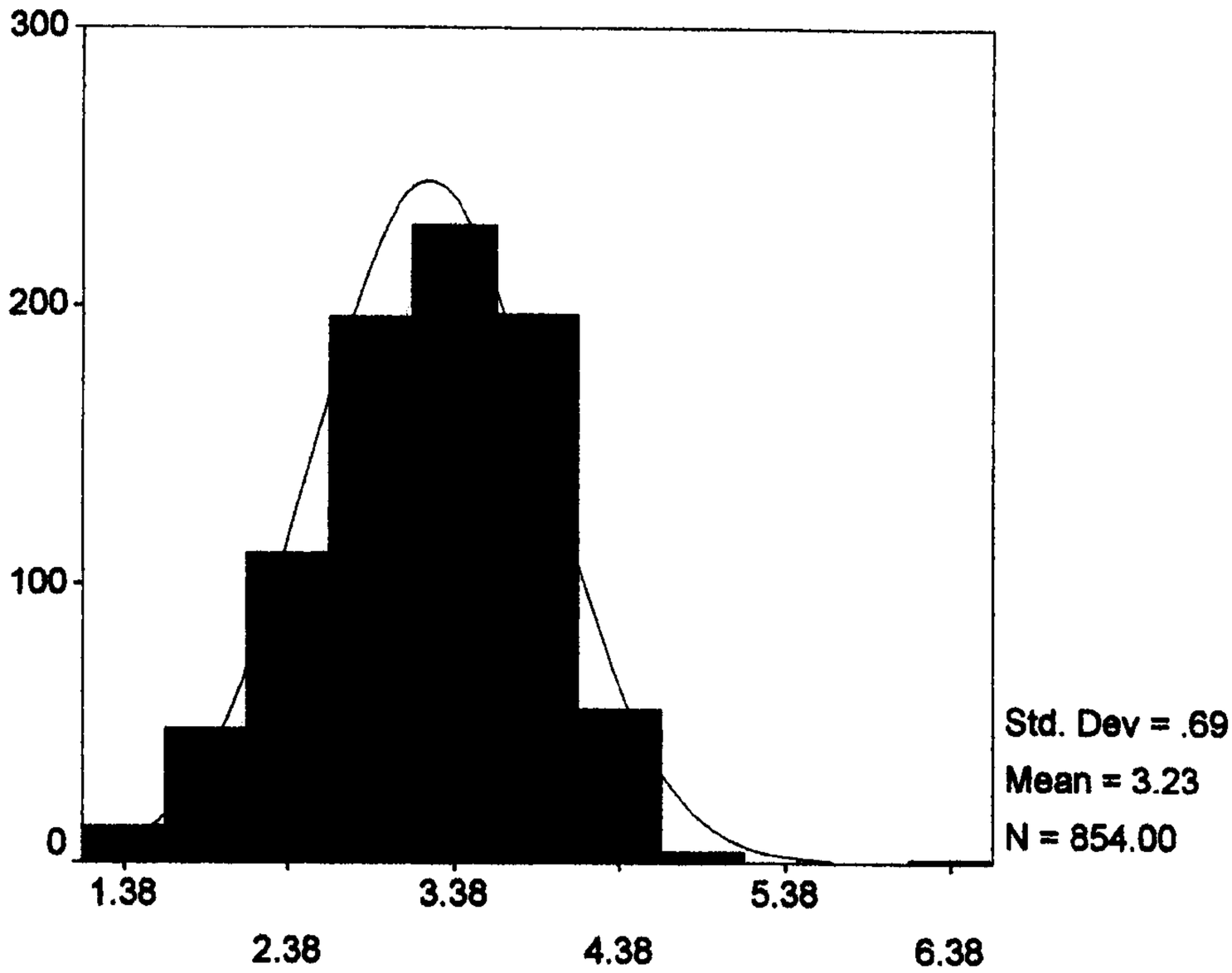


Plot for Job satisfaction

ormal distribution parameters estimated: location=37.332429 scale=7.1766866



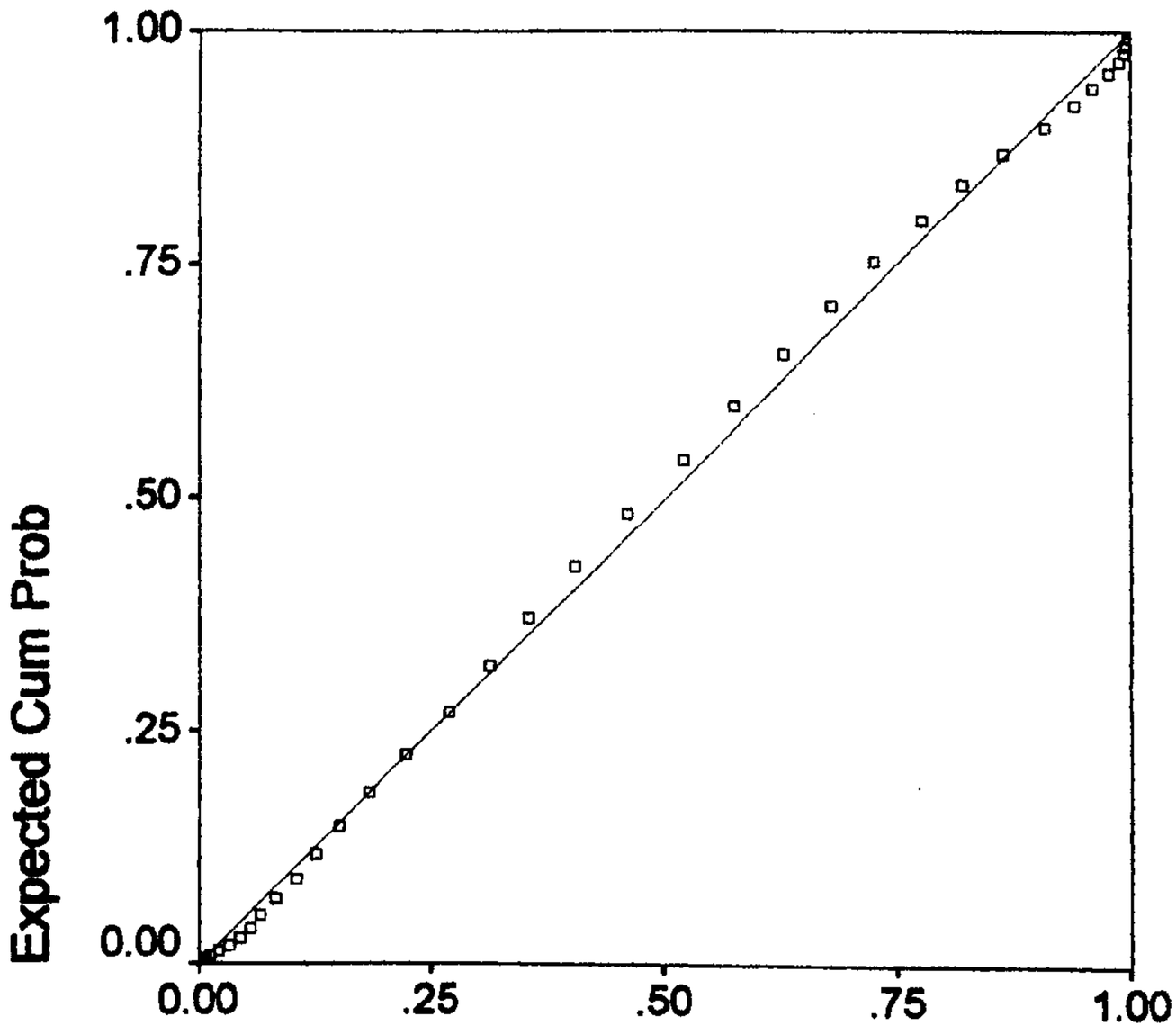
9. Histogram for QUALLAB

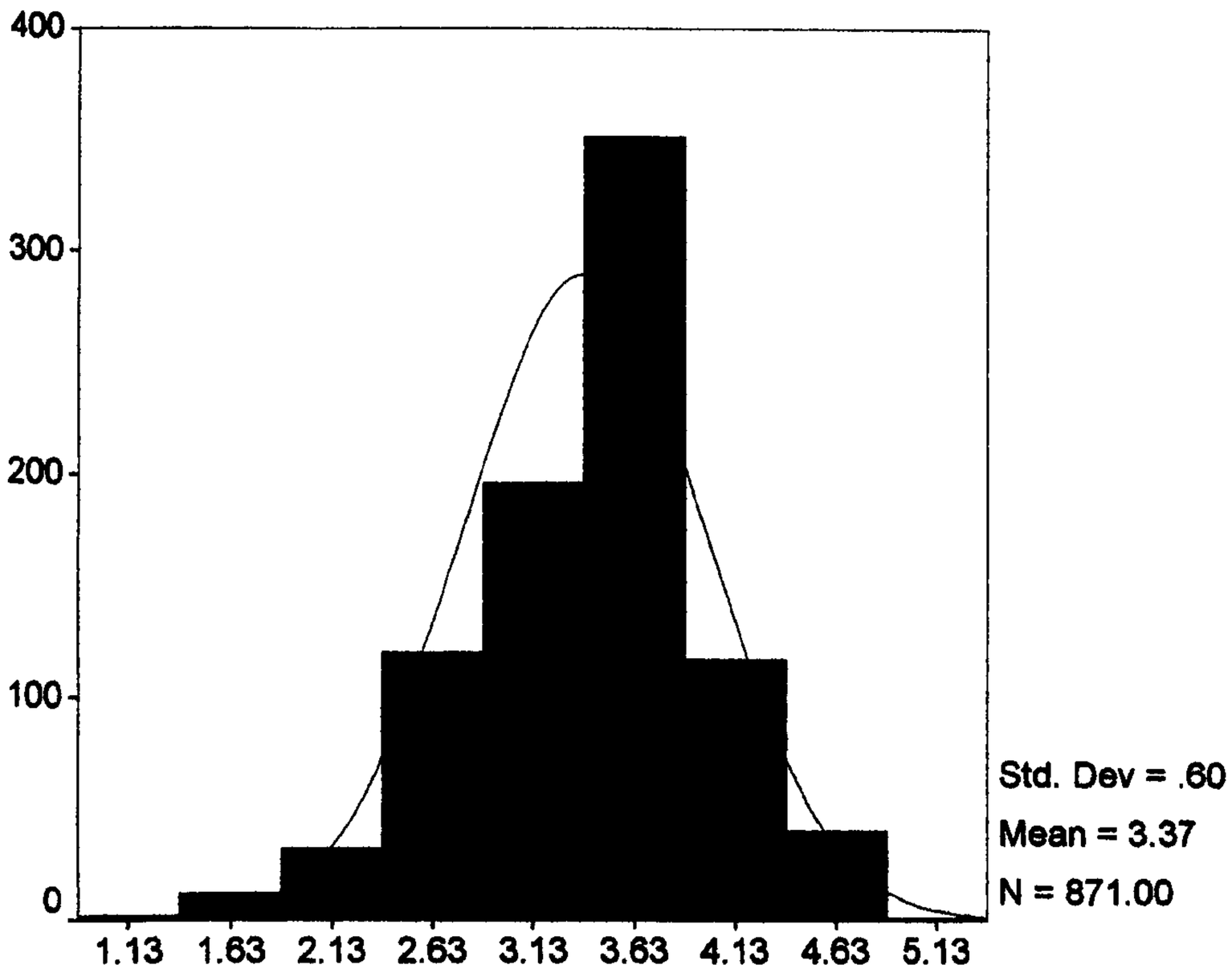


Plot for Quallab

ormal distribution parameters estimated: location=3.2255269 scale=.69420944

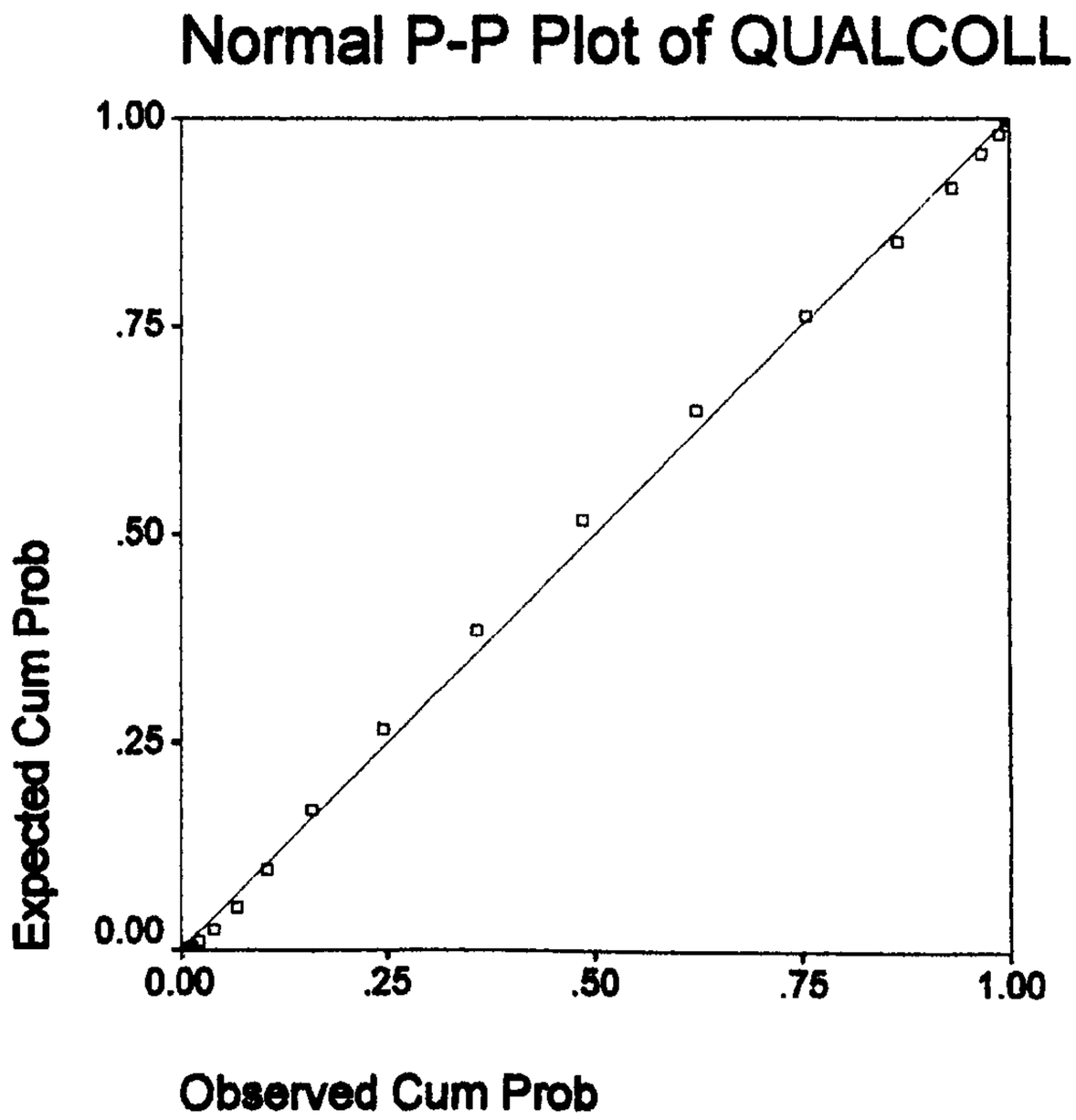
Normal P-P Plot of QUALLAB



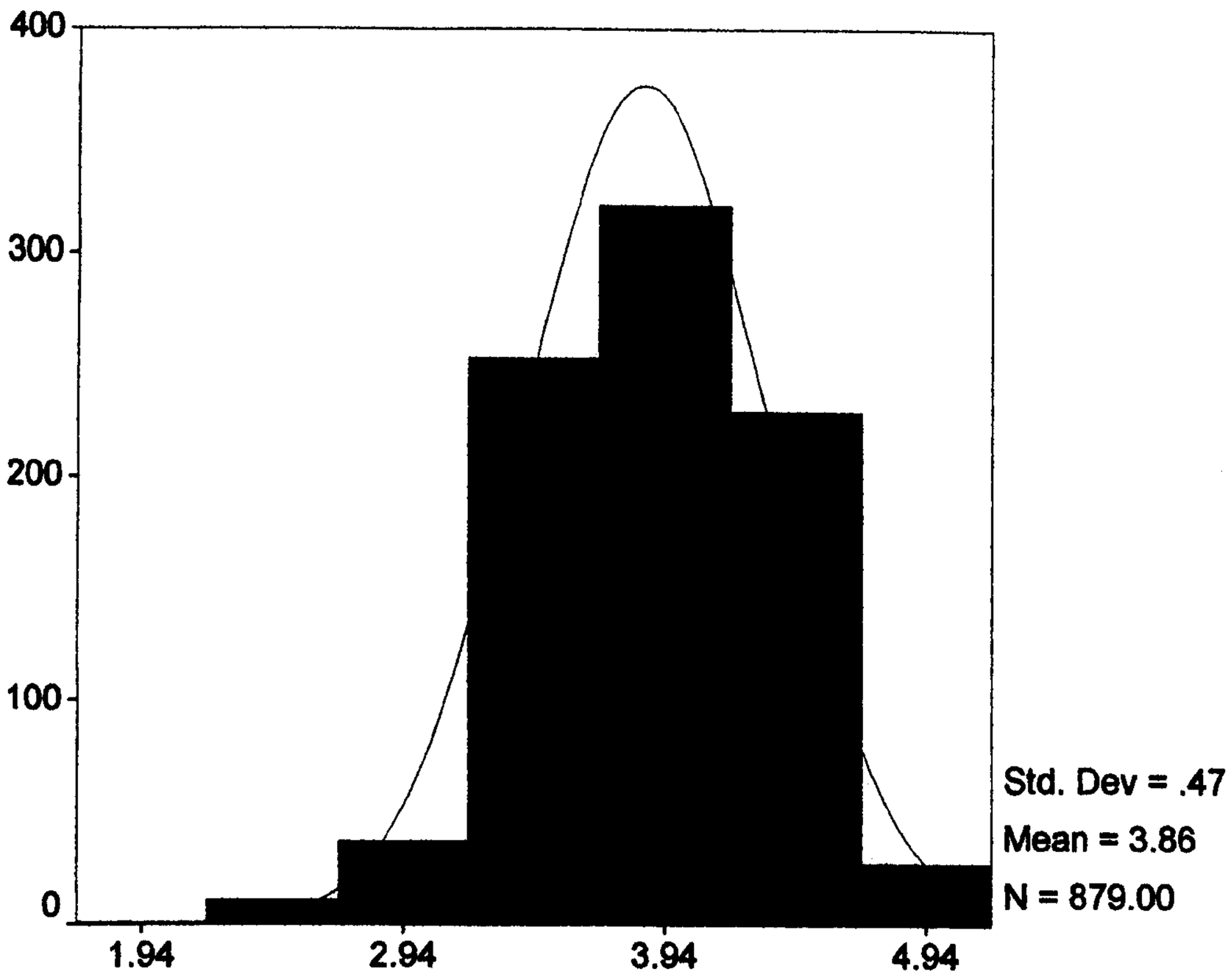


Plot for Qualcoll

ormal distribution parameters estimated: location=3.3742824 scale=.59868047



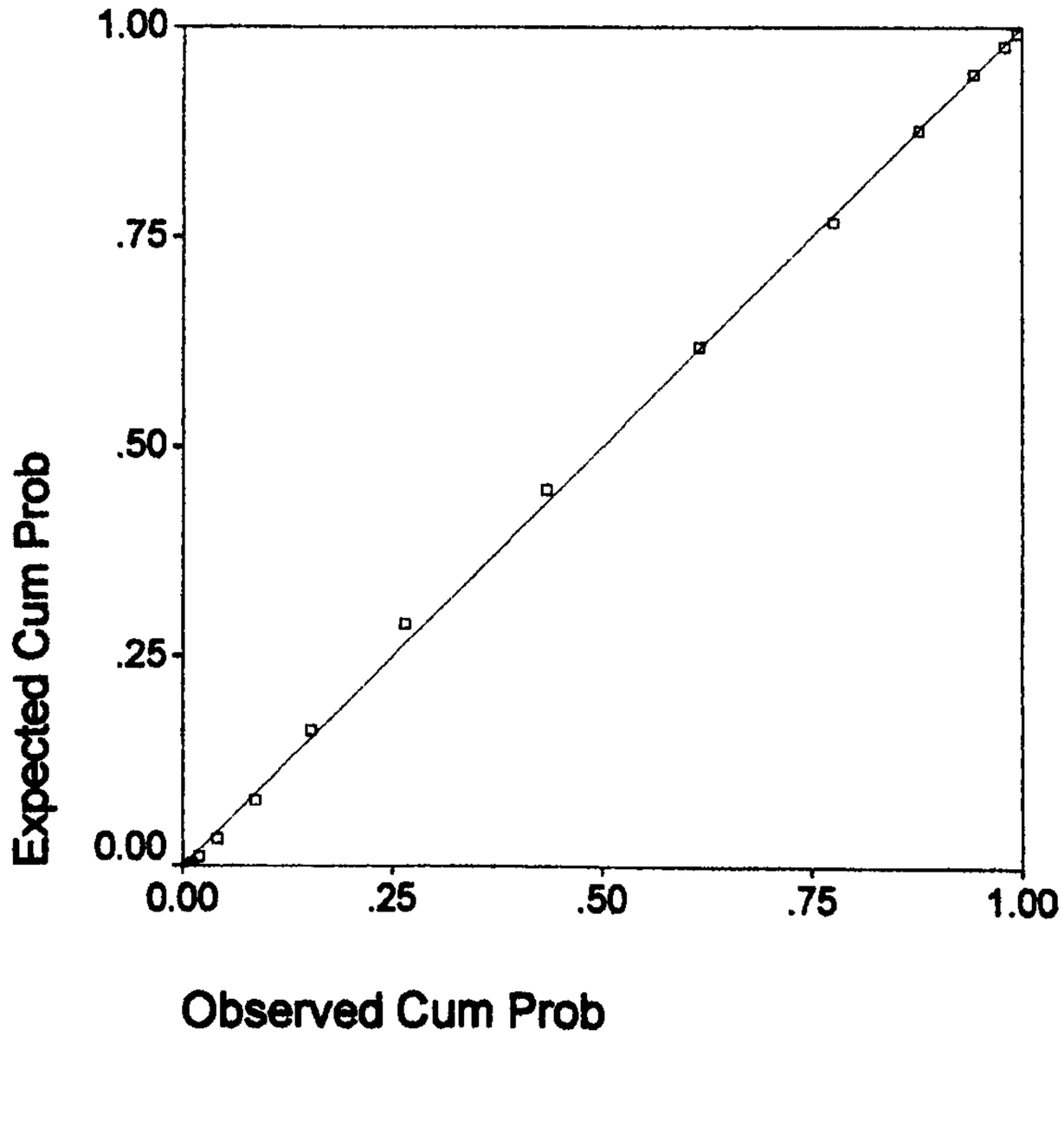
11. Histogram for QUALSELF

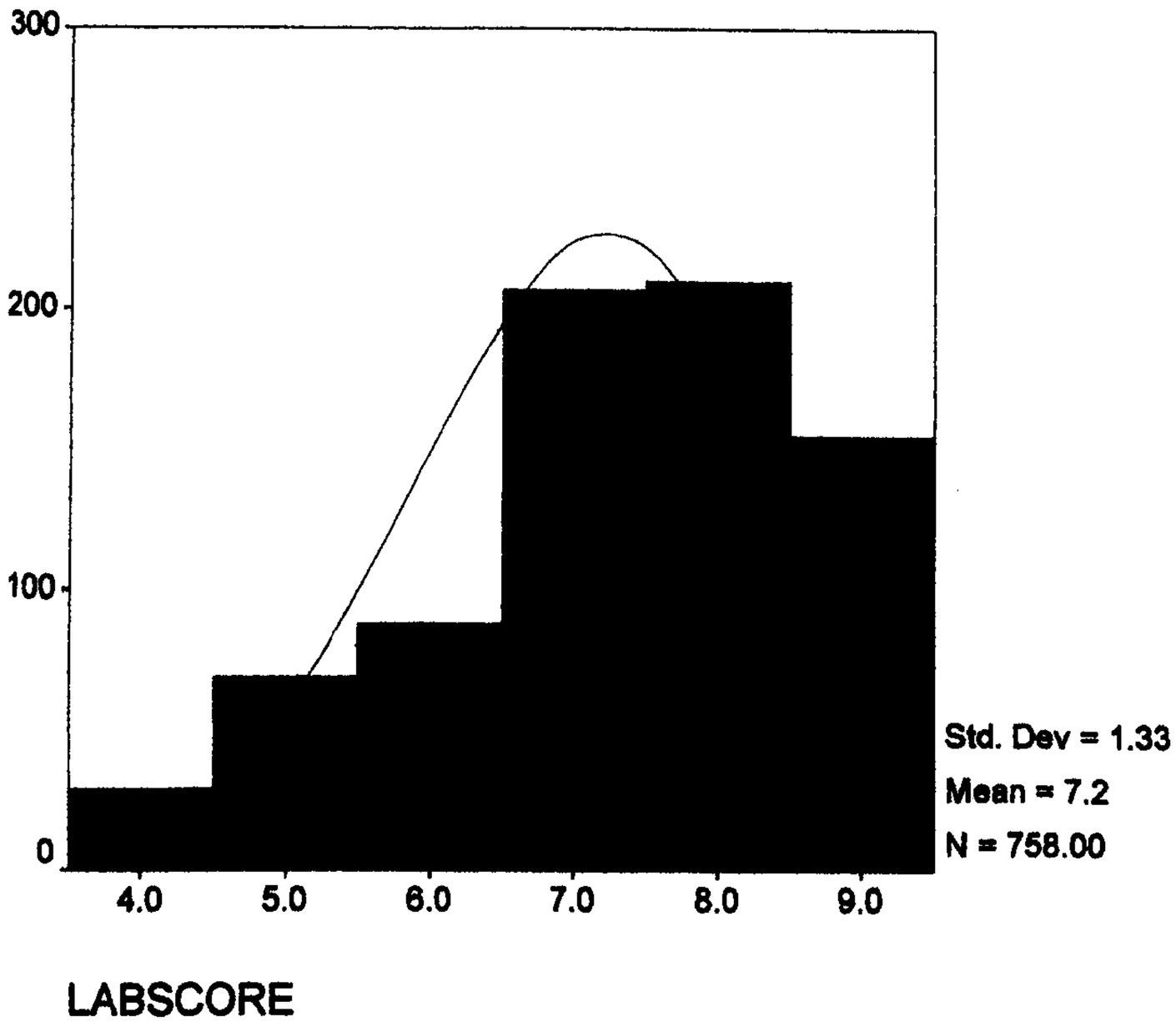


Plot for Qualself

ormal distribution parameters estimated: location=3.8598407 scale=.46676854

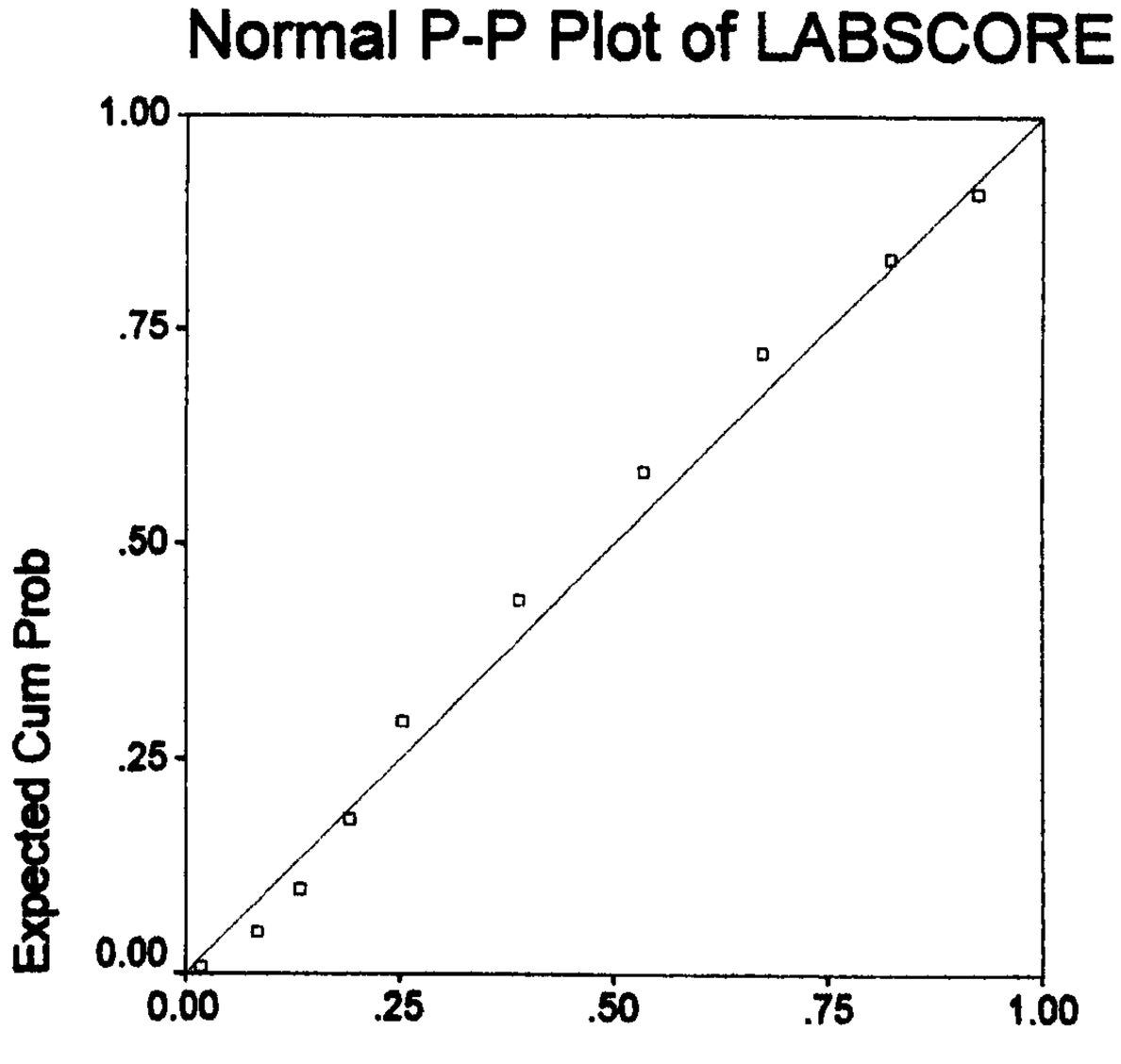
Normal P-P Plot of QUALSELF





Plot for Labscore

ormal distribution parameters estimated: location=7.2183377 scale=1.330277



Appendix C2a: Data obtained from Institute of Biomedical Sciences (following pages), then collated, re:age, gender and grades of members, compared with study respondents

Table 1.a: Numbers of BMSs in each age group*

age group	study group	actual from IBMS
up to 30	159	1064
up to 40	288	3629
up to 50	310	4389
up to 60	141	2409
over 60	6	964
unknown	10	336
total	914	12791

* study data recalculated to conform to age group categories in supplied data

Using data from Table 1.a, the percentage of IBMS members in each age group can be calculated. From this, the expected numbers of BMSs in each group if these percentages were distributed among 914 people can be calculated.This provides the basis for a 'goodness of fit' chi-squared test, as shown in Table1.b

Table 1.b: Distribution of BMSs among age groups

age group	Observed' O study group	% of total from IBMS data	Expected' E from IBMS data	(O-E)*(O-E)/E #
up to 30	159	8.4	77	87.325
up to 40	288	28.4	260	3.015
up to 50	310	34.3	313	0.029
up to 60	141	18.8	172	5.587
over 60	6	7.5	68	56.529
unknown	10	2.6	24	8.167
total	914	100	914	
			Chi-squared =	**160.652**

Chi-squared = sum of (O-E)*(O-E)/E
degrees of freedom is found from the number of groups minus one, in this case 6 -1 = **5**
From statistical tables, this value of Chi-squared is significant at p<0.001, which indicates a difference between the IBMS membership and the study group
However, the younger age groups appear to be under represented in the IBMS data, which is likely to be because membership is no longer a pre-requiste to sit professional exams. Similarly, the over 60 category includes retired IBMS members, so does not reflect numbers of practicing BMSs

To allow a more valid comparison, data from the middle three categories in table 1.b (i.e. age groups up to 40', 'up to 50' and 'up to 60') is given in Table 1.c. Chi-squared was calculated as above.

Table 1.c: Distribution of BMSs among 'middle' age groups

age group	Observed'O' actual data study group	% of total from from IBMS	Expected'E from IBMS data	(O-E)*(O-E)/E # IBMS data	
up to 40	288	3629	34.80	257	3.739
up to 50	310	4389	42.10	311	0.003
up to 60	141	2409	23.10	171	5.263
total	739	10427	100.00	739	
				Chi-squared =	9.006

degrees of freedom = 2
p>0.10, indicating that there is no statistical difference between the O and E distributions
In the same way, the IBMS data for gender and grade distribution was compared with the study population. Results are shown in Tables 2a and 2b and 3 below:

Table 2a: Distribution of male BMSs among age groups

males= 6559/12791=51% of IBMS members and 390/904=43% study respondents

Appendix C2b: Data published by the Department of Health (following pages), then collated, re:age, gender and grades of members, compared with study respondents

Table 1: Distribution of BMSs among age groups

age group	Observed'O' study group	actual data from DoH	% of total from DoH data	Expected'E from DoH data	(O-E)*(O-E)/E #
up to 30	159	2470	19	174	1.293
up to 40	288	4262	32	293	0.085
up to 50	310	4151	31	283	2.576
up to 60	141	1914	15	137	0.117
over 60	6	204	1	9	1.000
unknown	10	206	2	18	3.556
total	914	13207		914	
				chi-squared=	**8.627**

degrees of freedom =5
p>0.10, indicating that there is no statistical difference between the O and E distributions

Table 2: Distribution of DoH figures according to job description and gender

	all staff	%	female staff	male staff
manager	131	0.99	20	111
so	12719	96.34	7784	4935
trainee	352	2.67	256	96
	13202	100.00	8068	5142

Since the DoH definition of manager is Pathology Directorate/Business manager, rather than head BMS of individual laboratories and there is no breakdown of BMS grades given, comparison of 'grades' is not possible

Females comprise: 8068/13202*100=61% of DoH BMS staff
and 504/904*100=56% study respondents

Males comprise: 5142/13202*100=39% of DoH BMS staff
and 390/904*100=43% of study respondents

These percentages are not markedly different and indicate similarity of study group to population of DoH BMSs

APPENDIX C3: All items entered into initial factor analysis for quality scales.

1. The senior managers (ie head MLSO, consultant) in our department are committed to quality assurance
2. This is a chance for staff to take part in deciding what the work methods, activities and goals are
3. Important decisions are made by the staff members closest to the action
4. I would say that the standard of staff training in my department is low
5. There are sufficient well motivated and experienced biomedical scientists in my department to keep the quality of the work high
6. There are always deadlines and tight schedules
7. Staff try hard to get ahead
8. Staff know what the manager expects of them
9. People in this laboratory are proud of their work
10. There are regular departmental meetings to discuss issues including quality and standards in which staff working 'on the bench' participate
11. There is a strong pressure to please users of the laboratory service
12. If a colleague points out a mistake that I have made, I take the criticism personally.
13. The work requires a lot of technical training
14. When considering how well I do my job, I am my own strongest critic
15. I am responsible for doing my job right first time
16. I usually check my own work thoroughly
17. I try to keep myself up to date in my discipline by discussions with colleagues, attending scientific meetings and reading journals whenever possible
18. Staff stick to the rules
19. The staff try to do their best
20. Staff are interested and deeply involved in their work
21. The manager stresses doing the job well
22. I usually get positive feedback from my supervisor
23. Everyone is granted enough power to do his/ her job
24. When technical problems occur in our laboratory, senior managers are not always aware of them

APPENDIX D

Qualitative data from questionnaire

Appendix D: Additional,uncategorised comments from questionnaire

shown as questionnaire number and comment(s)

2.problems of recruitment and retention
6."I retire at the end of 1998"
39.very few females hold higher management posts.....those that do struggle to be taken seriously by male members of staff.....no way of changing deep seated attitudes to opposite sex
41.my answers may be coloured by my age and the fact that I am actively seeking voluntary retirement
44.microbiology deals with front page issues, yet the technical staff are virtually unknown
50.biggest problem is recruitment and retention of staff
59.departments and laboratories headed by medics this will never change. Oncall has prevented decent salaries being introduced
70.more money for technical part of health care less for fat cat mangers
92.hnd/hnc training was much better
93.Serious staff vacancies will lead to problems later
94.can no longer advise career in BMS-black box expt.....read again
96.only comments on my performance when something goes wrong
102.profession is 'bottom heavy' which does not bode well for future
122.there is simply NO RECOGNITION
125.I feel as if pathology in general is regarded as a "test factory"-sample in -results out.
There is a wealth of knowledge and expertise which is largely unused (in my employment at least)
The CPSMs view of eligibility for state registration could also do with a review
129.Improve personal standards ie dress code, appearance. increase the MLSO population at the expense of MLAs
138.(all NHS staff) really are all in the same boat ie overworked, unappreciated, low morale etc. It's just a pity that the various professions are so fragmented and so often seem to be competing for funds
142.it is almost impossible to fill MLSO posts now also that standard of any body applying unless an older trained MLSO is fairly low. Also we can no longer recruit MLAs as unemployment in this area is <3%
143.I feel governments recognise us as a profession but do not publicise this fact because it would mean ungrading our salaries to at least equal that of a nurses salary
144.labs should regulate the number of staff on courses
148."make public more aware of our actual work.....-eg testing of ecoli 0157"
149.the two big issues today are, I feel, poor salary for MLSO1 and the lack of trainee posts
163.we do a great deal of tarining and a lot is expected of us for very little return
164.no good employing graduates with no experience-therefore go back to day release system
184.I feel that my Trust (not my boss) want my all my life, not just most of it!
204.I can't see this trend changing.Everyone wants higher standards while reducing costs
211.there appears to be little incentive for (BMS students) to spend such a long time in further education
212.I am delighted to respond to this survey as it is so rare that anyone outside our profession shows any interest in our existence I always wanted to study microbiology and have found it an interesting career. However as things stand at the moment I would not enter the profession over again....
213.valued? no
216.management feel churning out specimens is most important-staff are often forgotten
217.I do not feel valued as a professional BMS by the Trust management.
219.I don't think anyone takes us seriously
220.I am proud to be a biomedical scientist but I do not feel particularly valued
221.no
222.I do not feel particularly value Like many biomedical scientists I entered the profession out .. of interest..... I feel that I will have to leave the profession very soon as I wish to live a

higher standard of life both in material and personal development terms
223.stuck in rut and demoralised I find my job very interesting-why should I change?
224.I feel very undervalued as a professional biomedical scientist
225.not particularly the impending recruitment crisis....
227.I think of it as a job rather than valued profession
232.I don't feel valued as a biomedical scientist
233.I feel I should be valued but don't think I am
235.yes
236.yes-usually
237.I feel valued within my own sphere of operation
238.too many highly competent Biomedical Scientists have left the profession If somebody somewhe listensto the problems that currently exist in BMS and particularly among the current pathology staff then maybe the future for this profession may not be as gloomy as it would appear at the moment
239.I do not feel valued as a biomedical scientist how they expect people of Masters level to be loyal to something that pays a wage comparable with unskilled jobs is beyond me
240.no some colleagues are at worst incompetent at best poorly trained
doing away with the old HNC/D route has produced technicians who are not always up to scratch
242.I definitely feel valued within my department ..recruitment to the profession is at an all time low which in turn undervalues the profession
243.no,not valued
244.I feel valued by my manager and colleagues but..
245.I don't feel valued as scientist The proposed merger with the RCPath may have some beneficial outcomes in terms of profile and ' clout'
247.I am a trainee MLSO after graduating this year-it's difficult to answer this question
248.I do not feel valued at all we are a profession led by donkeys, both from the medical side and the IBMS,which serves no useful purpose at all as far as I can tell
249.I feel valued but not appreciated
250.Whilst I enjoy my job I hate the treatment / salaries of young junior and basic grade staff
251. I do not think I feel valued
252. I feel undervalue(plumbers and joiners in the NHS are paid a higher salary than most MLSO1s
253.overworked,underpaid and undervalued
254.I feel valued by my supervisor
256.I do not think we are valued as a profession
259.I enjoy my work... recognition of the Fellowship outside the profession
260.as time goes on, I feel less valued no.how can you argue against 'progress'?
261.definitely NOT recognise people ability use them don't abuse them as happens here
263.We do not feel valued at the BMS1 level, only a worktool and not a person
Health has suffered as a result of long time lab work.....and it wasn't worth it!
267.'partially' social facilities
268. Improvements ? yes
269.I have never felt valued as a BMS....it takes too long to explain who and what we do and it is usually met with expressions of disgust
270.as this is a scientific profession, I really liked it at the start...
271.having worked in microbiology for 23 years, I find that the current situation of low morale etc is the worst it has been throughout my career
274.I feel valued by the senior staff
275.I only truly feel valued by other healthcare professionals
276.I do not feel valued as a biomedical scientist
280.valued? not really the recent move to employ graduates only could help in boosting the prestige of the profession
283.I do not feel valued ...I always feel I am personally underachieving my potential improvements? change job.....from talking to colleagues only comradery with my workmates holds me here
284.not valued.. IBMS no longer representative of the 'real' profession. More support for MSF
285.I feel valued by my colleagues A little bit of praise goes a long way....

286.I do not feel valued
287.I do not feel particularly valued more realistic approach to workload
288.improvements? not at my stage
289.I do feel valued
290.labs arranging displays in the lab in which I work...in the past three years, two trainees have come and gone-left for other types of jobs, not of a scientific nature
291.generally I would suggest that biomedical scientists are significantly undervalued on a more personal note,there are occassions when I feel valued as a professional biomedical scientist for each BMS to adopt a truely professional attitude, including dress code
292.I feel I am valued...however the value is undermined by....
.....this will see an increase in the more 'gifted' biomedical scientists remaining in the profession and will therefore improve the service in years to come
293.at times it would be fair to say that one does feel valued
perhaps one area which I feel was neglected in the questionnaire was the relationship between the biomedical scientist and the patient
295.no people don't matter, money is all that is important
296.no I don't feel valued,as the image pay and image of the job creates the impression that it is a poor and unrewarding career,only suitable for second rate graduates
297.no I feel undervalued
298.I believe that the Biomedical Science profession is grossly undervalued ..there will be difficulty in obtaining staff who will be suitable members of the profession in the future
299.I most certainly do not Out of a technical staff of 21 only 1 senior grade is female.....
I do feel that the playing field in this discipline is far from level and greatly undervalues its female staff
301.Science , it seems, still retains some element of witchcraft; a mystique beyind the intellectual competency of most people!
303.Questions assume that there has been emplyment without break but a lot of women have maternity/child leave
304.I do not feel valued as a biomedical scientist
305.no recognition as a professional not just a technician
I 'fell' into this 'profession' .....with the promise of a 'good career' in a 'respected profession'.....
..I am now doing a Masters ...and plan to leave the 'profession' as soon as possible after qualifying
306.....a graduate should not be expected to start their salary at less than £15K
307.I do not feel especially valued
308.open days, school visits...increase contact with patients..?expand role beyond laboratory tests
310.I didn't realise how much I was valued as a scientist until I went on maternity leave....
when I came back I realised I was missed.....
312.Patients seem to think that the blood test consists of just taking the blood and requires little intelligence or skill
315.I feel valued
316.In my present post I do feel valued no public voice as our professional body shows a deplorable lack of backbone...
317.no provide suitable space and facilities in new/modern hospitals
318.do NOT feel valued ...lab open days, better union represntation
319.yes and no
320.valued? who by? the morale within the NHS has never been lower. The Institute has sat on the fence and has allowed the powerbase of consultants to rise unhindered.
I believe the future entails the use of molecular biology with the implementation of automation. scientists to interpret the results and consultant/medical staff to proffer advice
321.I don't feel valued-noone ever says thankyou! If we were paid more as a profession then we would have more self-respect and maybe the registrars/consultants would also respect us more. The type of people attracted to the work are often not very ambitious and also quite introverted so easily downtrodden
322.I do not feel valued
323.I am valued by the people who know what I do
324.The profession is under-valued poor recruitment may eventually force change

325.All the attention and rallying for better pay and conditions concentrates on doctors and nurses
326.I don't always feel valued
328.less stress during working hours to enable us to enjoy our social time more..
I enjoy medical laboratory work and would probably choose to do it again apart from the pressure
330.I do not feel valued as a professional biomedical scientist
332.No I do not!
333.I feel valued.....an Being valued as an indivdiual does not always equate with one's salary
334.I do not believe the profession is appreciated The general impression is that we are well paid and have interesting work and associated benefits ie promotion
335.not considering myself as a professional yet,but see scope for being valued
336.I don't feel valued and I feel taken for granted
338.No, I don't feel valued
339.I do not feel valued as a BMS most of the public.....are only aware of BMS and other professions supplementary to medicine when soemthing goes wrong, for example cervical screening ...institute.....needs to address the lack of trainees coming into the profession, most of whom cite the poor pay and poor promotion prospects as reasons for not joining
341.No I do not feel valued at all an unacceptable level of abuse of authority...technically we are well behind any other ..lab
344.not really
345.I do feel valued
346.No there is not respect for the workers in my profession There is no challenge anymore, I have learnt all I want to learn about the discipline I am in but am still interested in science Helping people I enjoy but to stay with this organisation for many reasons would destroy me...
347.not really open dayss for staff and other healthcare workers
348.I feel undervalued a word of thanks sometimes
349.low morale over pay and a general feeling that "someone upstairs is taking the piss"....low morale over lack of representation.....concern over the future of the profession..
HOw would a young person coming to this profession going to survive as a basic BMS.I honestly don't know and I would certainly not advise my children to go to this profession
350.I do not feel valued
351.saying 'thankyou' and 'please' occassionally! or even 'well done'
352.No I definitely do not feel valued other health care groups (those with patient contact) are more highly valued increase the status of the profession..greater liasing and cooperation between medical professions and BMSs
354.Yes I do feel valued as a professional biomedical scientist I left nursing in 1974 to join up the MLS in those days to get away from poor pay and conditions.
358.I feel valued when my opinion is asked,by the clinicians, mainly oncall
361.I do not feel valued IBMS representation of BMS to public-poor
Stop laboratory privatisation from NHS
362.I don't feel particularly valued as a biomedical scientist I also feel that if I left work I would quickly be replaced and forgotten but that is true of any job isn't it? I have come to the conclusion that I do the job because I like it.God knows why!
365.open days....more positive press articles would help - rather than cytoscreening problems
368.low moral in lab-high level of sick leave in lab.....have to be of right colour or social group to get ahead Equal opportunity (not only on paper)
369.I do not feel valued as a BMS.... Morale is very low, we are underpaid, undervalued and have no prospects for improvement whatsoever
People do tend to stay and suffer because the work is very interesting
370.A change in culture!
371.I feel partly valued The possibility of some clinical training would enable MLSOs to become part of the 'caring team' I myself am proud of what I do , knowing that I am helping people who maybew suffering through illness
374.I do feel valued as a professional biomedical scientist ...it is unlikely that young people will want to enter the profession, which now requires a degree, when the biomedical scientists' pay is so low More money=more motivation, more pride in the job and greater commitment

375.No I don't feel valued
379.NO I do not. The profession itself is far too insular by insisting that you possess a 'biomedical science' degree Most graduates entering the profession do so to gain experience so that they can earn a decent wage in later life—no people left
382.I do not feel valued as a biomedical scientist
384.not valued Also the CPSM and Institue have completely lost their way with recruitment CPSM and Institute need to look very closely at their qualifications standards for entry
385.I do not feel valued as a BMS
386.NO I do not feel valued The CPSM and Institute of Biomedical Sciences are outdated, do not understand what the profession is all about and cause more problems than they sort out. Bring the Institute into the 20th century never mind the 21st...
387.I feel valuable 1 job=no applicants ...one day it might be a job people want to do and don't just fall into, instead of come to work-do job-go home.Let's get interested again.....What does the IBMS do except take our money?
389.I do not . I used to I would leave tomorrow if I could get the same wage with less pressure It is easy to gain accreditation by producing the necessary paperwork for a one off inspection.Many of the required procedures are then dropped on the grounds that we don't have time
390.no remove MLSO 1 grade so all staff move up 1 grade....the MLA grade could then become much broader.....and degree entrants could come in at a reasonable salary
392.one week national strike is rather drastic but would be effective
395.In an ideal world all staff would get complimentary feedback when doing well at their work
396.I do not feel valued ..we are encouraged by our Institute to have a very high opinion of ourselves and to acheive more and more academic qualifications-for what purpose?
397.No I do not feel valued as a professional biomedical scientist
398.reduce the time it takes for the reports to get back?by e-mail or some similar method
399. No-not valued
400.better PR etc by union reps etc
404.I used to feel valued.. ..with more SOPs enforced.....personal experience and intuition is not going to account for anything-ie the sense of job satisfaction will go
406.no we feel that we are not valued enough which leads to low morale.
408.I feel this is an interesting worthwhile job, very much undervalued in public recognition and remuneration....
409.However , on the whole I am reasonable satisfied
410.many biomedical scientists feel undervalued whilst pay is not necessarily a motivating factor, comparable pay with other professions would be appreciated
How we are expected to recruit good quality staff with current pay and conditions and prospects is debatable On a positive note,the profession has many committed individuals who will continue to be the backbone of our profession
411.I do not feel valued there is also not a lot of feedback about how a patient progresses If a patient asks let them know what happens to their specimens liase with schools/colleges
412.CPSM registrations-all science degrees within reason should be acceptable
the job is underpaid , therefore graduates will choose industry
413.I don't feel valued the work we do is often ignored,misunderstood,misused, misrepresented better pay- better entry pay-better quality graduate entry-competitive-better status-recognition-better conditions at work-more enthusiasm-quality work output-new perspectives-media attention-recognition-better pay!
414.no
415.I feel undervalued
417.no job enrichment
419.No, I do not feel valued the public, managers, doctors, NHS civil servants ministers and government secretary of state, journalists and media do not know and appreciate what I do
422.I do not feel valued more patient contact
424.I do not feel valued nurses are not the only well qualified,overworked,underpaid members of hospital staff
425.no,we are merely a factory for results greater thought and training of medical staff to use the

laboratory as a diagnostic service, not as a "results" machine
426.I personally feel that the profession is of great importance but is undervalued
427.MLSOs today feel less valued
428.I do not feel valued at all its almost as if we're ancillary workers like porters or cleaners. People who know what we do automatically think we get loads of money
429.I feel undervalued as a biomedical scientist as a department/group of people we are highly qualified and usually conscientious ..many of the things that are portrayed in the news are in fact to do with BMS not doctors

513.I do not feel valued either as a professional or as a person
514.I feel that in general, biomedical scientists are not valued by users of the service
515.I do not feel valued. defined goals for orgainzation and members of staff
516.....we are undervalued. Morale is at an all time low
517.I feel that my job is important, but.....(see not valued) Scientists in Britain should be given a higher profile;only large groups of workers seem to be able to shout their worth!
I am proud of our profession.....I am an optimist but it is getting harder!!
519.occasionally
521.Being head of the laboratory, I see myself as a lab manager priorily and a very part time BMS...
.Promote the 'brand name' of PHLS
523....lack of valuue coming from being part-time than for any other reason

525.I have gained from working in a large well -equipped laboratory
527.I do not feel that this is a well recognised or valued profession
528.I used to think so (ie that he was valued ed), but.....
529. As a trainee, I am pleased with the time and effort that others have given me, which does make me feel valued. However, I believe that my position as a virologist maybe under threat due to imrpoved molecular typing methods.
532.Working in the regional centre for mycobacteriology.....I have found this challenging and satisfying if ocassionally isolating
533.I do not feel valued as a professional biomedical scientist There is becoming a desparate need for BMSs as is the nursing situation at present
534.We might be perceived as the stereotypical 'egg-head' scientist-all most inhuman-even though most of us are mothers and fathers.The salary is laughingly low.....
541.I feel valued as a trainee because of the high level of training I receive
542.There is a 'I'd like to help but my hands are tied attitude' (among managers)
543.I feel proud to be a BMS but not valued.....I would get another job if I wasn't already too specialised in my education At present I feel... (that) the system works on stoicism
545.I feel valued to a certain extent now that I have been promoted to MLSO2. When I was an MLSO 1 I felt that my opinions were not considered to be very important
548.NO Closure of my laboratory and a forced move or redundancy have left me in a less challenging work situation and my opinions and experience are no longer called upon
550.I feel I do a worthwhile job
551.....maybe then we 'll get paid on an even keel with nurses (who don't train as long as we do) or even get paid enough so that we know we are valued within the NHS and the country as a whole
552.(valued?) NO
554.We're the 'forgotten army' in the health service
555..without the BMS these other professions would suffer severe professional impotence....
more direct patient contact
558.I make a difference to the organization.....more time to think!
559.Yes I feel valued as a professional: BMS publications, presentations
561.Open days for other health care professionals and exhibitions within hospital public areas
562.Poorly maintained buildings and inadequate facilities for lab staff More open days for patients, healthcare workers and new personnel as part of induction
565.I do not feel valued as a professional BMS. I have stayed in one place too long and now wish to leave. I am totally undecided as to what to do next, but will probably stay within the system as I'm not qualified for anything else.....Career guidance
567.I feel of value as a BMS.....By giving value I ensure I am valued
568.I do not feel valued as a professional BMS
570.How can you feel valued when the profession is treated as if it is not valued?
571.I do not feel valued as a professional BMS
573.Who in their right mind wants to start a career, with a degree, as a trainee on £8,000 pa when they can get double that starting in their local high street bank?
574.I do not feel especially valued
575.I don't(feel valued)
577.Having only recently joined the team (here) I am very impressed by the welcome I received and the professionality of the staff..I am sure that I have the oppoortunity here to rise to my full potential
580.I think BMSs are the backbone of the medical profession

581. I do not feel myself to be a 'BMS' at all as the term does not seem accurate for the type of routine laboratory work done.....On occasions I feel valued, mosty I feel unknown and sometimes neglected All MLSO1s are initially hoping for promotion and most will never get it
587.Urgent need to have protected job title which will identify those qualified to use it
588.NO I do not feel valued as a BMS
594.Am not too bothered about the low profile in the public's mind-nurses get all the publicity-but probably deservedly so
599.15 years ago an ICN would have deferred to a Chief MLSO,Today and ICN says "he's only an MLSO3 what does he know?" This is a reflection on salary not knowledge!
600.Valued-not really Less money-based decision making
604.(valued?)NO
605.I feel undervalued as BMS
607.I do not feel valued since the profession as a whole has been de-valued and re-grouped
608.I used to feel valued biomedical scientist up to a few years ago but now I don't due to change in situation in the whole profession
609.Not completely any more. Certainly a lot of change brings insecurity-so stability of a sort for a while would improve things
610.I do not feel valued any more. Re-establish the former route of entry into the profession and require graduates to do the same
612.I love my job
614.I love my job and was very enthusiastic about it
616. Less administrative loading giving more time for scientific involvement and training
617.It might help to aim for a higher standard of academic ability not 3rd rate degrees
618.Unvalued because the job is semi-revolting
619.NO.... Inside the profession it doesn'tv matter how well or how badly you do your job, you still get treated in the same way
621.WE run the risk of spiralling downwards with poorer staff, incurring more errors, reducing the quality of job satisfaction, attracting worse entrants for worse pay etc.....When I started work in 1962 pay scales were on a par with the scientific civil service
622.Not much valued at all. MLSOs are the mushrooms in the NHS. Low pay growth in the dark not informed and doing a lot
623.Stop paying Group directors >£80.000 plus bonses to make our lives more difficult
626.If mangers/consultants were more in touch with reality
627.I feel undervalued, underpaid, unmotivated, unappreciated, unknown, unhappy unthanked
628.I feel that BMS has become the poor relation compared with other disciplines with the health service
630.scrap degree level entry-best BMSs go through the old HNC/HND-FIMBS system..
631.Generally no!
634.I believe the process of becoming valued may take a long time (a whole career)
Our lab has launched IIP.We invest in training and encourage CPD with minimal effect
636.The salary and local atmosphere preclude any feelings of value
638.Open days in hospitals, advertise in newspapers, lobby MPs
639.I do not feel valued
640.I feel undervalued as a professional BMS
641.I feel valued
642.Do not feel valued
643.End the Internal Market. leadership from the medical staff is lacking
644.THe NHS should be privatised completely
645.No I do not feel valued
646.NO members of the Group' spent some time in each individua lab getting to know the staff
647.I do not feel valued
652.No I do not feel valued. I did when I first entered the profession in the late 60s..
654.Not really. There is a danger that the efficiency and quality of the service could be affected
655.BMS are the unseen and unknown workforce in the NHS less competition and paper work
660.I do feel valued
663.I feel my own self value
665.remove competition between laboratories
666.open day for interested people-lay men not just medics
668.Lower grades....are demoralised.It is a dying profession

672.(valued?)no (improvements?)no
676.I now feel less valued than I did 15-20 years ago I am not sure that graduate entry has helped anyway-expectations are much higher at this level-unless we can deliver we will not attract
677.no I don't There are a number of vacancies in lab with NO qualified applicants
678.not valued
680.I do not feel valued
681.feel extremely unvalued aim to get a new job asap
683.valued? No Improvements? no
685.I value my job very much but.....
686.I feel no value at all in my profession
687.I do not feel valued as a professional BMS
690.Do not feel valued as a profession
692.not valued
693.not I do not feel valued
696.I do not feel valued as a professional BMS
699.I feel undervalued
702.I love the work I do, I just want to have the time and resources to do a good job
Amount of work done should not be a race-quality takes time
704.I have always enjoyed working in clinical micro but feel the NHS is not the organisation I joined many years ago
707.I feel my contribution is valued and therefore I feel valued
708.You reap what you sow. Improve input and you'll improve output
711.I enjoy my job but I am seriously considering alternatives due to the lack of financial reward and promotion prospects
713.Let us absorb all the changes that we have had so far before and take stock before they impose any more on us
714.How can anyone answer yes to that question?
715...I feel less valued within the PHLs as a whole
716..not particularly from the organisation of the PHLS
720.I love my job-it's something that I've ALWAYS wanted to do-but I'm considering changing careers now-there are no prospects or money in this job
723.Valued by whom?
724.a shorter name....

726.not anymore
727.currently involved in a merger-unhappy time
729.I enjoy my work and always thought it a good career but would never recommend my children to follow me into the profession
730.I certainly do not feel valued
731.I was proud to be a BMS prior to working for the PHLS
736.Independent status as a profession
737.It is not a career any more ...it is only a job
Increase lab working hours to safely cope with workloads
739. An example would be a national strike in blood transfusion depts which would halt hospital operations
740.valued by some not by others -as in most professions It is a job with a low public profile until something goes wrong eg cytology screening
741.I do not feel valued...after 14 years in the PHLS I now get paid almost the same salary as a newly qualified nurse!
742.I certainly do not feel valued.it is a 'cinderella profession
743.I certainly do not feel in the least bit valued Changed jobs from nursing-at the time, better job and better pay...
746.Luckily I love my job that I do, which is why I remain in this career
747.When I came into this profession over 20 years ago I was excited and the job showed promise. I feel we are no longer valued.... Cases of meningitis and E.coli in the news but very rarely mentioned that the PHL has done the work
748.we are very rarely mentioned in the Press except when something goes wrong
753.improve? no
755.I do not feel valued as BMS because I feel that the profession has become elitist and has lost

contact with its roots. Entry qualifications are far higher than necessary
756...losing staff to industry. However as my last MLA increased his salary by £5,000 who can blame them
757.only in the news when something goes wrong
759.profession is undervalued
772.you earn more at Tesco's
773.I do not feel valued
774.not valued
775.I feel valued as a member of the laboratory team
776.I do feel valued on an individual lab scale but overall I don't feel the PHLS values its staff
778.money isn't everything but I do feel that we are underpaid as a profession
779.I do not feel valued by the Organisation at large
780.although I enjoy the job....
781.med lab science as a profession is going to change considerably in the next few years
785.unsure.are statements of value from managers genuine?
789.staff turnover and shortages in pathology is now in the same state as nursing
795.I do not valued as a professional ...
796.I feel proud of my work I also feel that attitudes to part time workers should improve
797.improve ? No
798.problems within group....
799.I feel that morale in this lab is fairly good Secondments to labs in other countries would also be a good way of improving enthusaism
801.No I feel I am regarded as just a cog in the laboratory machine.As such I only receive attentions when I malfunction!
802.Unfortunately you don't feel completely appreciated
Staff morale is at an all time low
804.I don't feel valued as a BMS-I just do it as a job-but I enjoy my job and look forward to retirement in 5 years
805.The system is out of control:.....
808.valued?NO
810.As a trainee with a First class hons in BMS.....I feel very undervalued when I am earning less than a checkout person
812.valued? not at all, hence why I am planning to return to college to train a a teacher
814.No better professional support
815.....making people who actually love the job itself wonder was it all worth it-ie 4 years in University for a BSc hons
816.Valued? No long and bitter experience Improve? This box isn't really big enough...
817.No
818.We are known as ancillary staff which seems to lump us with cleaners, porters etc. Downgrading us really ...hidden up some little known corridor, a bit like moles really
821.Recruitment for the future looks bleak in 8-12 years time much experience will disappear
822.Valued only as far as keeping the manager's life as peaceful as possible
Improve? new dynamic manager
826.higher profile of microbiology
827.Even at the top of the senior scale I am earning less than the national average wage. Salaries are important
829.effect of group formation in my lab has caused me a great deal of stress and frustration.....
The grade 1 vacancy we have is proving difficult to fill as there doesn"t seem to be anyone out there with the relevant skills
830.I definitely do not feel valued in my job staff morale is at an all time low
praise and encourage more pay. less hours. leave the PHLS
831.I do not feel particularly valued when I entered the profession it was what I really wanted to do, but recently, like many others, I have become very disillusioned
833.I do not feel valued-you are always made to feel you can be replaced
we are starting to see problems in recruitment
834.I do not feel valued as a professional biomedical scientist I am very disillusioned with my career choice.Although I enjoy the work I do, I feel that the amount of effort to become a qualified MLSO far outweighs the benefits.....I would not encourage anyone to enter this line of work.
835.No, I don't feel valued as a biomedical scientist

allow more degrees to become acceptable by the CPSM
836.No The qualified MLSO 1 salary is 5K less than the average garduate starting salary
837.NO
838.I feel taken for granted
839.No strong feelings
840.I feel partially valued
841.Generally I would say I do not feel valued as a biomedical scientist
842.The job as a whole is perceived as low status because of the low pay
843....which would assist in recruitment and improve staff morale
845.I came into the profession feeling it was very much a vocation and a way of helping patients but there is very little reward in the 1990s. better union representation
847.I feel valued as a professional BMS in this particular organisation but have not in others
849.not really valued no Speaking as someone with a BSc, MSc, there aren't many jobs where you need these qualifications with such low pay. It is very difficult to feel valued and respected in these circumstances
850.I do not feel valued as an MLSO
....I have no chance of promotion unless I leave. An MLSO 1 post feels like a dead end job
851.I do not feel valued ...I used to feel a valued member of a team, now I feel I am just another face improve? no
852.I feel valued improve? regular appraisal
853.no I don't feel valued as a professional biomedical scientist
854.I feel valued because I have received rapid promotions to a senior position at a relatively young age
858.I don't feel valued improve? no
859.I have no professional value. 13 years no promotion no IPR no illusions
no aims and no ambitions other than to leave any jobs! Improvements? none
I love microbiology but I loathe this job
860.no, we are basically cogs in the wheels
861.MLAs are thought more of than MLSOs. More time to think about what your doing-so giving a better service to the patients
862.valued? yes. I have had 37 years experience
863...government past and present do not value our profession as it is not high profile enough
864.I feel valued as a professional
865.I would like the opportunity to be more involved in policy making...
age and currently more old fashioned qualifications now act as a barrier to further progression
866.I do not feel valued I also feel that , as a trainee MLSO, I have a lot to cope with. (qualifications for CPSm etc)
867.Am I doing a good job? I hope so-I think so.Has anyone told me?-no.Does anyone care?-no if anything goes wrong does anyone come to see me ?yes!
869.Low salary, low recognition leads to the feeling of low value
870.The profession as a whole is not valued .....people who enter and last in the profession are the type people who are happy to have a low profile or they would not stick in it.
871.I categorically do not feel valued a a biomedical scientist one feels that nurses and doctors are the only NHS staff that interest the government(or anyone else for that matter)
872.do not feel valued
873. maybe the England football manager got it wrong.MLSOs suffer for their sins in past lives
874.on a personal basis, I feel valued
875.the government are the same and take advantage of 'morally obliged attitudes to do the work' when giving lousy pay awards.once upon a time we were paid better than teachers-not now
877.decrease in hours worked or more flexibility in the working week
878.I feel valued by my managers
879.morale is very low.....I am feeling more stressed and too tired to do much in the evenings which I resent deeply
880.I actually do enjoy my work, but this profession on the whole is completely undervalued and suffers from a total lack of recognition ....at times morale is very low
882.overworked,underpaid,undervalued
886.I feel valued by my colleagues
887.I feel valued by colleagues
888.don't feel valued by external bodies

891.I feel valued by my colleagues and supervisors
892.I do not feel valued as a biomedical scientist discrimination in favour of Clinical scientists over MLSOs with same level of qualification
894.improve? not under the present circumstances
895.I feel this is valued by my boss but not by the organization as a whole who makes me feel like an overhead it would like to cut
896.I feel valued in my individual workplace....

APPENDIX E

Transcripts of interviews from case studies

Appendix E: Transcripts of interviews conducted for case studies

A. Laboratory C, 26th July 2000

Interview 1-Infection control nurse

Working here: Very Much, yes. Size of the hospital means that you are able to get to know lots of people and feel part of it. I've been here 71/2 years and still enjoy it.

Colleagues: I think I do – whether they do – I - yes I feel I have a good rapport with them

Enjoy job: Nursing and Lab. Colleagues? Yes. I enjoy it, it – it's challenging and - It's always changing and IC is developing quite a lot quickly and so there's a big challenge to take on the different aspects of IC. So, I think that's why I like it, because it's not boring.

Management style: Managers – Consultant Micro day-to-day
Professionally Director of Nursing
Business Management – Pathology Manager.
I think from the consultant – I think we work fairly well as a team. He's been here only not two years yet so and his style's very different to his predecessor but I think we, you know, we understand the way each other thinks and therefore we usually are able to come across as a united, er front and have a united view on how to manage situations.
The director of nursing used to be an IC nurse herself so she - fully understands my role and is supportive in .. in that as well in the just nursing side.
Path Manager is very efficient at the business and financial side so I don't really have to worry about them.

Quality: I think it's – well I've only had contact with maybe two other .. laboratories – fairly close contact – and I would say that it's definitely the best I've come across – because it's not too big and I know all the people and they very seldom ever have come up with false … positives or, they have a good checking system and give out reliable information – I think they're good. I try to keep them involved in what's happening in the hospital because they obviously don't have any direct patient contact and they don't have any direct contact with the clinical staff .. er .. so I'm hopefully a link between the patients and ward staff and therefore I can fill them in on the background of patients who we get – they've got specimens from and I think it helps to make it more – come alive for them, rather than just – er – specimen on the bench.

Users view of service: I think the informed ones – the ones who understand microbiology think yes they've got a good service. But I think there's still a problem with staff thinking that in the year 2000 they should get more instant results and they don't understand that it's still a manual – very much a manual process – and the bugs take time to grow so you can't get instant results like you do out of biochemistry. So I think once you've explained that to them they, they - definitely feel they can ring up and ask for results and you know the people on the end of the phone are helpful erm but as I say the well-informed ones would rate them highly – the others would think maybe they were a bit slow – but that's just – you know ignorance really.

Users impression of service: Limited view, yeah. There are – are some who make it their .. their job to find out what goes on in the lab – so they want to understand what's happening to these specimens erm .. but there's a big group that have never had the opportunity and don't .. maybe just haven't thought that they could go in to have a wonder round and see what happens so there's a bit of a closed shop to them really. Erm.. but I mean the staff would be very happy to ..to tell them what's going on and show them around but they just don't ..urm, take the initiative. Well … I think lots of them are colleagues and .. I think there is probably – more so with microbiology specimens than with others, the nurses initiate them and ... therefore you probably get more erm inappropriate specimens for microbiology than you do for biochemistry or haematology because they're medical staff decisions about what goes to biochemistry etc. but nurses historically if they're dressing a wound and it looks infected they will just go ahead and take a specimen. Erm and so probably, particularly with chronic wounds, you get inappropriate specimens because they think it's smelly and its mucky they should take specimens. They don't understand that because it's chronic there's bound to be organisms there that aren't necessarily causing any harm to the patient. So I think there's probably – yes – there's a bit of education to do on that side but .. otherwise I think they're fairly good and conscientious.

Best: Err .. I think it's a good team. I think there's a sort of family feeling about this Trust because .. there's been a hospital – not this one – but there's been a hospital in this area for a long time and there's a lot of people who've been around for a long time, there's not a big staff movement. So you do – you know the people quite well that you're working with and .. just like a family you know you have your ups and downs and your moans and – but I think that helps everybody to work together and to, to sort of share and co-operate with one another.

Worst: Worst one is .. seeing staff in wards – short staffed with too many patients and not enough time to give the quality of care that they they want to give and that's a big problem .. and particularly when it comes to IC its .... It can cause a problem because if the staff are nursing from one patient to another then things get missed like hand washing and .. therefore you can get infection spreading and you get patients moved from one ward to another and if one of them got an infection you didn't know about, before you know it it's all round the place so I think it's overwork of the staff that is the biggest concern because I'm sort of watching them and not able to really do much about it.

Other Comments: I think the quality would be improved if they could get the computer system up and running because then we would get more rapid results out to the users ... and ... and it would be much easier for someone like me to actually go and access the information than ploughing through filing cabinets so I think that's a big handicap to working within the department - but we manage to sort of work around that.

Interview 2: Midwife

Working here: No-understaffed, under pressure. The midwifery side is OK-at the moment in the middle of a rota where I will be on duty for 15 days.
Pathology service: Reliable-one you can rely on.Quick. Efficient.
Microbiology: Not bad-funny notes sometimes and lack of liaison between Obs and Gynae and Path labs.
Staff: never see them
Lab work: No: they process what we want done . Microscopes and things on slides-growing things.
Lab staff: think we're idiots! Lack of communication and liaison.
Would be nice to meet up with some of the people. Go down to Pathology for a day and see what goes on.

Interview 3: Consultant medical microbiologist

Working here: yes-small friendly hospital (smallest Trust in the country)
Colleagues: Other medics-mostly OK. Laboratory staff-yes-good atmosphere. Good relations and work well together.
Job itself is interesting and enjoyable. I have autonomy-not really answerable to any one else for clinical decisions. Continuity with patients and colleagues. The down side of being a 'one man band' is always being on call-but I would rather be called frequently for patients I know about than less often for patients far away that I don't know.
Management-Trust-Pathology Clinical Director-Infection Control team-Laboratory
Trust-don't have much to do with them until you need money! Then you have problems! Day to day laboratory management is down to the head BMS-but I think we work well together.
Quality: good .IQA-NOT helpful to pull out specimens, because the ones you really want to be sure of because they are important can't be checked-e.g.CSF. I don't think that splitting a routine urine and sending it down two different routes and comparing notes at the end is very helpful. The head BMS and I agree on this. In some laboratories, the QC specimens are treated differently –only tested by a senior person. I can understand why people do this, but that is not what QC is about. I am worried that it will all come down to league tables. Quality assurance results don't necessarily tell you what you need to know about quality. Imposition from external sources.
Best: Small friendly hospital. Worst: Same- small Trust, might be taken over.

Interview 4: MLA

Not worked here for long, but enjoy the work. Everyone seems friendly and fair. The hours are good and the management are flexible and understanding about my need to look after my children. Everyone has been very supportive -easing me into the job. Don't know about quality or users' opnions.

Interview 5: BMS1

Working here: Yes, I enjoy it here-yes.
Colleagues: Yes-I get on with everyone.

I enjoy the job-I love microbiology.
Management style: Yes it is OK the management is fair and supportive.
Quality: it is OK - we are short staffed, so it could be better.
Contribution-I do my work to the best of my ability
Users: We get no feedback at all –except when something goes wrong.
Don't know what we do in the laboratory-but then I don't really know what doctors do. I know it is a stressful job.

Interview 6: BMS 1

Working here: Yes. Everyone is very friendly
Colleagues: Yes I think generally we get on well.
Job itself: I enjoy it-it is what I always wanted to do.
Management: I would say the management style was fair-I don't think we sell anyone short here.
Quality; Very good. I have worked in other hospitals and I would say this lab was the best. But it could be better if we didn't have to cut corners. We do not have enough staff and resources to do everything as well as wee would like. There is not time to follow up interesting specimens and in some cases, we don't do the follow up tests ourselves anymore, to save money on buying the kits. So you don't have time to be interested and you can be so busy trying to get routine stuff done that you think "oh-it's an *E.Coli* 0157 that means al this extra work" , rather than "oh-it's an *E.Coli* 0157-I wonder where that came from". I am very interested in epidemiology, but there is juts no time.
Users: no feedback except giving results over the phone
Users view: No, I don't think thye realised what we do-I don't think they care as long as their results arrive on time.
Drs and nurses: Yes, I think I do have a realistic view of what doctors do. They have to work under pressure like we do. When we are on call, we are not called very often, but they have to be awake all the time –they have to be there all the time and talking to people-that is hard at 3am!
Best: small department- we all know eachother and go out socially
Worst: Pay.

Inteview 7 : Trainee BMS

Working here: yes, I enjoy it
Colleagues: yes, they are nice people, we get on well
Work: As a trainee it is all new to me -it is very interesting
Management –yes, they are fair and supportive
Quality-good I think-not sure
Users-don't know
Drs and nurses; Probably not
Best; small hospital
Worst: Pay

Interview 8:BMS 1

Working here: yes, I enjoy it
Colleagues: yes, they are nice people, we get on well
Work: There is a lot of routine work-some of it is interesting. I am quite conscientious. But I am not staying in pathology-I am actively looking for something new at the moment.
Management –yes, they are fair and supportive
Quality-good, but it would be better if we had more resources.
Contribution: I try hard to work carefully even if that means staying late. Quality could be better with more staff and resources.
Users-think the service is good, but don't know what BMSs do. They see the lab as a 'black box' where specimens are taken on the ward and sent to the lab and results magically come out of the other end!
Drs and nurses; Yes.
Best: I like the science-training people. We recently got a new machine which is great-I enjoy seeing the introduction of new technologies. I think also making a difference to patients. It is good when you get positive feedback on interesting cases.

Worst: I used to have high Job Satisfaction, but now morale is low. The lack of interest by others demoralises you- the low pay and there is too much bureaucracy.

Interview 9:BMS 2

Working here: yes, I enjoy it
Colleagues: yes, we get on fine.
Work: It is quite interesting
Management –yes, they are fair and supportive
Quality- I think it is variable , due to lack of staff and adequate resources
Users: They think the service is good
Users view of lab: No I don't think they do.
Drs and nurses; Probably not-it's very stressful.
Best; small hospital –the work.
Worst: Pay. It is not so bad for me as a senior, but the starting salary is disgraceful and the pay for MLSO1s is poor. Although that is no excuse for poor quality.

Interview 10: Nurse manager

Working here: yes, I enjoy it.
Pathology service: Reliable – quick-accurate
Micro service- Yes, the microbiology service is good. We have a good relationship with the lab.
Lab's work: I did chemistry at school and I tend to think it is a bit like that-not about patient care at all. And yet I know they are very much involved inn patient care.
Some understanding of their work through infection control work and cooperation with the micro lab on things.
Lab staff: I think they understand that we work under a lot of pressure.
Quality in healthcare: Communication. Reliable Service. Accuracy.

Interview 11-BMS1

Working here: Yes. Most of the time, I like it here, yeah.

Colleagues: Um yeah. Generally. Um the increasing work load of work does put a little bit of strain on the relationships when colleagues don't – and I actually see myself as well – don't pull their weight from time to time – not every day – but you know, everyone has off days and stuff and it gets frustrating. But yeah, that's the only thing I could see would cause tension.

Work Itself: Erm. Been here a couple of years, erm, I've started to see most of the things that I will see, so now I am starting to find the works getting a little mundane. Erm. Although because we are such a small lab we do see a lot of – if anything exciting happens, we all see it, so that's good in that respect. But, er, I'm starting to feel now that the job has a limited life expectancy seeing that the career structure's so poor.

Management Style: Um, yes it's, it's very informal to the point where I feel, um, I have a good rapport with my immediate line manager. Although I feel the managers above him are remote and aloof and er really the buck stops with my line manager. So er although he is very sympathetic um he does – I believe he does – work within his – to his limits. Um so it doesn't seem to get beyond – beyond him very far – the changes that need to be made. That's politic isn't it?

Quality Rating: Um. I've seen a few laboratories – on voluntary work um although this is the only one I've actually worked in full time. Um, and I would say that generally the quality of this lab is er from very good to excellent in a lot of respects except where um corners can be cut in terms of time. Erm, so er if something needs time allocated to do it properly i.e. looking through a microscope field to make sure that a negative is truly a negative, there is potential there to cut time and I think there we er we fail, say compared to our immediate neighbours, who actually allocate a person, in that hour, with that number of specimens, to do that job. And I think that's perhaps a more cytological approach to microscopics and things like that, so I think we'd benefit from that. And staffing and workload.

Contribution to Quality: Erm. Being fairly new to it, I'm a bit er of a stickler for er sticking to the rules. Because that's all we have to go on, when the rules are broken er it makes us look incompetent. Um things are

missing on forms and things like that. So I'm I suppose my personal goals are increasing quality and of course that's in conflict with the increasing quantity em but I'm also er very hot on modernising erm I sort of try and take – where I can take – the role of new clinical trials and testing er new work rotas to try and speed things up a bit and cut out the dead wood. That sort of thing. I think I've achieved it in some respects and failed in others. But the failure was again due to time and er very little management support from above my immediate line manager so um he's saying, you know, I can't do these things if he doesn't place me on the bench – you know the work still needs to be done. So it drags on for months and months with no change.

Users :Yes. Um. Slightly pessimistic I think but erm I think they perceive us a bit of a black box. Um stuff goes in, they get a result out and we don't actually care in any way what the result is actually – what result is actually put out, so for example, a biochemistry result is a numeric result. The result is that number irrespective of any interpretation you'd like to put on it. But er so recently we've had problems with our culture em sort of arguing er whether the white cell count – because if you do a white cell count on it, which is standard policy at the time – whether it was a true infection or not. Um. Even though they had a significant amount of a pure growth of an organism in the urine! So um. We have this – I think they have this perception of us that we chuck it out without actually interpreting anything. Um and I think a bit more positive PR on our side to educate the users um we get I certainly get a lot of feedback from the users – it's mainly negative I tell you from answering phones. But yeah a bit more focussing and perhaps er a quick and easy way of the users being able to find out what we do and how we do it erm. Perhaps a web site or something like that. I believe something like that is supposed to be started up – so er there's a quick reference if they want to know – for a complicated UTI for example, what routes they should go down. That would be very useful and would save a lot of wasted reagents, time etc.

Doctors and Nurses: Urm. Yes. I think I always did, but now it's been um consolidated. Erm. A lot of them are under the same, similar pressure that we are, um, and from our point of view they sometimes cling to us. You get the impression that they're asking us to give them the golden result to get to treat the patient and get them out. Erm. Of course we can't do that and I think that causes some, some tensions – especially when they say "How long is it going to take?" "It's usually about a month turn around on that serology" So er things get heated on the phone.

AO Issues: I think it's basically time. Erm to improve and er appropriate allocation of resources. I think. Urm. We er. I only get the impression this is my impression – that er the lack of interest in putting more financial input into a department is a blanket number. Irrespective of whether the long-term goal is going to make a large financial and time saving. So I think it is money and staff, basically.

Best: I'd say because it is small enough and we see everything that's interesting. It's a nice locality – er from the microbiology point of view it's rather boring er because we've got quite a middle class, normal sort of population, so we don't see er rampant gonorrhoea and things like that. But um I'd say it was the smallness of it. But that's also its downfall. We're in between being a major lab. I think we're starting to suffer as the number of specimens goes up.

Worst: Worst thing – erm – staffing yeah. Mainly down to er finances and them upstairs. So – we keep shouting and nothing happens.

Interview 12-Nurse manager

Enjoying working here: Yes I do, Yeah. Been here so many years, yes I do.
Urm. I was involved in the move when we moved from Hospital and a lot of the sort of senior nursing staff at that time came over. Urm so there was a very friendly sort of atmosphere here and I think it's about a lot of people being around quite a long time – a lot of people knowing each other and – and supporting each other.

Pathology Service: Erm. A reliable service with a very quick turnaround, really I think that's one of the most important things. I mean the wards now are incredibly busy, the throughput on our wards erm you know we need results quickly. We're sort of looking at our length of stay and why they're longer than some of our other sort of peers of other Trusts. Um. Things for instance like MRI scans, we have to wait quite a long time to get these and quite a long time to get the results back. SD something like microbiology you know if we can get the results get the patients treated and get patients through quickly, urm, and get them better quickly that's the main thing.
Micro providing: Yes I do. I mean we – erm up until last year I was Ward Manager on a gynaecology ward for instance. And urm, we used to set our pregnancy tests down here and they were turned round incredibly quickly. I mean you would have a phone call within 20 minutes. And some of those decisions were crucial for diagnosis purposes and acting on, you know, which direction you go with a particular patient. So yes I would say they do.

Good Working Relationship: Definitely – urm. At times I – I feel concerned about sort of the lab in general because there are a huge amount of phone calls. Urm from wards to the department asking for results. And you know results are in the post, on the way back and, you know, it must stress them a lot, I think, the amount of phone calls that they get. But urm, you know – we get a good service from them and they are very very friendly.

View of lab work: Gosh that's a good one. Obviously I've mentioned the pregnancy tests urm. HSUs erm sensitivities erm. Gosh you know being a manager now for a year and not being clinical on the ward – Idea of what it would be like to be working in this department Erm to be honest with you, no erm. As a cadet nurse, actually, I worked in a path lab for some time. So perhaps I've got more knowledge than most, but that was over 20 years ago urm, so their day-to-day work I don't know. How the results magically get back to us from the work they do on the specimens – I don't know the ins and outs of it to be honest.

People in Labs. think of you: Do you know I don't but urm I think they are aware of the pressures that the ward staff out there are under and they sort of understand the reasons for us phoning and erm. I would think at times they can get, you know, quite fed up with us. Because often nursing staff will ring then doctors will ring. So, you know, I think that must cause them operating difficulties. And I should think at times they must think, you know, what's going on out there. But urm I think they are quite understanding of the situation out on the wards, with the amount of work that's coming through.

Quality Issues: I think the paper system that we've got at the moment needs improvement. We need to go towards an electronic path order communication system. That's one of the things I would like to see in the not too distant future – and I know they're thinking about it. To be able to access the results through the PC. Erm and that there are accurate and reliable results, because diagnosis and management plans are going to be sort of made you know, on those results. So that it's accurate that it's fast and I think, to get it on the computer I think would be a huge advantage for everybody.

Interview 14 –head BMS

Working here: Yes - I think so. After 22 years as I just calculated! I don't think I would have stayed if I'd, if I hadn't enjoyed it. Why? I think it's er its been a somewhat unusual job because erm a move from C Hospital - whilst on that site we moved to a converted lab on the – on the C. site. Then we were involved in the planning of this hospital. We planned something, which never got built, because it was too expensive. But eventually they downsized it, so they could afford it, and er so I had an involvement in the planning of that. So it was never just an ordinary laboratory job, where you go – go to work and er do the microbiology and go home. There's always been other elements to it. And also, when I first started, there was no consultant microbiologist. I was the first Chief MLSO, in those days, urm. So it was a great challenge initially building it up from a very, very poor erm quality standard in those days. It was a very challenging role urm. We're getting towards erm, you know, completing a lot of the things, but you know, if you're constantly urm faced with new challenges anyway. So it's – there's so much ongoing that still needs to be done and er responded to. It will keep me going until retirement – if they don't close the place before that!

Colleagues: Yes, I think so. Erm. The biochemistry department are a bit strange. They're our next door neighbours here but they're machine minding most of the day. And so it's a very different branch of pathology to, to microbiology, which is very labour-intensive and manual. Erm and I think you need to be a certain type of

person to do this job and a certain type of person to do their job and er I think most people in pathology find they're a bit strange!

Within the Lab: Yes. I er I think so – I think we've got a pretty good team all in all. We could do with some more some more people. More staff would make a world of difference – instead of working everyone out! Management Style: Urm I think there are some problems with management throughout the whole of the Trust. Er communication is not what it should be. And most of that, I think, is down to just the sheer pressure on everybody. Urm within the department, we just don't have the management meetings that we should have. We don't have the regular er, sort of education and training meetings that we should have. A few years ago, we had a regular weekly tutorial. Urm now we've tried to set them up again on a monthly basis and we're failing – miserably. Urm but as I say, an extra couple of people would make all the difference to it. So yes there are some difficulties from er within the relationship between myself and the Pathology Service Manager, who is obviously responsible for the whole of Pathology rather than just one department – and then onwards and upwards to the Directorate General Manager and eventually up to the Chief Executive. Urm obviously the higher you go, the broader the perspective that you have to take. And they don't always assign the importance that I think they should to Microbiology! But it's all a balance isn't it?

Rate Quality? Well, I think I would put us about on the average on quality. Urm. It is something which does decline noticeably when people are under pressure. And we, we frequently find that, you know, we have to chop out something just to try and cope with the routine day-to-day workload and I'm not happy with that. But, you know, I mean, at least we make the decisions. They are, sort of, informed, educated decisions as to which bit of the service that we do stop. And we tend to go for those areas which don't affect the quality erm as regards the end product for the, the clinicians and the patients that use the service. Er. An area of quality which I am not happy about is the, the quality of the paper reports that we issue. And the quality of the responses to clinical enquiries. It all comes down to the fact that we are still not computerised and again to the pressure that people are under. It would be nice to have time to be able to er ensure that everybody was polite and friendly to enquirers on the phone. But when er you've been prevented from doing your job for the best part of half an hour, just dealing with a couple of enquiries, it can be very tedious.

Users: I suspect that most of them will say that they are happy with the quality of the service they get. If people say that they are unhappy with some of the reports – the quality of the reports – the legibility of the results and the responses to telephone enquiries – if they comment adversely on that, then it wouldn't surprise me at all! I'm with them all the way! We are trying to address those issues.

Users think of lab? Their knowledge would be very basic. We are backroom boys and girls, basically, within the hospital. The patients don't get to see us. The clinical staff, on the wards, don't get to see us. It's just a black hole where the specimens disappear into and hopefully results come out of. And I think their knowledge of who works in the department and what actually goes on in the department is – is very basic. We have, in the past, tried to address that, by getting involved in sort of science fairs and open days for staff. But there again, that just puts you under even more pressure! It hasn't been done for a few years now.

Realistic idea of Doctors and nurses? Yes I think it's easier for me to have an appreciation for of what they do, urm, than the other way round.

Quality A.O.B. One of the areas of quality, which I'm interested in trying to do something about, is the quality of the specimen. Because, from a microbiology point of view, particularly bacteriology culture – if we get a poor quality specimen taken and sent to us then it's going to be very difficult – if not impossible – for us to get good quality results out of that.
And to try and get the people that are initiating the request and taking the specimen – to try and get them to, sort of, accept responsibility for that part of the job is pretty well impossible. Urm. We are currently reviewing the specimen requirements in the Pathology handbook for all the users and its – its very difficult to try and write down instructions for how specimens should be collected and stored and transported. And the fact that if they take a swab or a urine specimen and keep it on the ward for 2 days and then sent it along to us, you know, that's 2 days lost. And in fact the specimen's beyond use! So that, I think, is a quality issue, which I am constantly battling to try and find ways around. As regards other quality issues, I think they're the ones which I've highlighted – the lack of computerisation and the poor quality of the paper work. But we are addressing those.

Best: Oh er, it's nice to be able to look out of the window and see some trees, rather than a concrete block! Er, I think actually the size of the – size of the department, size of the hospital is a good thing. It's – urm it's possible to walk around the hospital and know lots of people in it. It's not a big, huge and unpersonal building where body knows anybody else, other than those people that they work alongside day in, day out. So, I think that's one of the plus points. It hasn't got the same atmosphere that the C – Hospital had – the old hospital – that got lost in the move, but er that was inevitable. But as I say, I think we are perhaps a bit on the small side of ideal, but I think we're – there are things you can achieve in a unit this size which in a large 1,000 – 1,200 bed general hospital, you're just um one of thousands of people. And what you do tends to go unnoticed – you've achieved something here.

Worst: The worst thing is probably exactly the same. The fact that it, it is on the small side. And so that can actually leave you very vulnerable at times – particularly when we had all the internal market and you had departments, hospitals, competing against each other. And so, even now, they're – there are some people who feel we are in danger of being swallowed up by, because they are the large organisation, whereas its, the integration of clinical services should benefit our catchment area as well as B – so it's really not a question of just been swallowed up. But there is that danger. A lot of people take the view that it's only a small place, so you don't always have as much clout as perhaps you would like to have.

INTERVIEW 14 b: BMS 3

Working here: Yes. Why? Yes the er work is interesting – um, some of it can be boring as only routine laboratory tends to be. Um. But there are interesting aspects of it, which er make things worth while. Um, it is not only the work itself erm the individuals that I work with erm some chemistry between individuals in the same department. So er it makes the work – we all want to achieve the same aim um, I am sure there must be some er feeling within the department that "I'm only doing it for the money" – but if you are only doing it for the money, you don't work for the NHS! So – there must be some scientific and er philanthropic advantage to working in this sort of department.

Colleagues:Yes. You know we are all human beings – we all have personal conflicts, but it's how you treat them. It's all a question of being rational when they occur um. There is always recourse to the better of any procedures that you need to do – but that's a long way down the line. If you can deal with them face to face – I am a strong believer in doing that – deal with it face to face and get it sorted out so it doesn't escalate

Work: Erm. The work – well it's the nature of the hospital erm the Institute that we're in where the – the scope of the work in some ways in limited … And so the range of work that we do is consequently also limited. And so what we do is focus it – we necessarily have to focus – our attention onto urm several groups of patients, perhaps more intensely and perhaps what we may have done – or may do – in a district general hospital, as an example – er which I have worked in before. And so in a district general hospital, we have a disparate er group of patients with lots of different interesting aspects with er different types of conditions. But obviously in this type of er institution um with the limited age range, then we have to focus in.
In some ways that can be very interesting, erm … Allied with the erm research institute next door – um because we are in close alliance with them – things are developing all the time and that's – in that respect things are interesting. But as I say because we are talking about the work – um ok some of it is still routine. Things are requested in such a way that you get to focus on individuals or looking at individual aspects of a disease or a symptom, um which is er generating interest.

Management: Erm speaking objectively erm – I suppose I am part of the management structure anyway – um… Yes … From it's – the current management structure in the department er in terms of the head of department – the technical head – erm that style of management has developed more positively erm than what was in place before hand erm. Individuals are encouraged more to do their own study, to go on courses. So professional development is a positive aspect, in that respect, of the management style of the structure is good. Personally I am involved with erm discussion groups in the (London) area erm continuing education for MLSO's – BMS's – in London and nationally as well. And so that – the management and myself are both of the opinion that this is a er- this is part of our duty. Erm … In terms of erm style of management in er dealing with people: everybody has their own way of dealing with people. As I said earlier, I prefer to deal with people and problems face-to-face. But if people want to sit and have a dig at me behind my back they're cowards. They will get more response and sort out things much better face-to-face. Um. Doesn't mean to say it has to be erm um combative or erm atmosphere, but it has to be entered into with a sympathetic ear to what people have to say. And then we

will listen. But the work has to fit the individual, not the individual to the work. Um. And we have to bear that in mind. But as regards personal conflicts, as far as I am concerned – both subjectively and not subjectively – the management style and structure is suitable. There's always problems, but this seems to be working.

Quality Rating: Very highly erm. We are highly motivated, highly trained. Erm. It's a – it's our loss that we don't have a training post. Erm. Although we used to. But that training post is now filled by a qualified member of staff. Erm. We want to have a training post. I grew up in the service where you used to be able to rotate. Er. Within each laboratory there was always one or two training posts – especially in a large hospital where I used to work – there were one or two training posts in each department and you could rotate. There were a number of us – er at least a dozen in that particular hospital.
And that was an essential aspect of training until people decided what discipline they wanted to pursue. Urm in some ways the professional er requirements of entry have strongly influenced er people's choices. Um into this job not actually fully realising what other aspects of the job can be. Erm. They will do – not er putting down people's ambitions or er qualifications – but they will get, for example, um a BSc in Biomedical Sciences or Medical Microbiology. Um. I sometimes feel that they should have the opportunity to experience the work at first hand. And perhaps be able to make the more important decision at a later date – ok this is what I want to do. Urm. I know the Institute of Biomedical Sciences wants graduate entry. In some ways, that's a good thing to do, but you can't – help feeling that the training post lacking has led to that grounding at the base, grass roots level. Coming in with 'O' levels or 'A' levels and er learning at the bench whatever discipline going round the room of each department and having an appreciation of what other people's work is.

Contribution: Erm ok. Technically we have a erm – our external and internal quality control is very good. So we can prove nationally, to external assessors that our competence is very high. We – because we have internal quality control – obviously that is more regularly er inspected as to the standard of people's work. And if anything is highlighted as being lacking, then er it can be brought to that individual's attention. If it is something general within the department, er we have regular departmental meetings to discuss any problems or any things that have happened in the recent post. Erm to suggest that we should change a method or introduce a new one – the liaison between us, the technical, bench staff and the medical staff is extremely good. We have close collaboration with the medical staff who in turn has close collaboration with the er clinical staff um in the hospital. Um. I think this two-way traffic of information and discussion between these three groups is very important. That's how we maintain our standard. We constantly keep up-to-date, we do our CPP erm, as much as we can. People read when they can – obviously the work comes first – but if we've got a spare moment we try and read. Um yes – that is how we maintain. Other people may not be so strongly motivated. Everybody has their own um their own wants. Erm I'm motivated in a different way. I want to see the department work sufficiently and the technology expertise is kept up.
If there are problems or faults obviously these are the manager's and myself erm responsibility – and the other senior members of staff – to make sure that er it doesn't fall. By having this constant discussion we maintain our standards. So we're not looking over people's shoulders, but by having the quality control system we have installed, we can prove both internally and externally that we keep our standards up.

Users: Erm. The perception is that er, I don't think erm the users of the service fully understand what the service is about. The perception is, I feel, that erm people – there are users of the service who do not fully understand erm the science involved within Microbiology. What does it mean when they send a sample in for culture? What does that actually mean? Erm and when they are entitled to get a result. The interim report. What – what information they have kept from us at what time. Ok we can specify turnaround times for processing of samples. Some will be quicker than others, some may take a day, and some may take the next 12 weeks. But it's the realisation er or er not fully understanding as to what the department is capable of. Erm. We have – we do have liaison with erm the nursing staff and we regularly teach on nursing programmes to give some idea as to er how the department works and particular types of samples, how we deal with it and the problems that we have erm. Not necessarily going through each day, what happens on this day, what happens on that day with each particular sample. But the processes involved in treating the samples. Erm. How far that filters down erm – I am not particularly picking out nursing staff in particular – erm but how far that filters down to the other staff. Who are not so experienced erm and perhaps are asked by medical staff – "Where is this result?" Erm. They are expected to phone. They say "Can I have the result place?" and we say "we have not received the sample yet". Or "we only received it yesterday" or "this morning". "It's being processed." "Oh". And then, because they don't fully realise that it will take 18-24 hours, in most cases, to get a meaningful result. Erm. Even some medical staff are not fully conversant, they should be because it would have been part of their training – are not fully conversant as to the capabilities of this department. And I think the erm the clinical role in our department

erm goes some way in educating, certainly the clinical staff as to what can they expect. Erm. Having said that they, they do appreciate the difficulties we have and we are always talking to them every day as the problems with swabs they have sent. Hopefully, usually they will find us very accommodating. Erm. But judging by the number of telephone calls we get into the department, Microbiology seems to be the fountain of knowledge! Er everybody phones Microbiology if they've got a problem. If it is a haematology problem or a chemistry problem, we always seem to get the queries or a sample that the porters don't know where to send it, they send it to us first. Erm. So in terms of that, certainly from the porters' point of view, they know they can trust us that we – their perception is that if "we don't know where to send it – I know a man who does"!
Erm. It would be nice to have a proper feedback. Erm. Of the users as to exactly what they think. No only of Microbiology, but also of Pathology as a whole.

Realistic View: No. No I've admitted as much to people who use the service er in general conversation or in other meetings. I don't we .. fully appreciate what work they have to do – what problems they are faced with. Erm I think laboratory staff as a whole are blinked in that respect. Erm. Ok we're at the sharp end of laboratory practice, but we're at the blunt end of hospital practice. And er the same will be the er view of the users. They don't fully appreciate our work and the problems we have. And similarly vice versa. I don't think we fully er appreciate that er if you've got a pre-term infant whose circulation has shut down we you can't get a ca.....la in and we're begging for another sample because the other one smashed in transit. So we say 'sorry we need more blood'. "Sorry we cannot get any more because the circulation has shut down we can't get another sample". "Sorry this patient is on drugs, we can't do anything with this child yet [this child is too unstable] – you were lucky to get that sample!"
Erm. Yes I don't think we fully appreciate. We try and understand and it's very difficult to understand at 2 o'clock in the morning – do you really want this done? Is the treatment or surgery absolutely critical or dependent on the result of this test? Erm. Some more experienced colleagues in the department would be able to argue the point. Erm. Say "just think about what you're asking me to do. Is this really necessary for the good of the patient, at this hour of the night, just ask yourself that question". I know they've probably been asked by a senior member of staff to following this up, erm perhaps, but if your asking if we understand what they're trying to do – I don't think we do.

Best: Erm. Actually putting on tape. It's an internationally recognised institution. People want to come to work here. Erm. So the people who come here are very interested in what we do. And ... It's good to feel that you actually work in an institution where people want to come and see what you do and see your work. I think that is probably what motivates people to do their job properly. Certainly in my case – I can't speak for others. Erm. Want to try and do your best and we can educate people to take that to wherever they are from. We may be just a unique institution – we are able to say that. Erm. The atmosphere is good I think the general ethos of the whole institution is good. Erm. For a disadvantaged section of the population, erm, not only in this country, but in other countries, erm, who can't go anywhere else, erm, it's good to know that others will trust us with those people.

Worst: You'll have to pause there, while I think about this! There will always be niggles as to all aspects, but ..er.. you try and remove the niggles. They'll always be something that'll irritate you. Erm. I find it difficult to put it down to one single thing. Erm.
The profession as a whole lacks recognition. I think recently events have brought it all into the public eye. Erm. How far that will go is anyone's guess. Whether we are remuneratively .. um.. appreciated – well they say we will be but er. ..um.. in this sort of profession we tend to be very cynical. And we only believe it when we see it in black and white on our bank balance or in our pay slip. Erm. That's possibly the worst thing I think overall, is that we're not fully appreciated. Erm. I think the er – politically – we're probably over a barrel. As I say, we can't be seen to go on strike or refuse to do work or 'work to rule' because patients will suffer at the end. Although, however much we feel strongly about – erm – injustices erm to us as a profession. At the bottom line – we feel very strongly about it – our voices and complaints have largely gone unheard. Erm. Whatever this current bout of publicity this institute has done – certainly that helps to promote or increase our profile.
For national news and newspapers to cover us it's not all bad. Get a greater profile in the House. There are MPs in the House who are aware from visiting laboratories what we actually do and perhaps the continued lobbying is finally having its affect. And, er, we feel better. People in similar situations to us in other countries are far more appreciated than we are. That's probably the worst aspect.

INTERVIEW 15: BMS 1

Er. I do enjoy working here, yeah. Why? I think it's not too big a laboratory – we're still quite small – though it's a reasonably sized hospital. The workload's not that overpowering and we're quite a united laboratory. We've had a sort of a few erm problems outside the laboratory, which has managed to sort of get us together and keep us quite close. Yeah I think and we do quite care for each other, which I think is quite good. We're not overwhelmingly big, like some of the big hospitals either. Yeah I think it's ok here. I think most people say generally they don't mind working here too much. Yeah.

Work :Erm. Because it's a screening hospital, a lot of it's very repetitive. So it's not the most – erm – interesting job I've done. I've worked in other hospitals where it's been a general hospital and they've had casualty departments and the work that's come in has been more interesting. But no I don't think the work is that interesting. Although we're trying now to do some more, urm, experimental work and outside research work and that does make it a little bit more interesting. And we do tend to rotate the benches quite frequently, so it does tend to cut down the tedium.

Management: Helpful and supportive? Erm. I think they do try to be. Yes. There could be improvements – but they do try to be. Fair? - Er.. yes, I think so. It's a reasonably new management so I think they've got a lot to learn – but I think, yes, they're learning – I think they're ok.

Quality: It's very good, yeah. I think what we do here is very good. I think generally it's very good. Everything gets checked and everything so I think, yeah its pretty good.

Contribution: Yes – I do try to keep things – make sure I do check on things and make sure that everything that goes through is very accurate. It was drilled into me when I was a junior – which I think isn't so much these days – that everything should be checked and thoroughly checked. And I think sometimes that is lacking a bit from the training.

Users: Erm. I think generally they think we're quite helpful. Because I find they tend to phone us rather than the other departments. I think we've got quite a good telephone manner with a lot of wards and things. And they do tend to phone us for help. We do try to be helpful on the phone, because – especially now the new computers are in, the system isn't that good – we know it's hard for them to find results and things like that. So I think .. er .. I'm sure a lot of people think we're just being obstructive, but generally we're quite good. Especially 'after houses' – I think they do appreciate the 'after hours' service that we do because we do do quite a lot that isn't urgent, and I think it is appreciated. And I hope it's appreciated!

Realistic: Erm. Probably not, but then I should think I've got no real idea of their job. I think it is very hard in a big'ish hospital like this to appreciate the other departments. So I don't think so, no.
I think it's – I worked in smaller hospitals where you're all on top of each other and the actual doctors come up and they're in the lab and they can see what you're doing. But not in this sort of hospital, no, where we're so far from the wards.
Quality: A.O.B. – Not not really, I can't think of anything off hand.

Best: Erm. The management are quite understanding. Because I've got two young children – they're quite understanding about time I have to take off for them if they're unwell. And erm I work flexi-hours – you know, I come in later and go later, so they're very good about that. So that's the most thing I think important. You know, if I went to another hospital, they might not be so understanding. And I do try to sort of erm compensate by not being off sick myself too much!
Oh yeah, I think that's the thing I find – being a working mum – I find the most important thing. They understand my situation.

Worst: Probably erm … Commuting, I should think – but that's the same in any London hospital. That's the only thing I can think of really. The 'on-calls' is a bit of a nuisance, but it's not too bad. No. That's the only thing I can think of – the travelling in I should think.

INTERVIEW 16: BMS 1

Working here:Yeah. I think so, yeah. Why? Erm. I generally get on well with most people here so no antagonism really. Erm. Generally though, I mean it's the same in most places. Erm. You get things that upset

you occasionally.

Work: Rather mundane and boring, really – Erm. We don't do a lot of research work. It's generally day-to-day and routine bacteriology. Occasionally there are a few things to do that are slightly different but er generally speaking, rather mundane.

Management: I don't think they've rally done much to improve it or change matters. I mean we've been promised that we will be doing research work for years now, but er nothing's actually come of that. So it tends to be that the research work goes to people coming in from outside. So those are the people that tend to get it. Doctors working here doing degree courses – they tend to take that sort of thing. Erm. Generally speaking I'm just left with the routine. So, it can be a bit soul-destroying. Erm. I would say the work is very demanding though. Erm.
I haven't been on many courses since I've been here. That's basically myself not putting myself forward enough to do things. But er since my initial training – formal training in most things. That tends to go to people who are more pushy. I tend to be one of those people who lays back and let things happen.
Management generally – yeah, it's pretty good I suppose. The manager will generally pick up any problems and you can go to her with any problems. So that's quite good.
Fairly: Erm. Yeah. I should think so, yeah.

Quality: Good – fair. Fair to good. I wouldn't say it way excellent, but erm most places tend to make mistakes every so often erm. Again, I mean, I'm just involved in my particular work, so I mean sometimes you don't interact with other people across the benches. You think "ok – I wouldn't have done that", so that's what happens sometimes when you pick up somebody else's work – or they pick up your work and say "oh my god!" But erm generally it's whispers sometimes – they don't tend to some up to you and say "oh you've done this or that wrong", you tend to hear through 3rd parties talking about it. So that can create an atmosphere in the laboratory but er generally speaking, it's satisfactory, I suppose!

Contribution: I turn up every day and just do the work and go home! That's my contribution. Erm.. The quality of the work, I guess I'm just normal like everybody else – I wouldn't say I'm sort of above average. I think I'm above average – although some people might say below average!

Users: Erm. I tend to get the impression that maybe some of them think we do a very good service. Erm. That's generally. Probably people just get hassled at ward level and surgical units – like they need results promptly. But generally speaking, our workload isn't as heavy as some other hospitals, so we do tend to keep on top of things rather than in other hospitals. If we do get something that is urgent, we do try and get on and do the urgent samples for them. I don't think they take you for granted so much. I mean we get Christmas cards from most of the units! Erm. It depends really on the doctor or nurse concerned – whether they've got an attitude to us, where something else has happened before in the past and we get labelled – you get a case of labelling. Oh god – they're not good, I sent something there last week. That would be a sort of labelling situation. But generally speaking I think they are fairly happy with sort of what we do. So I think a lot of the problems are just getting hold of the doctors sometimes. Erm. Consultants are either on the end of the phone continually, or when we try and get messages to them it takes some time and it gets bounced back to the wards. So I think that delay – any sort of time delay – is viewed as being negative. So apart from that .....

Realistic: Basically they have a reasonable idea of what we can do, what our limitations are. I mean we usually inform them of the sort of tests we can do here and what sort of tests get sent away. Erm. Yes. I think overall they've got a good idea of what we actually do and the sort of timescale of things. The only thing occasionally is that they forget sometimes that bacteria take 14 hours to grow! We have to remind them sometimes – they say "when can we get the results? Like we want them now". So erm generally microscopy and things they can get quite quick results in that situation. I think at ward level as well they've got booklets and things, explaining erm – like SOPs we've got here – explaining how long things take.

Know Level of Training & Qualifications?:Um not necessarily. No. Erm. Presumably they are just talking to someone they think is quite advanced. I mean generally, we have got some unqualified staff in the laboratory, but they tend to hand those things over to us anyway. But erm no I don't think they really know what groups have what qualifications.

Realistic Doctors and Nurses: Erm. Reasonably realistic, yeah. I mean, we don't interact that much. When we used to be in our old laboratory, we used to be actually in the hospital. But now we're stuck in here we don't

have that much interaction. Erm. Again that would vary from case to case depending on the scenario, erm in a given situation. But er yeah I mean I've got a reasonable idea of what they have to cope with and er it tends to be more our end rather than their end. If we're trying to give results it's no problem, but if they're trying to get results it's usually more of a problem to them. So erm.

Best: Erm. That's a tough one! I don't know, really! Sort of ease of the work, I suppose. I don't mind – I mean I don't find it too stressful. So that's probably kept me here all these years. If I was going to have a career anywhere else, I think it would have to be outside the laboratory set up. I just wish I knew what it was! That's it really, I wouldn't say it was any grater than that. I haven't got any high expectation of sort of proceeding with a career in biomedical science. I haven't done anything to improve my chances of doing that. I mean I probably could get a job somewhere else, but I'm quite happy working here. I know a lot of other laboratories erm, they're much more stressful situations and areas to work in. And I think if I was to move on, I wouldn't go to another laboratory because I am aware of that sort of situation.

Worst: Probably doing the on call. I mean that's just a routine thing you do for extra money – but not much money. 9 to 5 five days a week suits me – occasionally the "on call" drags you down a bit. We do get the time off for doing the on call, so that does help. That situation is better than a few years ago, so that's a bonus. So that's it. Occasional upsets, but that happens everywhere else.

INTERVIEW 17: BMS 1

Working here: Erm. Sometimes. It's the same as any other job – if you're doing the same thing day-in, day-out you get bored. But it's alright, yeah.

Colleagues: Most of them, yes.

Work: The work's fine, yeah. I like the work, I actually do like the work.

Management style ….. and Supportive: Erm. Half-and-half. In some ways, sometimes it's very good and supportive, but at other times, you don't get back up, over things. Trivial things you don't always get back – major issues you do, but day-to-day running could have a bit more support.

Quality: Mostly it is good. Most people are good. Erm. We – there are a couple of people who could be more careful, but mostly it's good, yeah.

Contribution: I ask questions all the time. I get the things that I'm not sure about checked. It doesn't always go down very well, someone asking questions, but I like things checked by a second person, because it's not 'yes' or 'no' answers. So. If someone's done something wrong – I want to be told if I've done something wrong and I would also have no problem if they had done either – whatever grade they are. So – I'm a bit outspoken! But you got to – so expect it back!

Users: Erm. I think they think we're a bit stroppier than we are. Because they ring us at all hours, expecting us to only deal with them – we lots of other – especially this is 'on call', out of hours, erm we've also been here all day. And they don't know that a lot of the time – they expect us to go. "Oh yes, we'll do that immediately". When someone might have been woken after only ½ an hours' sleep, having been here 24 hours. They could be a little bit more – not patient, but they should know that we're not just here for one person, we've got the whole hospital to deal with. Yeah. But apart from that, I think most people think we're alright.

Realistic: No, not a chance – a lot of them don't, no. We like to get people round – we actively encourage people to come round the laboratory when they first start, especially nursing staff. So they know what we do, the hours we keep and how long it takes to process a sample. They send it, you do it and before you're half way through it, they ring for the result and you say well you can't – if everyone does that, you'll be on the phone more than you're working. So, no they don't. It would be nice to see more people round – even for, like an hour. So, no.

Dr. and Nurses: Erm. Probably the same. Because quite often they bleep you and you ring them back and they're not there. They probably have been called off to do something. So probably not – it's probably the same both ways. So I wouldn't presume I've got any better knowledge than they've got of us.

Best: Erm. Whatever grade you are on, you basically do the same work and your opinions get valued whatever grade you are. That's quite nice. You don't always get that. I worked in other placed – you don't get that in a lot of places. So that's ok.

Worst: Erm. So many people working in one room. I mean, it's like a big family. It's not bad, but it gets too much sometimes. You're with them 8 hours a day in one room. So, that's hard work!

INTERVIEW 18: Head BMS

Working here: Actually I would say that was a very difficult question to answer! Because sometimes I enjoy it and sometimes it's totally frustrating and sometimes it can really get you down and you just never want to come into work again! So that's the answer to that one really.

Colleagues: Generally yes.
Work itself. The job itself tends to be drowned in vast amounts of paper work, which I don't welcome. Excessive paper work, excessive administration, excessive e-mails, telling me things I don't want to know. If I was able to actually do what I'm supposed to be doing, I think I'd enjoy it quite a lot. Especially dealing with companies, getting discounts, that sort of thing is what I like doing.

Management: with-in lab and managing you: My management is slightly open to question at the moment as in who is in charge of me. But I find people – the two people – that I do refer to are very supportive and helpful. Erm I feel somewhat distanced from the hospital management overall. Erm. Pathology is perceived to be somewhat of a strange entity and people don't really understand us I don't think.
I try to make it helpful and fair. I do as much as I possibly can to be helpful and fair. People – people don't always like it, but if I apply the same criteria to everybody that's how it has to be. And I do try and take a real personal interest in people and their development, as much as I possibly can.

Quality: I would rate it really quite highly. And that's not just because I'm in charge of producing the work here, but because of comparing it to NEQAS and other sorts of control that we have. So I feel that what goes out is good. Nothing is 100% perfect, but it's as good as we can make it and if there's ever a problem then we try and tighten up, follow up, to see what went wrong and how we can improve in future.

Contribution: I contribute to overall liaising with the person that runs the Internal Quality Assurance scheme, I see all the External Quality Assurance work that comes back. Also, I do appraisals with every single member of staff so we can talk about what they feel about their work. I go round the lab and I work on all the benches as well as doing my own office work. So I'm out there, working in the lab. I liase with our own medical staff, so if they're not happy with the work, we can meet and discuss it in the meeting and say how we ought to make changes. And I try and get as much outside information and keep up to date with all the scientific developments and what's going on in other places, so we're up to date.

Users: Mostly nobody comments unless they want to complain, which is always the way! A few people will actually – when you actually, when you do something, go out of their way a bit and will say thank you very much indeed. At the moment most people, who phone up are polite in asking for things. Now we've got the compute link to the wards, it has helped I think.
Some people expect far too much. I don't know where they worked before, but they would never have got the sort of things they ask us to do at 3 o'clock in the morning. Erm. All I can say is presumably because they are not writing in or phone up and shouting, that apparently it's ok.

Realistic: No. Some please do. Some doctors have done lab work, or have done a bit of lab work. We also invite other groups to come and look round. We try and be pro-active about getting people in, so we do sort of demonstrations – either for small groups, we take them for tours round the labs, or else there's a 'Link Nursing' programme that we're involved in, educating the nurses. We do a series of lectures and then we lay out a lab full of demonstration plates and bits and pieces and come up and show them. When people understand that and we talk about our work they get a much better feel. But a lot of the people work shifts and they kind of assume that we work shifts, which we don't. And they don't understand that if they send a sample in the morning, it won't have grown by the evening, for example. It's getting time scale across and things like that that's difficult.

Realistic Drs. And Nurses: That's - hard to answer, because again I haven't ever been out actually working on a ward in any sense, although I'm – we do speak to the nurses for example partly on this course – so we understand their work patterns, we receive samples, most of which are written up and sent by the nursing staff, so we know the work of work they do for us, as it were. Erm. It's hard here, where the nursing is so technical to get the line drawn between what is a doctor's job and what is a nurse's. I feel really that, even if you want to have separate senior consultants, that doctors and nurses jobs could become one, sort of 'medical carers' type job with maybe nursing assistants or something. Because it's very hard to work out where the divide is, you know, why can this person say you can have a drug and this person can give it and understand all about it, but they can't actually prescribe it even though they know that's what you need. So that, that's something that I sort of perceive from a different point of view. Managers, again I don't know a lot of managers, apart from our Pathology managers, or some of the people that I've met during my time – when I was a union rep., for example, and I met other people who were union reps. who are now managers of their sections. So management of all the different areas is completely different, because everybody has got different problems.

Best: It's hard - again, it is quite difficult to say this. The money in our profession is absolutely dreadful. The thing that keeps us here is very good money for our 'out of hours' working. So I suppose the salary that I'm able to get – however having done 'on call' for over 20 years you know and being in my 40's now, I'd rather not be staying here over nights, things like that. You also know that you are theoretically at the cutting edge of paediatric and neonatal medicine. But I personally also have some doubts, in that we spend huge amounts of money treating one child with one condition, who may never fully recover or have a really good life and that money would buy an awful lot of polio vaccine in the 3rd world, for example. So, I do have somewhat ambivalent feelings about working here. You do think your helping – I always wanted to work in a lab and I want to do a job that's beneficial to society, I don't just want to flog insurance or something. So I perceive that I'm doing a job that is beneficial, but I've still got questions in my mind about what I'm doing.

Worst: Not being understood, probably, by an awful lot of the hospital. Erm. Having been moved into a beautiful new building, with lots of space and then constantly having your space eroded when other people are being chucked out of other bits of buildings because they thought afterwards it would be nice to put them here. So we are having our space eroded. Out pay, although that it a national thing it's not just a local thing. And travelling. Ok my travelling is not bad because I travel by motorbike, but travelling and parking for an awful lot of people is a real, real nightmare.

INTEVIEW 19: Consultant microbiologist

Working here: Yes-exciting hospital. Tricky infections-challenge.
Colleagues: yes.
Work itself: Pulled in lots of directions.
Management style: Don't know, too early to say.
Quality: Mostly good-room for improvement.
Contribution: Deciding what needs to be done-changes-communications-use of computers. Encouraging good QC, positive atmosphere-personal behaviour.
Users opinions; Not really. I haven't done a survey to ask people. Not endless complaints-some positive feedback.
Users work: Some idea, by and large , yes.
Best: Good quality of hospital-enthusiasm of staff. Ability and need to innovate.
Worst: Computer system

INTERVIEW 20:BMS 2

Enjoy working here: Yes. Yes. (Why?) Something different every day er a challenge and after 22 years, I still enjoy it.

Colleagues: Yes. Because I'm fairly outgoing, fairly easy-minded and I get on with everybody.

Work: Interesting. Certainly on the clinical trials side. Erm. That's about it, really.

Management Style Helpful & Supportive? 90% of the time, yes. Every so often they have a little blip, where, I think, some of the managers forget that they are supposed to be managers and they tend to become dictators. Fairly? 90% of the time.

How do you rate Quality? - Currently very well. We've had a few glitches with a certain department within the hospital, which was not necessarily our fault, but they would perceive it to be our fault.
On What Basis? Having worked in other laboratories purely on personal experience. Erm. Having worked with the PHCS, the NHS and another private laboratory, this has got to be one of the better laboratories I've worked in.

Contribution By lateral thinking! Because ... I often approach problems – sorry challenges! – differently from other people. And therefore I will see opportunities, and I will say "Perhaps we ought to be doing this" and when we start doing a different test, that pushes up the quality, because we're doing test, a different way, or a new test that pushes up the quality, because we're doing a better job.

Users Apart from this one department I would think they are generally happy with the results they get out of it.

Do you get feedback? Out consultant is very good at that, yes.

Realistic Again, 90% of them would have no idea whatsoever, but we are trying to – certainly with this one department we have problems with – we have bought them round, so we show them what we do and then they become more aware. But then it seems to go completely out of their head as soon as something goes wrong. Because you can say "look there are problems um we cannot always sort out on the day". But then, that seems to be forgotten.

Realistic? Drs & Nurses. I would hope so, yes. So you would understand the sort of pressures they would be under? Yes, yeah.

Quality A.O.B. No.

Best Pays the mortgage! Again there's opportunities here – far more than I have felt in other laboratories. Er. If you provide a good service, they'll push you to do other things. Because I'm hopefully setting up new tests all the time they allow me to set up new tests all the time. If I can see a market and put forward a good point they'll say "Right, run with it". Whereas again, if you were in an NHS or PHLS laboratory there's all these money constraints. You can't say "well perhaps we ought to be doing this", because they'll see "we can't afford to do it. Simple as that.

Worst At the moment, the travelling because I live about 30 miles away. And that's the only thing. They're very flexible in hours, so I come in at 7.00 and leave at 3.00 so I miss the traffic. But at the moment it's just the travelling.

INTERVIEW 21:BMS 1

Working here: I do, yes. Why? Basically because I enjoy my work, because I love microbiology and the way a lot of things are still done manually rather than automated, as it is in other sections of the laboratory.

Colleagues: Yes. Definitely.

Work itself: Um. It's quite routine. But having said that, there are different patients and different – erm on different days, there's different isolates and sometimes you get an exciting organism. That is basically what microbiology is all about – getting something new every day. Especially from patients, rather than clinical trials. Yes, to an extent. Yeah. Erm. It could be better – that's all I can say – it could be better.
People Treated Fairly? Yes.
Quality: From 1-10 I'd say 8. Why? Because there's a lot of quality control, wasn't there in the NHS laboratory. A lot of it is – most of it is – regularly very good quality control and that makes all the difference. You know everything is working properly and in good order every day we've got daily, weekly and monthly checks, you know. I think that makes a lot of difference. Quality of people is important as well. I'm sure not everybody is 100% - which I know they aren't. But erm overall it's good.
I'm very conscientious. I do know that there's a patient at the end of it and I really think about it as if it were my own child who had an infection (urine infection or whatever) and then try my best to do as – do it – quantity-wise as well as quality-wise – I try my best to get an end result that's a good result and I think I've done a good

job of it. I don't want to take short cuts. I don't like taking short cuts.

Users Erm. Year. I do have an idea and I think it's good a reputation, yes. And I think that's mainly because it started with SB. Smith Kline Beecham is a well-known laboratory and everything and they've maintained the standards from them and they found they've been given that high standards.

Realistic No – No, absolutely not. Erm. A lot of the time, doctors don't even know er bacteria takes 24 hours to grow and they will just want a result immediately and then if there's an urgent one they try and ask us why it's not been done within the first hour. There's problems in transportation, problems in reaching the laboratory, problems in data entry – and by the time it comes to the lab, it's not the first hour in which it was taken. I think that's mainly it. And er, it would be useful if they can do a round of the laboratory sometime and see the stress that we go through as well.

Doctors & Nurses Erm. No, probably not. It's probably the same there. But I do think about it and see things from their point of view as well – I try – but obviously maybe I should go there as well.

Quality AOB I think people mainly they need to be kept a check on, because they do go lacksidaisy after a while! When you get used to something, you could er, try and take short cuts, just to finish off and make the turnaround time shorter. But urm, that should be – needs to be – kept a check on. I think are most important.

Best Erm. I think microbiology. I just like microbiology itself. I just enjoy reading the plates in the morning and trying to find new things and – I just love it! I enjoy working with my colleagues. Some of them have been here just the same as me, even longer perhaps, and I get along well with them. You do have your off days, you know, you don't get on with some people. But I do enjoy the work.

Worst Not being able to get along with certain people! Because it can really upset you and er it's just – not nice if you can't get along with your colleagues. And erm especially if you are trying to train someone and they start behaving as if they are the trainer rather than you and er, you need to be able to deal with that sort of situation and I think that's the worst. I really get upset if I don't get along with my colleagues or if someone upsets me. That's the worst bit – just does my day!

INTERVIEW 22: BMS1

Work itself :I do, I'm involved in practical work and er I have the chance to work with the seniors and BMS and BMS1. So I would say I enjoy it to be hones.

Colleagues: I do. Without any doubt. I think – I think I'm ok, yeah!

Work: It's demanding. Very high demanding to be honest. You have to have er – you have to give very good attention to whatever your are doing, because if you miss anything – anything could go wrong. So you have to concentrate when you are working – especially with the numbers. Sometimes I do make mistakes – so you find it the next morning and do it again.

Management: Yes, in a way. Yeah fairly. Yeah, I would. Yeah.

Quality: Very good.

Contribution: Oh being an MLA I'm one of the people who sort of feed the biomedical scientists – for example if a swab comes, if I put the swabs in the wrong place, obviously the result might not, sort of, be the proper one. So we are the people, the MLA people actually, especially in this department, where we have to watch out, according to the swab or according to the request form. So I would say I just try to concentrate.

Users No, not from the hospital. I wouldn't know, no.

No I wouldn't say so – I wouldn't.

No. No. As you know we are in an exclusion zone from the hospital. We have no contact with the patients. It's just a matter of feeding a paperless report onto the computer! So it's just, click onto the computer and look what results have been released. And sometimes they phone for directions on which specimen to send.

Best That's a good question to be hones. I don't know. You've caught me, yeah. That's a really good question. But I really do enjoy working here, I should point out.

Worst: There's too much pressure. There are only 2 MLA people – so if one is sick we do not get any help from the BMSS – so I would say that.

INTERVIEW 23:BMS1

Yes. Love the work-always wanted to do microbiology. The laboratory is my second home!
Colleagues: yes.
Work: Not too much work. You an enjoy it if you spend time on things. Routine and project work, so quite challenging.
Management: Sometimes helpful, sometimes fair.
Quality: good standard-good quality. We are doing our best.
Rating by: IQA, EQA,TATs,SOP. Checked by medics. Problems dealt with by seniors.
Service: yes-good service. Maximum use of service.
Users: Not 100%. Junior doctors don't know things-they often request the wrong test.
Best: Proud to work for this company. Some team leaders don't know how much I am contributing.
Worst: They treat everyone the same, regardless of age and qualifications. No communications between team leader and company management.

INTERVIEW 24: BMS2

Yes. Why? Basically I mean over here they provide a lot of, I would say, things I am actually looking for, er in this sort of job, like equipment. Actually my area is clinical trials which is something I've been targeting for a long time and obviously, when it comes up and you come to a place where they provide erm things to your expectations, obviously you feel happy working here. So in terms of that, yes.

My colleagues generally year. Well, I'm the type of person who can fit into any situation you see what I mean? So I can fit in anyway and I work under any circumstances. I'm a generally easy, go lucky sort of person.

Very stressful. Um it can be fun, but I mean it is very stressful in the sense that you don't have – this place being private – obviously you don't have as many staff as you would wish. So one person has to do a lot. And then if you're unlucky – because we don't have enough staff to cover if somebody's on holiday or one person is sick, you know the few people who are left have to do the job. And the job has to be done before you go home; you see what I mean? So, it's very stressful no two ways about that. But if everybody's present, it's lovely – but you never get everybody present! All the time – there's always something – either somebody's on holiday or sick or something like that.

Management General. Management style, yes. But not in microbiology. In terms of general management of the whole place, yes. Fairly? Erm. I don't know to be honest. I can't answer that satisfactorily because I may be treated different, somebody else may be treated differently I don't know, to be honest. My general impression is that people are treated fairly.

Oh very high. I would rate if very high. (How do you know?)

Because one of the goals of this company is that quality is part of their sort of company's goal. And they always emphasise you know good quality of sort of work. And generally most people stick to SOPs, so I take it that the quality of work that comes out should be high.

Like I mean I said – fully sticking to the SOP and not cutting corners. To make sure that if a test hasn't worked I mean not to ignore it but just repeat. And if you are happy with the results then you can release it, but I mean if you are not happy with the result and you think, "oh I haven't got time put them back in". I mean you have to go back repeat it, make sure it is according to the SOP. Either way you contribute to the quality of the work that goes out. But otherwise I mean you dilute the quality and it is not accurate any more.

Fairly. I can only say about my section – clinical trials. In the sense that we get some feedback as to how we're performing and we tend to get more contracts. So in that case you know, I think that if they're not happy with the work, they might not want to give us more contracts you see. So, in a sense, yeah I have a fair idea as to how we're performing. If you mess up somebody's work for him or her you don't get the contract.

I don't think they do. And all they're probably interested in is the results. When a doctor sends a urine here for culture and sensitivity, what you do to give him the results, I don't think he'll know – or he doesn't care. All he wants is to see on his desk is "ok" I sent sample A from patient B to you for urine culture. You said you cultured E Coli and the sensitivity is this or that". How you arrive at that decision I don't think they know yeah… The doctor's training here is I think – they do very little infectious diseases training. So erm they don't seem to understand erm the processes that you go through particularly in microbiology for the results to come out. Or in other sections all they know is you just push the sample through a machine and the result comes out. So my feeling is that most of them don't know the details of what we actually do and what goes on in the lab.

I have, yes. Because I have worked in a hospital. I used to do vacation, employment in a hospital, working in theatre erm folding gauzes and things like that. And I worked in the wards. So I have a fair idea – other than how you supply chamber pots to a patient! They do quite a lot. They do patient care, basically. I have a fair idea of the sort of work they do in hospitals yeah, I do.

Best I began by saying they met, you know, most of my expectations of coming to work here, like it was something I wanted to do and erm they provide me with the opportunity to sort of, you know, erm do what I was expecting – So in a way, I mean, it gives me some satisfaction erm. I live very far away, so that's another thing – driving to work drives me crazy! But that is my own sort of thing – either I have to move closer to sort of get to work quickly. Sitting in traffic for 2 hours is not a very good thing erm. But basically in terms of the work, it is something that I wanted to do and a job like this is an opportunity for me.

Worst The worst is travelling. Travelling to work, yeah. And you know the chances for climbing the ladder are very very slim. It's like a pyramid and it's very difficult to, you know, get to the top in this sort of job. But we all live in hope – and hope one day somebody might sort of retire or whatever.

The worst is travelling – it is very stressful.

INTERVIEW 25: BMS 1

Yes I do, go far. Well er first of all, I work on the clinical trials side and then the diagnostic side I am trained in clinical trials and then the diagnostic side. The work there is very busy but erm people are very nice and it's a good place to work.

Yes I do – to my knowledge!

Work as I said, it's a bit too much at the moment. But I'm getting there.

Erm. That's very difficult for me, because erm I never met my manager – that's the Team Leader – and I don't work closely with him either. I'm very new in this company – I've only been here 8 months. Well it's quite a long time, but erm I suppose they do, but I'm not quite sure.

Erm. I think it is a very high standard erm because we get audited every 2 months – internal and external by our customers (for clinical trials) and we get quite good results – and erm it's good.

Well, I work very hard! And I er make sure all the quality control work sheets are filled in properly, on time and date and signed to make sure everything's of good quality.

Yes. Because in – I keep saying clinical trials because that's where I'm working – when you work on a project or research you have a specific client and at the end of the day what they want is feedback from you and we get more and more work from the same body, I assume if our work wasn't good I don't think they'd supply us with more work. And um stuff, I think. So I assume they're happy.

Realistic Users I don't think so. I don't think so because, well maybe those people who arrange for this research work are not really lab based or background people. And I mean like you get odd calls. And then well you tell them the bacteria hasn't grown today and we are doing "this" and they erm don't seem to understand sometimes. They way "oh it's been 2 days" and it gets a bit difficult, so I don't think they do sometimes.

Realistic, Doctors & Nurses I can't answer that because I don't work with doctors and nurses, I work with clients like pharmaceutical companies which is quite different from the diagnostic side. – clients then? Not 100%.

Best Very nice people working here and very nice environment. Erm. I'm happy!

Worst Oh, the food! I know it's not going to be important to you, but the food in the canteen is the worst thing in this company!

INTERVIEW 26:Trainee BMS

Yes, I do. Why? Erm. I suppose the work's pretty interesting, the people are nice, it's generally a quite nice environment to be in, I suppose. Erm. After a little while here, certain people talk about their jobs and the surrounding area and I'm fairly happy where I am.

Yes, I do, definitely. Nice bunch of people.

Erm. Sometimes a little bit tedious, but interesting all the same. I mean the science itself is interesting anyway – as long as that sort of thing interests you, I suppose. It's safe to assume such a thing, isn't it? So, I think it is, though I sometimes wish for a bit more variety.

Yeah. My boss is actually very fair. He's good like that. He's er quite honest and to the point, but he's also willing to have a laugh with you when the time is right. Yeah I think I've got a fairly good manager.
I would assume it's fairly high, but I've got nothing to compare it against, because this is the only place I've every worked in. Erm. But through the feedback from other people and er just – I don't know, I really wouldn't

know how you'd gauge it because I've got nothing to compare it against, I suppose. But people seem happy with what we do.

I've no idea at all. I assume they think it's fine, otherwise they wouldn't keep coming back to us. But that's my theory behind such things. Erm, I suppose if they hated the service we were providing and thought the work we were doing was useless, they wouldn't keep sending us work.

Erm. I've no idea to be perfectly honest. I think a lot of the time they just send it in and expect it to be done without knowing exactly what we do to get it. I say that because we get certain people phoning up wanting results and we say "well you can't have it yet, because it's a known fact that you can't have it for at least 48 hours", and they're like "Oh. Ok, I'll wait till tomorrow then". So I think they just sent it off – but they're not trained in the lab ways, though.

So – no one would expect me to know what a doctor does, because I haven't been trained to do such things.

Best People. I've made a lot of friends here and I've erm – probably one of the main reasons why I come really. I mean, a job's a job, but I mean without the environment and the people, it becomes a nightmare. So, that's what I like about it.

Worst Being trapped indoors all day. Which is probably quite a common answer but, I mean, once you are sat in the lab all day, you've got no idea what's going on in the outside world. Someone will say, "lovely day today, wasn't it?" And you go "I don't know, I was stuck in the lab – air conditioning broke down". So, yeah, that's probably about it, really.

INTERVIEW 27: BMS 2

Working here: To some extent. Work itself is interesting. Good team.
Colleagues: yes.
Work itself: Stressful-not enough staff. No time to finish things. I work late with no breaks some days-we are really squeezed.
Management: No-don't care about the stress and pressure we are under-but you are in trouble of you don't do it right!
Quality: High quality under the circumstances
Contribution: Extra unpaid hours, fewer, shorter breaks-exhausting myself!
Users think service is good, but don't realise what we have to go through to provide that service.
View of your work:Probably do-want thinks done before they arrive, though.
View of their work: Yes, realistic
Best: Up to date equipment-easier to get money for that than previously
Worst: Stress.

INTERVIEW 28: Trainee BMS

Well actually, I've got er mixed feelings. Erm. As I said earlier on, the condition of service cannot be left from quality of work. And this place is no exception. Erm. A lot of times I feel we're not doing the best we should under the present conditions.

The infrastructure is apart and the professionalism is what I expect. Because I mean I've worked in Nigeria, I worked in the US, I've worked in Saudi Arabia and in a Capital City it should not be so. Although I've learned never to compare continents. There's too much emphasis as far as I am concerned on the turn around time. And er, in that respect, I'm not very impressed.

Well, to some extent, yes. But er I'm not against any one in particular. Actually, my strategy is er, I try to get as busy as I can. So getting to do my job to the best of my ability. But as I said, there's some politics in the lab er whereby if some people make a mistake they are treated different from others who make exactly the same mistake.

Er, it's ok. It's not the workload but the organisation. I mean you do this much, but the organisation wants you do this much. But I think the organisation is – well I would not say it's completely lacking, but it's not what I

would expect.

Well, to some extent. But er, again, I expect more. Fairly? Well, to some extent.

Well, as I said, with the available infrastructure and er with the qualities we promote, I expect much better. And er a lot of times I have to develop certain negative attitudes as a result of the treatment in a situation. And er professionally I'm not happy with it. Because I mean we may be handling samples, but er indirectly you are harming the patients.

Erm, I do the best I can within the best of my abilities. But again I still maintain they're still too much emphasis on turnaround time. I mean something like the NEQAS: I want a situation where it's slotted in to like a routine sample – you get the best picture that way. But as soon as its NEQAS all hell breaks loose – I mean it's hypocrisy as far as I'm concerned. If the same sample comes in under disguise, with a patient's name, it's treated as less important.

No. I believe they have a client response. Occasionally when they call, you see I'm here as a trainee, so there's a limit to .... But er I don't know, I'd rather not comment on that.

No. In fact I was showing somebody a breakdown of professions that come up in the news this week and I was surprised as usual the list of doctors, midwives, hairdressers, cleaners... and nobody knows who the BMS is. However, you try to explain they really don't know what you're talking about! They know about the nurse and the doctor – but who are you?!

I think so. I lectured directly in the School of Nursing before and I have friends, colleagues, who are doctors. But I think this profession deserves more publicity.

Best Er. I have not thought of that – I really have not. Well the – as I said – the infrastructure is ok, but er. I believe it's been ....

Fortunately I've been to the other centre in the US and the attitude is different there. When you're treated with respect, you put in the best.

I don't know what else to say.

INTERVIEW 29: BMS1

Erm. Well, it's a tough one because I mean I don't really enjoy work! So the concept of 'enjoy' and 'work' in the same sentence just don't – I mean I don't hate it that's as best I can say. I mean it's as good as anywhere I've worked.

I do, with the ones I know, yeah. I mean I do sort of try and keep myself to myself – but yeah, they're ok to be with.

Erm. Well, there's too much work too little people basically. I don't think we actually – you know the service is not as good as it should be because there aren't enough people to cover the work we've got – it's all so rushed.

Erm. Within the lab, yes, within the company probably not.

Erm. Well, I think it's, you know, as good as can be expected.

Er not really. We don't get much contact with them apart from – because there's CRC, Client Response, any sort of issue – any kind of communication with GPs or whatever is when there's a problem. So we probably don't see the best side. But as far as I know they think the service is, you know, up to standards.

I don't think they've got a clue.

Erm probably not really, not that much. I mean probably more than they do of us though, to be honest.

Quality A.O.B Well, I think with microbiology in particular, what's important in isolating a particular pathogen from whatever site it is, getting the correct pathogen and what's more important, getting the erm sensitivity to antibiotics right. Because ultimately the reason they're sending a sample is so they can find out if it's something pathogenic and perhaps treat it. That's what we're telling them. So that comes above everything else.

Best Erm. I think basically – well that's a bit of a tough one really. I think, for me, personally, it's a job I'm quite comfortable with and I can do it quite happily, you know, if I'm not in the particular right mood for it. But erm it's sort of easy, but it's not boring basically.

Worst I think the way that – generally the, sort of way that the lab staff are sort of treated – or thought of – by people here as factory floor workers, when we're actually really qualified. And the way that things are done within the organisation without any consultation. I mean, the company actually puts on a sort of façade of being really interested in what you say, but when it comes down to it you've got no choice in the decisions that are made.

INTERVIEW 30:Head BMS

Yes. Why? It's challenging, motivating, erm exciting and rewarding.

Yes. It's difficult being in the situation I'm in because of having to crack the whip. Erm. But I try and be, sort of a "user friendly" Team Leader – I get out there and talk to them. And I think I get on pretty well with all of them, although obviously it varies, depending on the situation.

The work I have to do, erm again is finding itself more and more now caught between going towards pure administration and management. I very rarely get out on the benches these days. We've been deluges with more and er more clinical trials enquiries and things that need a lot of paperwork. But again, it's quite enjoyable at the moment but how long it will continue to be I'm not sure.

You as Manager Yes, on the whole I think I'm very fair and supportive. I can be cantankerous though if I find people are not living up to my expectations. But generally, yes.

You as Managed Staff Member My immediate supervisor is a superstar. He's fair, he's supportive, he' honest, he's straight and you know where you stand with him. Er. I think you'll find that all the Team Leaders would agree.

Out of 10? Probably about an 8. We don't do everything as perfectly as I would like and I think that's probably due to an element of short staffing. Er sometimes we're under a lot of pressure to get things out. Expectations of a private lab seem to be far higher than that of an NHS lab. You know the old "shove it in the fridge, it's quarter past five", doesn't apply here. Er and we are expected to produce – unfairly sometimes – much that we use to before when we were NHS.

Contribution Quality is higher than anything I've now from working 25 years in the NHS. Er the quality audit and documentation and database is incredible. There's so much of it. It's very difficult to keep up to date. But when you do it properly, it works very well.

Users I've got an impression with some of the users, which is probably more internal clients, and they think we're doing a good job. Erm. They find we're very supportive, very responsive, er very quick to answer any queries. I find it difficult with being quite geographically distant now to find how the hospital users find us. We only seem to get the complaints. Er all the positive and easy questions go directly to CRC – they don't come to the lab. We only get involved when there's a problem so it's probably if anything, a slightly negative approach.

They don't have a clue, in effect. Er judging by the amount of badly filled-in erm request forms incorrectly requested tests, lack of clinical details, lack of documentation. That really, they don't have an idea at all of what goes on in a micro lab. Again, they seem to judge all Pathology labs as the same. I've been asked in this last week why can't they have a 2-hour turnaround time on a faeces sample! – Because they get it on a blood. Er and I think really, that's probably partly er down to education and training. That the time a consultant microbiologist

spends with junior doctors is only something like half an hour, and I think we should be getting involved far more in lab tours and inductions to let them know what we're doing.

Not always, no. We've had this huge discussion today about a clinical sample, where it's very easy to see your point of view, but not as easy to see the clinician who is surrounded by angry patients demanding this, that and the other. Plus obviously, the long hours and stress. I do find though that a lot of documentation and requesting of samples isn't done by the doctors, it's done by the ancillary staff on the wards. And I think that's where a lot of the errors are happening.

Quality AOB Quality of the result is obviously, its accuracy, its turnaround time and more and more than focus is on cost. If you can balance the accuracy and quality of the result against cost, then you have a happy user.

Best That's the hardest question you've asked me, you know! The er variety in the job I think. You know, coming from a lab manager position in a smallish NHS hospital to working here – it's completely different. I think the clinical trials, administration liasing with the clients in the United States, it's quite exciting. And of course, this company being a global one, obviously we've got er constant communication with our counterparts in the states. So we get to find out what tests they're doing and what we can use in ours – it's great!

Worst Worst thing about working here is the amount of pressure that is sometimes on us. I mean, I quite often work a 12-hour day without a break just to get the job done. Erm. I think that's something that the senior managers here probably need to take more notice of. We've had several grades such as myself go off with stress-related illnesses. So I think that's something that worries me a little bit.

INTERVIEW 50:Head BMS

Yes. Why? It's a job I like doing er and er from that point of view, I've been very fortunate. There are days when I don't like it – there are days when it's a real pain – but on the whole er I haven't reached the stage yet where I don't want to come to work.

I think so – whether they think so is another matter!

Erm. The work I do, these days is a lot of the time quite frustrating, because it isn't microbiology. It's er the management of er everything that's necessary to keep it going and some of those are such petty problems – stupid little problems – er which we they're the things which cause real difficulty. I mean today when there are no staff, we'll just get on with it. But when everybody's in you'll find that er things go really wrong over the most stupid little things. So I think it's a combination of things, the frustration erm – the people side of things is, I find, not too bad, but there is an increasing generation gap in attitudes, which is probably not peculiar to MLSOs.

Your Manager? There are 2 answers to that. From a purely scientific and day-to-day point of view, I work for the Consultant Microbiologist, who is the head of department. And I have no problems with that – I've been very fortunate, I've worked with more than one in the same building, and I've been very fortunate with the people I've worked with. Erm. There is now a laboratory manager. There are personal issues involved in that, which are not easy to overcome. Erm and in essence, I just get on with it. Because I've got nothing to lose now erm I don't – career aspirations I just don't have any apart from to just keep on doing what I'm doing erm as best I can. So I think that's the honest answer to that one.

There are 2 answers to that. From a purely scientific and day-to-day point of view, I work for the Consultant Microbiologist, who is the head of department. And I have no problems with that – I've been very fortunate, I've worked with more than one in the same building, and I've been very fortunate with the people I've worked with. Erm. There is now a laboratory manager. There are personal issues involved in that, which are not easy to overcome. Erm and in essence, I just get on with it. Because I've got nothing to lose now erm I don't – career aspirations I just don't have any apart from to just keep on doing what I'm doing erm as best I can. So I think that's the honest answer to that one.

You as Manager? I'd like to think so. Er but I think that I – there's a point beyond which you can't go and I am prone to going beyond that position to make a bad situation even worse – but I'm learning!

Erm. Above average. Why? I think the people in the department are interested in what they're doing. I think they do it to a very high standard – to a good standard – but they don't have the resources in terms of time, equipment or space to do it, erm to a higher standard. I think it's constraints on the service – in other words, there's no facilities er for people to pursue anything they're interested in – in terms of – I don't have any equipment er an er I'm stuck in terms of space as well. Erm and also resources so I think that that would be my impression – if you were to start off with a – and it's not a PHL reference laboratory either, it doesn't have those facilities erm. So I would put us in the best of the DGH group.

By making sure that the resources in terms of materials and facilities and staff are in the right place at the right time. Erm – I don't always get it right – it does hiccup occasionally. If there's something wrong, er it is with the funding aspect of the whole health service and more importantly if anything probably, the continual "crisis management/fire-fighting" attitude erm that is certainly – has certainly been true for that last 10 years. And coupled with that, "Stop-go" concept.

Yes: I think that erm as far as I'm concerned, they've been very satisfied with the service that has been – that is provided. And compared with the attitude of some other people in this building – as far as other departments are concerned, we came out very well.

They haven't a clue. They just don't. The only people, unfortunately, these days, they come into contact with are the medical staff erm. They used to regularly – they would send the junior medical staff – one of the junior medical staff on a team used to be sent down to the lab, to find out what we were up to and what we were doing here. But that hasn't happened probably for the best part of 15 years now. So that sort of contact has gone and we're definitely the "backroom" boys and girls and unless they show an interest in us – or unless they've done it at University, um, they will only come into contact with our consultant or our specialist registrar.

The Pressures they're under? Erm. I think I would say yes to that. My sister in fact worked as the sister running Casualty and also running Coronary ITU, both in this country and abroad. Those ideas and experiences are probably quite out of date now, but the principles are still there. I don't think the principles have changed that much. Erm. I think in many respects they are probably under worse pressure than we are because they have specialised more. And I am fortunate in having come up a multidisciplinary route – I have a built-in appreciation of what goes on in other labs as well as microbiology – they have lost that.

Best Half past five! Erm. Best thing about working here. It's not an easy answer, but the answer I would give you it's a hospital, which has – well is going somewhere. It's going somewhere, it's having resources put into it, it is expanding. It has done that all the time I've been here. There were hiccups on the way as to whether it would be B or W that would close. And when they closed the lab at B, my wife lost her job, so I understand that. So I've been fortunate – I made the right – I was lucky, this was the job I got. No regrets about this job. It isn't in town, I've an easy journey to work, it isn't frustrating, rarely get stuck in traffic in the morning and that's probably true of most people too. Erm and we're spoilt, we will have enough contact with people in other departments of Pathology, and we do discuss other issues. It's not completely out on its own, it hasn't become that big. And the people I've worked with, over the years, I haven't worked with any – there have been one or two difficulties – but on the whole they've been fine.

Worst I'm struggling with that one erm. I suppose the worst thing from a personal point of view is discovering that you are not quite as good as you thought you were. That's always a risk when you try and do something that's different. Mind you, I didn't think I'd end up by being the maverick I am. Coupled with the fact that my youngest son isn't 30 yet and he's already – without the car – earning – his last pay rise took him to £6,000 a year more than I earn. And he's got a Golf GTI ! Interesting isn't it? What does he do? He works for a firm of – a computer company, they do all the computer stuff for PG, so it's a big company. That's sobering. And his pay rise was more than my wife earned in a year at RLH doing cervical cytology for 3 days a week. You can't compete with that, can you?

INTERVIEW 51: BMS 3

Yes. It fluctuates – like a lot of people you have good spells and bad spells, but generally, yes I do. Why? Er. I find it a challenge, actually. Er I think we are understaffed and under funded and it's a challenge to do it well and to er to get an end result. You feel as if you are doing something, you know, with a purpose. Erm. I did go through a very negative phase when we first became a Trust – I didn't agree with Trusts at all – erm I felt very

bloody-minded about it. And, you know I know my dedication to the work dropped off tremendously. Erm. But it's sort of crept back, over a period of time. I went through another spell where I thought I was going to be moving away, and that was very unsettling and difficult to focus on things that are happening in the department if you don't think you're going to be to be around for very long. But that has passed and I know I'm going to be staying. So I feel as though I'm giving more to the department again now, yeah.

Yes, I think so. There's always one or two individuals that you might, sort of, clash with – more from a personality point of view, but from a working point of view it's pretty good, yeah.

Erm. Yeah. The work I actually do – or I'm designated to do – I don't have a problem with. It is beginning to take me away from the general benches quite a lot of the time. And it is an absolute delight when I do just have to run a bench and not being pulled away to do other things. I do still enjoy the 'hands-on' side of things and if it's my turn just to run blood cultures for a whole week, I'm in my element. I love it, I really do. Um, but I think if I'm going to go down the management role, which is what I am pursuing now, I have to day – well I have to accept that I'm not going to be able to do that so often. Erm. And just look upon those days as sort of a bid of utopia! And once – I think if I could spend more time doing the management stuff I'm supposed to be doing that would give me more job satisfaction. But because of, as I've said, the shortage of staff erm and recruitment problem, I feel as though I'm constantly being pulled between the two. I'm sort of between the devil and the deep blue sea. You know, I should be one side and I'm constantly being pulled back to the other side, which does cause frustration. Er because you feel as if you can't do the job properly.

Your Managers? Erm. Supportive, yes. Helpful, yes. Erm. What I do find, from the consultant's point of view is, I wonder whether she really knows what pressure's we're under? I know she is under pressure and I wonder whether she really, actually could do with a "back to the floor" type of thing. You know just, you know just to see what it's really like and the pressures we're under. But generally speaking yes, they are fair and supportive. I would say, yeah.

You as a manager? I think so. I try hard to be anyway. I mean and I – things that you learn from management skills – you know if people go on courses, make sure you ask them how they got on and somebody gave a talk yesterday and you have to remember to say "well done" and "how did you feel about it?". Those are things that you have – and remembering to day "thank you" to people when they do things. Er and you often hear people say "Gosh you don't get any thanks for doing anything in this place." And you need to stop every now and again and make sure you do thank people. But because you're so busy yourself – it's not that you don't feel grateful for the work they're doing – but you just forget to say "thank you", and you have to remember to do that.

Erm. I think it's pretty good. I think most – I can't speak for all the staff – but I do think the majority of the staff do take a pride in their work and are very conscientious about the work they do. Erm some people take their conscientiousness a little bit too far I would say and I sort of feel like saying "come on, live in the real world" erm. For instance, last night we had a positive blood culture at twenty past five, now the consultant has made the decision that any positives after half four get left till the following day. And this individual said "but I'm not happy about leaving it, you know, what if it was my father or whatever" and I'm saying "yes, that's how you feel about it, but that's what the consultant has decided, that's what she wants. You have to draw the line somewhere or you'll be here 24 hours a day". You know you have to be in the real world. And I can understand what she's saying but I also have to try and say to people "I know what's ideal, but we've got to try and be realistic". And I think in most cases, the quality that we are producing is very good.

Erm. Motivation I think. I am motivated in the job, I enjoy the job and I hope that my attitude to the job will filter down to other people and perhaps give them the same motivation to what they're doing. Erm. And also, when people ask me things, I'm not one of those people who says, "oh, I haven't got time" or "I can't be bothered", I always make time. Even if it means I'm the one who stays late at the end of the day. I always make time to help people with problems or things that they want to learn if they're not sure about something, and encourage them. And also encourage people who want to do new things s well. So I think that's probably how I help towards the quality.

I don't really know, no. The only inkling I had of it was a few years ago, when I was Contract Manager for Pathology and we used to deal with the GPs a great deal. Erm. And they seemed to have problems over how quickly you got the report to them – not the quality of the work we did or the quality of the microbiology. It was more the speed of report. But that seemed to be more from a Haematology and Biochemistry point of view.

They accepted that Microbiology took 2 or 3 days. Erm so I think, generally speaking, at that time they were reasonably happy. They sort of said "oh yes. We know microbiology takes a week. Don't worry about it". Erm. But that's the only contact I've had really. I don't have any dealings with doctors within the hospital.

No. I personally don't think they have any idea what we do. Erm. I don't think they realise how important a cog in the wheel that we are. Erm. Somebody – I was once talking to somebody who worked at one of the Manchester hospitals where the lab was burnt down and she said the whole hospital ground to a halt! Nothing was done for 48 hours they closed Casualty, they closed Theatre, they closed ITU, they closed everything – simply because the lab ceased to exist. I mean I'm not actually talking for Microbiology, I'm talking about the whole thing. I mean Microbiology does have an acute role as well. Erm. And sometimes I wish – I mean every now and again I get this very militant feeling that comes out in me, because I feel we're just left behind, "backroom boys". We were discussing earlier about salaries: we have fallen so far behind, we are so undervalued that I actually have got to the stage now where I would strike. If I felt that all laboratories across the country would strike, so that everybody knew what we do and how important we are. But I'm afraid that I don't think that would every happy. But that's how I feel – that the doctors don't have any idea what we do and they don't actually – and the general public don't have any idea what we do either, because doctors take blood samples and say "I'll go and cross-match some blood for you now" or you know "we'll send these down to the laboratory to see if you've got an infection". And the GP probably thinks the doctor does it. You know they don't understand what we do al all. So I do feel that erm – I don't think the medical profession really have any idea of the pressures we're under and the lack of morale and the quality of the work that we do do for them and how important it is – to them.

Probably not, no. I mean I think, when I said earlier about "back to the floor", I think it would be quite interesting to have an insight in what's going on out there as well. Erm. The only experience I've had is as a patient on a gynae ward a couple of years ago. And there was a real mix of nursing staff – some who were totally dedicated and working hard and others who really didn't seem to give a damn and spent a lot of time just sat on their backsides on the nursing station. And I think that's probably just a general spread of what the nursing profession is like. As there would be in any job – you always get people who don't work as hard as others. Erm, that can cause resentment. Going back to the Microbiology point of view, if you do get people who don't work as hard it does cause resentment within the other colleagues. Erm but the pressures, as far as lack of beds and trying to squeeze all the patients into casualty and that we don't really have any comprehension of. Because we are a bit isolated here and we don't really get to see what's going on.

<u>Best</u> In microbiology? Oh dear! Erm. I think generally speaking, we're not a bad bunch of people together. There are a few individuals who are very good at raising people's morale. I'm not saying it's me – there are one or two others who I think are particularly good. And when they're around it's really quite a happy place to work. Erm. On the reverse of that, there are a few individuals who can have a very negative effect on the laboratory and when they're around it can have a bit of a down feeling. But generally speaking I think we are quite a happy bunch and it's quite nice to come to work. You know, even if you're feeling a bit down about something outside of work, you come to work and you know you'll probably have a laugh about something. So there's quite a nice morale. Erm and I just love microbiology, I mean that is the problem about moving into management is that I am going to lose that "hands on" bit. And I love the feeling of having done a job well – a practical job well done whether I'll be able to do that from a management point of view I don't know. But it is the actual "hands on" work and being in quite a happy team, I think.

<u>Worst</u> The worst thing is the fact that we haven't got enough staff to run it properly. Erm. It's got a lot worse for us in the last 12 months, as pressures are really great and have been – the first person left last September and here we are nearly at the end of August again. So here we are, we're talking 12 months since the first one left, one left in October and one left in November. And these were 1 MLA and 2 qualified MLSOs. And we got no recruitment at all until February of this year, when we took on one MCA and then I think in March or April we took on another one. But all this time, we have not been able to replace an MLA. We got a part-time one for a very short spell. That actually did lift the pressure for a short while. Um she then got full-time work. We didn't actually have a full-time post to offer here. Then no sooner had she left then somebody else left and we did have a full time post, but it was too late because she'd gone. Erm. We are in the process now of – we've taken on one Trainee and we're taking on another Trainee. So I think we're looking at another 12 months of real pressure, until those Trainees are up to speed. But every year we have to make a financial saving but every year out workload goes up by a minimum of 5%. And we make savings and we've had no increase in staff at all. If anything, looking at it at the moment, we've taken a decrease. And those pressures are just getting so great that that knocks morale and makes people feel – and the feeling of being undervalued, not being in the Pay Review

Body. It is very hard to keep people's morale up all the time when you're constantly being kicked in the teeth and being told "you don't matter, you're a 'backroom boy' ", when we think we do matter. You know so that – I think that is the worst side of it: the lack of staff, the pressures on us and the low morale because of those pressures.
But generally we do try to keep as buoyant as we can!

INTERVIEW 52: BMS2

Generally, yes. Erm. I think like everybody else, you have good and bad days, but overall I would say I enjoyed it, yes. Why? I think it's a good team. Erm. We have our ups and downs and probably are under a lot of pressure at times – you've probably heard from my colleagues that we've been short-staffed since last November. We've got the final interview, to get the staffing levels back, is due to be this month. So hopefully things will improve. So I like it. I've been here a long time – I do quite enjoy it.

Yeah. I would. I think everybody gets on well. You can't put sort of 16 people erm in a department like ours and then not have clashes of personality – you have to expect that. But overall – this indicated that when the chips are down like we are sort of up to the limit of number of people off at the moment and we're short staffed and at our limit and someone's rung in sick today and everyone is pulling together really well. And I think, you know, we do do that – we are very good at doing that.

I – over time we've actually got less input into what we actually do and I find that a bid – er negative really. Er. We don't have as much say in what goes on. Medics seem to say "Follow this up" or "Follow that up". Erm I've been here 16 years and over that time that has changed. And you don't feel as though you have as much input erm, as you'd like to. But, having said that, erm, I do think we are consulted on a lot of things. The consultant and MLS)4 are very open to approach and to suggestions. You might not always get what you suggest, but at least they will listen to it and give it an airing. But the final decision obviously rests with the consultant and that's changed a lot over the past 16 years.

Yeah, I think so, yeah. Erm, I've – we were only discussing this yesterday. The – it's very much give and take, as long as that remains – it is better. There are people that complain they sometimes go home late, which is true. But there's nobody on your back, you know, if you're 5 minutes late back from lunch, or you're 10 minutes late in or you're 5 minutes longer on your tea break. And I think all that give and take is far, far better for the management and the running of the department.

I think the quality is very good, erm, considering the pressure people are under. I think it could improve – I think we could improve from maybe one more member of staff and then the quality would improve significantly – more than it would, if you want the financial cost maybe to have one more person. Because if people weren't working under such pressure then I think that would improve the quality no end. I think it would be a useful investment, quite honestly. But, as you go around talking to other people from other labs or people from other departments within the NHS, you find that this is an issue throughout.

Personally? Just by doing my best, I suppose. I mean you've got to – you'll see from the questionnaire that I'm an MLSO 2 and part of the recent sort of shake down of staff when we've been short staffed – were two of us have been upgraded to 2s and that's becoming more our area. So I hope – I think, being positive and having a positive approach to people helps the quality of the work. If people feel happy, then the quality of the work will improve and this gets back to you know, if we had another member of staff, then probably it would improve. That's not to say it's not very good already. It's as good as it can be.

I do actually, but I think you will find quite a skewed opinion when you go out and speak to them. Because erm, Microbiology is just part of Pathology, whereas in other hospitals, you have a specific microbiology lab, Biochemistry lab.

We have a general reception in the one building and it's just perceived as Pathology. And I think Microbiology – if you ask people specifically about microbiology, make sure they only answer about microbiology and you'll find that they will be very impressed. However, we have a multi-disciplinary "on-call" service and we have one or two members of staff who are less than approachable. And you do find that people have "run-ins" with them and use that to blame the whole of Pathology. Erm, I do think – I feel quite strongly about this, I am part of this multi-disciplinary "on-call" rota myself, and if you asked anybody in Pathology who the 2 or 3 were, they'd be

able to tell you. And I think it's very sad that the managers – I don't know what the management could do, the higher management – but I think Pathology would have a far better .....

The standard of Pathology throughout is good, but people just remember the "run-in" they've had at 4 o'clock in the morning. And if you go out and speak to people about microbiology – if you pin them down specifically to microbiology, I think you'll find a very favourable reply.

I think they probably have no idea whatsoever, to be honest. Erm. They just send the specimen in and apart from – in the cases of nurses and doctors – apart from the very small bit of Microbiology they've heard about on their respective courses, I don't think they've got a clue.

No. Erm. Getting back to what I was saying before, er, I'd like to think I did, but when you actually speak to people and you go on "in house" courses – I think these are good for showing you those things. You're having coffee on an IPR course over at Personnel and you get talking to them and you realise that you really have not a great deal of idea of their jobs and that.

The best thing of working here I do – because we're not such a big department, probably about medium-sized, I think you know each other really well. And I do think that we all do feel part of a team. We all have our "in-house" bickering like erm, you know, any department would. But when, erm, the chips are down, like today, you feel everybody rallying. And I think that spirit's there in essence. And I think that's quite good – rather than being part of a big, impersonal lab.

The worst think is, I do think you do feel undervalued. Not just because of – you mean specifically about working at Whiston? Sorry I was talking about as an MLSO generally.

Erm. Specifically about working here? Erm. Oh dear. I don't want to sound too positive, I want to find a negative here! Erm. I think you get frustrated. I think you do get frustrated, when you see the amount of stuff that you could do erm but I think we probably send too much away to the Public Health Lab. We don't do any Virology or Serology. Erm. We are in the process of getting a new consultant and maybe then it will happen. We would need more staff, but I think the extra – the variety of the work would increase people's morale. Because if you do become too routine – we are all scientists, we do all like to do something different and I think that would help.

INTERVIEW 53:BMS 1

Erm. Not particularly, no. Why? Erm. Pay, lack of thanks from anybody, lack of prospects it's all 'dead man's shoes' stuff. Erm, too much of it's 'backroom boys', the usual kind of things.

Most of them. But you do get some personality clashes, obviously. I do my best just to er get on with it. We do have problems when people have grudges, I think. So that's – I don't know whether you want to ask later about management – but that's probably a problem with the management that doesn't sort these things out.

Erm. Main problem is we're over-worked, so it's just a production line. You don't really have time to give the time to each specimen. When you do get things out of the ordinary you can't really give them the time you should. I'm sure mistakes are made because you're working at speed.

No. Erm. Tends to be sort of "head in the sands" management style. Erm. They just ignore problems and hope they'll eventually go away. I suppose it all gets back to problems with lack of pay - you don't get – anybody who's a decent manager will go somewhere else, where they'll be paid properly. You end up with people staying who are just struggling to do their job.

Fairly? Erm. No they do tend to show favouritism. Erm. And certainly here, the management structure is too rigid. Erm. Somebody who is a Grade 2 will always be right – if there's a problem between a Grade 2 and a Grade 1 – the Grade 2 is always in the right. It's quite disillusioning!

Generally, it's good to high quality. Obviously there are mistakes made and there are people who are weaker than others. How it's going to be when this new computer scheme comes in – there are teething problems there. I'm not sure whether it will give a better service to the wards. Maybe better from our point of view, but from the

wards' point of view, it's going to take longer to get out.

Erm. I suppose we do well in – we do ok in most of the quality controls. You don't actually treat them the same as everything else – nobody does. The internal quality controls we have, erm, are fiddled a little – because you know it's a quality control sample from the look of it. But generally, they are the same as the original. We do have quite a lot of people who've been here quite a while, who are quite experienced.

Erm. I contribute a lot – being completely modest! Like I do more work than anybody. Erm. I'm just – personally I'm very organised so I just get on. Whereas other people make a fuss as to how busy they are, instead of doing some work! But then, because I quietly get on with it, it doesn't get noticed, you don't get any thanks. The sort of thing is, there's no motivation actually to do the work, it's all – you've got to be self-motivated. Because there's no pay bonus, there's no reward at the end.

Erm. I do have some ideas, because er my family work in hospitals. Generally they – I do think they think about the service. The only time they think about it is when they don't get the results they want. If they get their results, then they don't think about it and if the lab haven't seen this back, it like "the labs have lost this specimen". And you don't send a specimen the next time. I don't think we're particularly highly thought of.

I think they've no idea. Because nurses and doctors training is almost non-existent about the lab.

Yes. Seeing as I have doctors and nurses in the family, I know very well what they do.

I suppose the fact you're actually – even though nobody knows it! – you're contributing to people's well being. Actually saving lives, or at least making lives better.

Erm. So many to choose from! It's a combination of everything really. You know, the pay, the prospects, lack of management, lack of gratitude. We have a consultant who has – doesn't have anything to do with supporting us. A management who finds it easier to

INTERVIEW 54: BMS 1

Yes, Yes. Well, I've always enjoyed microbiology, you know. I've done a stint in all the other disciplines, but microbiology particularly er I've always enjoyed it. And I think er we're getting that we're working quite well. Obviously we're short staffed and that, but that seems to be part of the job at the moment. So yes, I do enjoy It.

Yes. I feel I do! I'm sure there's some people that don't like me, but yeah, generally.

Erm. I feel we have a lot of work to do. There's a lot of pressure to get through the working during the day. We were only saying the other day that isn't there a way that perhaps at the moment we could work later of a night and be paid for it. Rather than having this mad, under pressure to get everything done by the end of the day. Basically because we're so short staffed at the moment.

I think so, yeah, yeah. I mean there are parts where we feel that, in microbiology in particular, the management don't fight for things. We see the other departments are getting extra staff. I mean we've been understaffed since September last year and we haven't even got to the point of replacing those staff, yet the other departments are getting extra staff. So we feel that our management – both medically and technically – don't actually fight for us. Fair within the department? Yeah.

They are moving forward. I've only been here three years and when I came they were a bit stagnant, but we are moving forward with new ideas and that now.

Er. I've been on courses since I've been here, particularly an anaerobic course. I've come back and introduced that, re-written an SOP for the anaerobic bench. I think just trying to keep people's enthusiasm going. I've started a Discussion Group, which we have every other month, and that just gets people thinking again. I think once you get to a certain age you tend to vegetate. And er the job I was in last time was a research post and it just did say to you "you're not too old to learn things", and it's just getting people back into the enthusiasm for it.

I don't think we get a very – I don't think we get much feedback from them, I mean the situation now – which I find strange having been out of the NHS for a while – is that we don't really meet any of the medical staff at all now. So, as I say, the only thing we get is a moan on the end of a phone – "well why isn't this ready?" and this, that and the other,. And I truly don't think, even medical staff have any idea about microbiology at all – how long it takes or anything. So I don't know how they particularly feel about us – apart from taking too long to get their results out.

No, no. I don't think they have any idea at all. The majority of medical staff or whatever come into contact with us through "on-call" services of a night time, which doesn't really involve microbiology very much. I just – I don't think they have got a clue – you know, what we do, or how much work we have to do.

Probably not. It works swings and roundabouts, doesn't it? I mean I have been in hospital recently, actually in here, and you do see a bit where you thing "oh they're sitting round, doing nothing", but then you realise that perhaps there's only a couple of nurses on duty to cover a whole ward, they are under as much pressure as we are.

Erm. I think the fact that we are moving forward. Erm. We've lost a lot of staff, but we're hopefully gaining staff. We're starting at the bottom again now, where we've got a trainee and possibilities in a few weeks' time of having another trainee, which I believe they haven't had for quite some years – probably 10 years plus. And I think that's a good thing, to bring new blood in and we can move on from there – and young blood.

The worst thing about working here. Erm. Probably when I was saying about management, that we don't – we feel undervalued. You know, we're under a lot of pressure and people may say "thank you", but thankyous only go so far. And we can see other departments get recognition – be it money or whatever. Money is a good thing, I think the money and the fact that we're not – we're undervalued, or feel undervalued.

INTERVIEW 55: BMS1

Most of the time. Well, I enjoy the Microbiology, but you know, that's mostly what I do enjoy. It's just a subject that has always interested me, even from school. I wasn't clever enough to do, you know, higher exams, so this was the ideal job for me really.

Most of them, most of the time.

A lot of it and it gets quite stressful sometimes, trying to get through all the work. Erm. I'm in a situation that I can't really work over, because I have to pick my children up from Child care, so that personally adds more pressure, I feel, to me you know because I've got to go on time – there's no leeway there. You know, if we have an exceptionally busy day, people think "oh well what's an extra 15 minutes", but I just can't do it.

Not really, no. I mean, I think your immediate managers do help, you know, but the higher up you are the more distant you are. And I don't really think they see what's going on at ground level.

Tx Fairly? Yeah. That is something they do try to treat everybody fairly.

I think it's very good. I think we all work very hard and, erm, I feel the bench training – I know it's a long time ago – but the bench training I got as a junior was really high standard. You know, compared to people I was at college with, I did – even though we're a small lab – what we did do was – we were allowed to do it at an earlier stage, but well supervised.

Well, you just have to read all the literature, keep up-to-date as best you can. You, I mean, going on courses for me isn't practical, with having the children and my husband works away. I perhaps —I don't do as much as I'd like to, you know, I realise that's an area where I personally lack.

I think a lot of people don't really know a microbiology service exists! I suppose the doctors do, but I don't think they realise what the work entails at all. You know, they seem to think sometimes that you can have a result in a few hours. You know, let alone 2 or 3 days, which it can take.

Feedback? The only real feedback I ever had was when I was pregnant, one of the midwives actually did say that our turn around time on the urines was marvellous. But you know she was saying like "with a negative urine you know you can sent it at 4 o'clock at night and ring up at 10 o'clock the next day and know that it was negative". And she was really pleased. That's the only feedback I've ever had.

No. No. I don't think the GPs have – I don't think the doctors in the hospital do. You know. Because they seem to think they can ring up at 9 o'clock and you're going to know the result of every one they sent in yesterday. You've got to day "well, you know, I've got to sit down and read the plates, you know. It takes hours". They've no idea whatsoever.

Erm. No. I'd say probably not really, because I don't – I mean all right you see the doctor as a patient, but you don't know what they have to do when they've finished a clinic or operation or whatever. Or, what the work entails. I'm sure they have paperwork, just as we have paperwork.

The best thing is, the majority of the time, we all get on well, I think. A lot of us have worked here a long time and we know each other fairly well. And it's a small lab as well.
Worst: The workload, really.

INTERVIEW 56: BMS 1 (notes only)

Working here: Yes-routine nature of work.
Colleagues: Yes, they are all easy going and tolerant.
Work itself: At times, it I stressful-too much work. Not doing it for best results.
Management style: In general , yes. There are some things I would do differently. Fairly, most of the time.
Quality: I think that it's high standard, given the pressure we are under.
Contribution: I work as well as anybody else. I try to make sure things are finished
Users: yes-quite a lot have no idea at all. They don't realise that urine takes 1-2 days to be processed. I don't think they think about it-juts accept results.

Drs and nurses: I think so-I am aware that I don't know everything.
Best: Nature of the work.I enjoy isolating and identifying bacteria. Worst: Pay.

INTERVIEW 57: Consultant microbiologist

Working here: Yes-microbiology is interesting. I enjoy training junior staff and medical students.
Colleagues: Yes-good group of staff.
Work itself: Overwhelming- but we should be getting more staff soon.
Management style: Usually supportive. I try to be fair and supportive.
Quality: I would say good quality .We do more than other laboratories and give as helpful comments as usual.
Contribution: Signing out reports. All positives authorised by medics. I check juniors. Interpretation to make results clinically relevant.
Service: yes-A part of CPA inspection, sent questionnaire to users. Generally favourable comments.
Users: Yes-general idea. They don't realise the pressures. Lots of people phoning up for results on same day. They think it's easy, 9-5 day, but it's not . Don't realise we do on call and weekends.
Drs and nurses: Contact through ITU ward round and with other consultants, so have rough idea.
Best Interesting job-always loved microbiology. Worst: Workload-never feeling you can get away.