EXTENDING THE BOUNDARIES OF CYTOLOGY

A personal and professional journey

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ABBREVIATIONS

AHCS	Academy of Healthcare Science
AP	Advanced Practitioner
BAC	British Association for Cytology
BSCC	British Society for Clinical Cytology
CPD	Continuing Professional Development
CPSM	Council for Professions Supplementary to Medicine
EQA	External Quality Assurance
ERS	European Respiratory Society
EBUS	Endobronchial ultrasound
FNA	Fine Needle Aspiration
HCPC	Health and Care Profession Councils
HNC	Higher National Certificate
HPC	Health Professions Council
HPV	Human Papilloma Virus
HSST	Higher Specialist Scientific Training
IAC	InternationalAcademy of Cytology
IBMS	Institute of Biomedical Sciences
IMLS	Institute of Medical Laboratory Sciences
IMLT	Institute of Medical Laboratory Technology
MDT	Multidisciplinary Team Meetings
MLSO	Medical Laboratory Scientific Officer
MSC	Modernising Scientific Careers
NAC	National of Association of Cytology
NCCETC	The National Cervical Cytology Education and Training Committee
NHS	National Health Service
NHSCSP	National Health Service Cervical Screening Programme
NSHCS	NationalSchool of Healthcare Science
OUP	OxfordUniversity Press
PBLAA	Pathological and Bacteriological Laboratory Assistants Association
PSM	Professions Supplementary to Medicine

PTP	Practitioner Training Programme
RCPath	RoyalCollege of Pathologists
RPMS	RoyalPostgraduateMedicalSchool
SAP	Scientific Advisory Panel
STP	Scientist Training Programme

INTRODUCTION

This story begins with the revolution in Iran in the 1979 and charts my journey from early rebellion against the status quo, to coming to the UK to learn English and get an education through training in a cytology laboratory where I learned about cytology both as an art and a science.

The story continues with my rise in cytology and my challenges on the way. It shares the learning from 13 public works which shows how I have made a difference to my profession by helping to: define its standards and boundaries; extend those boundaries; develop educational practices and produce textbooks and training materials that are used throughout the profession; and improve diagnostic services that have led to improved quality and reduced costs.

Finally, I reflect on the implications of what I have learned for my profession and my own practice.

CHAPTER 1 THE EARLY YEARS–ALL ABOUT ME

THE REVOLUTIONARY YEARS

I was born in Iran in 1964**.** Living through the 1979 Iranian revolution had a profound effect on my life and most likely shaped my personality to what I am today, including a taste for challenging the status quo.

The revolution grew from a small gathering of people to a large populist movement where millions were on the streets holding protests which eventually led to the overthrow of the Shah. My own personal experience of the revolution was the first days of the high school, when the senior boys had started a loud demonstration during lunch break chanting slogans against the Shah. Later I became more involved in street demonstrations.

My parents grew concerned that as a strong-willed and rambunctious teenager, I would soon run foul of the strict new public rules and get into trouble with the authorities. My parents decided that for my own safety I should move to the UK and live with my brother who was finishing the first year of his chemistry degree. I was not happy about this decision, as I knew that I would probably be leaving Iran for good. With a heavy heart I said goodbye to friends and family and in August 1979 left Iran. I did return to Iran, but it was not until 2007, some 28 years later.

THE BEGINNING OF MY CAREER AS A BIOMEDICAL SCIENTIST

I arrived in London in 1979, and studied English, O-levels, A-levels, including A-level chemistry. My chemistry teacher suggested that I should apply for a job that offered on the job training. He found a recent job advert for hospital medical laboratory scientific officers (MLSOs) as they were called those days.
In September 1983 I applied for posts as a trainee MLSO and discovered that there were a number of different laboratory disciplines covering various pathology disciplines:

microbiology (microorganisms and bacteria),

haematology (study of blood cells)
clinical chemistry (chemistry of blood and body fluids body fluids)
histology (study of tissues)
cytology (study of cells)

I applied for 10 jobs and was invited for two interviews. My first interview was with a clinical chemistry department. This discipline even in 1983 was highly automated and did not appeal to me. My second interview was with the histology Department of Hammersmith hospital. The manager (called senior chief MLSO) was a very charismatic man and sold me the job at the interview.

The way he portrayed the job was very different to what I discovered after working there for a few months. He correctly told me that I would be attending college for five years and eventually gain the fellowship of Institute of Biomedical Sciences (IBMS). What was not quite accurate was about the job itself; I was given the impression that I would have a role in diagnosis, but I soon discovered that as a MLSO I would only be involved in preparing slides of tissues for a pathologist to report on and make the diagnosis.

The next five years (1983-1988) at Hammersmith hospital were very enjoyable, interesting and educational. In those days NHS laboratories were adequately staffed and sufficient time was allocated to training. All trainee MLSOs attended college to study for the Higher National Certificate (HNC) in Medical Laboratory Sciences. The course included both practical and theoretical components. The usual mode of study was to attend as a day release student for the theoretical component and two evening classes at a hospital laboratory for practical training. The course was well designed with a good balance of practical and theoretical teaching. I completed the HNC in 1986 and obtained a merit grade in histology and biochemistry.

In September 1986 I began studying for the IBMS Special Examination that led to the Fellowship of the Institute of Biomedical Sciences (FIBMS). This was a very different course to the HNC. It was taught at a much higher academic level. There was no longer a practical component, but a great depth of theory was

taught by distinguished lecturers who were senior members of the profession. The subject included pathology (study of disease), histopathology (study of disease under the microscope) and electron microscopy (study of cells under electron microscope). I enjoyed this course, and socialising with lecturers after classes gave me an insight into the profession. Some of the lecturers were relatively young and their enthusiasm was infectious.

FIRST AWARENESS OF LIMITATIONS OF BEING A BIOMEDICAL SCIENTIST

This period was also probably the first time that I began to feel frustrated at work, as I could not apply the theory that I had learned. I also started doubting whether I belonged to a true profession. I had read somewhere that professional people had autonomy in their practice, but as a biomedical scientist my practice was limited to activities that were allowed under the direction of a medical doctor (pathologist). I eventually gained the courage to ask the laboratory manager who had employed me in 1983: “is biomedical science a true profession?” He was a very well respected senior chief MLSO and was surprised by this question. He told me that once I obtained the Fellowship of IBMS I will be able to apply for senior positions.

Hammersmith hospital also showed me a side of the medical profession that I was not familiar with: a very autocratic and hierarchical system. I later found out that all the medical doctors were employed by the Royal Postgraduate Medical School (RPMS). This independent medical school based at Hammersmith hospital was a leading centre for postgraduate education in UK, but closed after 1997 when it was assimilated into Imperial College. The senior academic staff of the school provided consultant services and academic leadership for Hammersmith hospital. Therefore most of the consultant pathologists were “professors” and I felt their treatment of more junior doctors and technical staff was unreasonably harsh as they were often asked to carry out menial jobs in the department.

FROM HISTOLOGY TO CYTOLOGY

One of my duties as a histology MSLO was attending frozen section procedures. This procedure is used during a surgical operation where a piece of fresh tissue is submitted for urgent microscopic diagnosis usually to confirm cancer, or to confirm if the cancer has been fully excised. The process involves slicing a piece of tissue and freezing it to make it hard before fine slivers could be cut and stained for examination by a pathologist. The technical process usually takes about five minutes. I had learned from a histology text bookthat cytological preparation could be prepared by touching the cut surface of the tissue against a glass slide. This tissue imprint can then be stained and examined under the microscope. The process is much faster that the routine frozen section but does not give details of tissue architecture that is needed for specific diagnosis.

The Head of Cytology had noted that while he was waiting for the frozen section sample, I was often busy looking at the cytology preparation that I had made. One day he said that if I was interested in cytology, maybe I should consider moving to his department and retraining in cytology. I told him that I felt very frustrated about the lack of autonomy in histology. He said that I would be trained to look at cervical smears and in time would report the negative cases. He also told me that I would have the opportunity to look at diagnostic cases (non-gynaecological) cytology.

So, though the Chief MLSO was not happy with my going, I joined the cytology laboratory**.** The lab was a very different environment to histology. The technical aspect of the work was minimal and most of the time was spent looking down the microscope “screening”. The laboratory also offered a very unusual service in that MLSOs attended clinics to help the clinician collect the sample. This service was called fine needle aspiration service (FNA service) after the technique which involved removing small tissue biopsies using a fine needle. This service allowed me to have some patient contact, as previously samples were bits of tissue in a pot, and patient contact reminded me that there was a patient at the end of a pathology report and some purpose in our work. I soon discovered that the best way to learn cytology was to look down the microscope as much as possible. I was an early riser, and I used this to my advantage and managed to

get to the lab early and use my own time to study.

There was very little formal teaching at Hammersmith hospital; this was not unusual as in the 1980s the training of cytologists was quite variable. These days the student must spend a minimum of two years working in the cytology laboratory, attend a formal course, and examine a minimum of 5000 slides before they can attempt the qualifying exam. In the 1980s it was enough for the head of the laboratory to certify a cytologist as competent and many cytologists did not bother with examinations. I felt that I needed to prove my competency and passed the cervical screening competence examination in nine months.

In 1988 I passed the IBMS Special Examination and became a Fellow of the IBMS. Equipped with this qualification I could now apply for a promotion and become a Senior MLSO. I enjoyed working at Hammersmith hospital and if a senior position had been available there, I would have been quite happy to stay. However a position did not become available and the Head of Cytology suggested applying to a newly formed private laboratory, Ravenscourt Laboratories.

MOVE TO THE PRIVATE SECTOR

Private sector pathology in the 1980s was still a new concept in the UK and I was advised by many to remain in the NHS, but it was a promotion and my sense of adventure took over and I applied for the position.

The interview was not challenging as I had been highly recommended. This newly formed laboratory in West London was based at the Royal Masonic hospital.

The workload in my new role was minimal and I used the free time available to read books on cytology. The pathologists used to arrive in the afternoon to report their diagnostic cases and as the workload was small I could sit with them to examine the slides on a teaching microscope. Looking back, I was very lucky to have had this opportunity to learn pathology on a one to one basis from such good teachers.

There were many differences in working practices between the NHS and Ravenscourt Laboratories. The main difference was that the pathologists were the employees of the laboratory and were accountable to the laboratory director. This was in stark contrast to the NHS where, the pathologists effectively ran the laboratory and non-medical staff were answerable to them. I also noted a difference in staff behaviour; in the NHS the lab staff took the work for granted, but in Ravenscourt they were aware that the client had a choice and could take their business elsewhere with resulting loss of revenue and ultimately loss of jobs. There was also a sense of teamwork that was noticeable amongst the staff. Their motivation was fuelled by the desire to do well and the personal satisfaction of a job well-done. Unfortunately in the NHS this element was missing. It is difficult to pin point a single reason for this, but staff stagnation and lack of career prospects were a real issue in the 1980s' NHS.

MOVE BACK TO THE NHS

One negative aspect of working at Ravenscourt Laboratories *was* the monotony of the work. The laboratory did not receive a wide variety of sample types and I felt, in time, I would be de-skilled. I discussed this with the medical head of department. He felt that I had gained valuable experience working in the private sector and encouraged me to apply for a senior post, and try to get back to the NHS. I applied for a senior MLSO post at Charing Cross hospital. At the interview I was verbally offered the post, but after two months I still had not received the written offer which was very disappointing. This was blamed on the inefficiency of HR department. Unfortunately this level of delay still occurs in 21st century NHS.

Meanwhile another more senior position (chief MLSO) was advertised at St. Peter's hospital in Chertsey, Surrey. I discussed this move with a few cytology colleagues'who all unanimously advised against this move as they thought District General hospitals had "backwater" laboratories and I would find the setup extremely boring, particularly as I had worked at the Hammersmith hospital.

I was interviewed by two pathologists, an HR representative, and the senior chief MLSO. During the interview the more senior pathologist took the lead and questioned me extensively on many aspects of cytology. I was honest with my

answers and substantiated them with real examples whenever possible. I did admit my lack of experience in afew areas, and felt later that I may have over-emphasised this aspect. I was called by thesenior chief MLSO offering me the post. The written confirmation arrived a week later. I was now the youngest chief biomedical scientist in cytology at the age of 25.

St. Peter's hospital was a District General hospital, a very different organisation compared to where I had trained. St. Peter's was much smaller in size and immediately felt friendlier than Hammersmith hospital. The labs were designed in a similar way to the Ravenscourt Laboratories, where different pathology disciplines branched off from a central corridor. The laboratories at Hammersmith hospital were poorly designed with different pathology departments scattered throughout the hospital.

The cytology department was quite small compared to today's standards. It had *a* staff of five people and provided a very small diagnostic cytology service. The senior MLSO, who would be my deputy was trained in theUK, but had spent many years working in Australia. I was very happy with this as I knew standards of cytology were high in Australia and she would be an asset.

During the first year I was busy finding my feet in the new role. I felt secure in the job as I felt supported both by technical and medical staff. In the second year I decided to introduce some changes to our practice. I discussed my aspirations for the department with the Head of Department. I wanted to emulate some of the practices that were offered at Hammersmith hospital, such asthe FNA service and involvement of biomedical staff in pre-screening of diagnostic cytology. The Head of Department was very forward thinking and agreed to these ideas. The FNA service was initially offered to the breast surgeon who ran a clinic to assess patients presenting a breast lump once a week. This service was a mirror of the service that was offered at the RPMS. We received very positive comments from the surgeon and the Head of Department agreed to open up this service to other users. We also started pre-screening the diagnostic work. It felt good that in a short time I had been influential in introducing some beneficial service changes.

In this chapter I have briefly reflected on my early life in the midst of Iran's revolution which gave me a taste for challenging the status quo. I have described how important learning is to me and how I have always used every opportunity to develop myself. And finally I have described my introduction to the professional world of cytology, and the lasting impression those early years have had on the direction my professional career would take, which is the subject of the next chapter.

CHAPTER 2 FINDING MY PROFESSIONAL VOICE

OBTAINING A TEACHING POSITION

It was during 1991 that I felt confident enough to get involved professionally. I initially joined the Thames Valley Cytology Society and Southern Cytology Society. These informal educational organisations were established by enthusiastic cytologists to provide educational activities. I attended a few lectures but soon discovered that the educational elements of these meetings were only half the story, and most people who attended were interested in networking. The concept of networking was new to me. I was told by a colleague that I should talk to as many people as possible and try to gather work related information. I found this suggestion very unnatural and insincere. I preferred to make genuine, honest friendships with people. This approach has served me well over the years. Talking to colleagues I discovered that many District General hospitals were indeed “backwaters” with many old practices. I saw the cytology societies as an opportunity to impart knowledge, but my face was still not known amongst the cytology community.

The first opportunity that allowed me to work more closely with cytology societies came in 1991 when I was asked to give a talk to the Southern Cytology Society on setting up a computer system. (see public presentation 1 Appendix 6)

In August 1992 I saw a small advert in the professional monthly journal IBMS Gazette, inviting applications for a part-time lecturing post at Bromley College of Technology. The post was to teach on the IBMS Special examination. This was the same examination that I had completed four years previously in 1998. I had no teaching experience, but I thought that I had a lot of recently acquired knowledge that I could pass on. I went to the local library in search of books on teaching and presentation techniques. I came away with a few books and read extensively to prepare for the interview. I was interviewed by one of the lecturers. I told the lecturer that I had no teaching experience, but I was keen to teach. We quickly formed a rapport and he invited me to join the team of four part time lecturers. My commitment in the first year worked out one day a month which was manageable.

I arrived for my first lecture with amixture of excitement and trepidation. I had given a presentation before, but to stand in front of the class for three hours was entering uncharted territory. My first lecture was on the respiratory tract, which is still one of my favourite subjects. I had decided to cover the syllabus first, but exceed it by including further clinical topics which were not strictly required but I felt they would make the talk more interesting. In those days there were no feedback or evaluation forms, but I asked one of the students for informal feedback at the end of the lecture. It was heartening to hear that she had really enjoyed the lecture. I left very happy and energised knowing that I could teach.

BECOMING A REPRESENTATIVE OF THE BRITISH SOCIETY FOR CLINICAL CYTOLOGY

In 1993 I was invited by the Southern Cytology Committee to be the regional representative to the British Society for Clinical Cytology (BSCC). The BSCC was a medical society established in 1962 to promote the practice of cytology in UK by organising scientific meetings. Its governing body was called a council which met every three months. The council consisted of 10 medical doctors and two token non-medical cytologists. I use the word “token” as it was purely to make the society acceptable to non-medical members. Without non-medical members (who were the majority) scientific meetings were not financially viable.

The role of regional representative was, I felt, not a viable role as the regional representatives were not present in the main meeting. Once the main business of the Council was finished the regional representatives were invited into the room, for a 5 minute feedback. However, this was not taken seriously by many members who would leave during this session. Although I was not satisfied with the role, there were many positive aspects including meeting other regional members and I continued in the role until 1998.

STARTING TO INFLUENCE THE AGENDA OF THE PROFESSION

In 1994 I joined the committee of the Thames Valley Cytology Society. I was soon asked to take up the position of the Meetings Secretary. Although suspicious of the motives, I was prepared to undertake this role. The secretary was responsible for organising meetings including inviting the speakers, trade sponsors, finding the venue, advertising the meetings and sending out the invitations. I felt the workload was disproportionally higher than for other committee members, but I decided to continue it and organised nine meetings in the four years that I held this post. Even today I still question the motive of colleagues who join professional committees but do not contribute to the discussions or running of the committee.

The role introduced me to new colleagues. Most importantly, the role gave me an opportunity to influence the topics presented. I was keen to involve as many non-medical cytologists as possible to present lectures. I was quite successful in this, as the chair of the society was a pathologist and was happy to leave the responsibility to me.

Until 1994 my involvement in the profession was mainly at committee level. Although I enjoyed teaching and had the opportunity to put my name forward to speak at the Thames Valley Cytology Society, I decided to wait and increase my cytological knowledge by attending lectures and reading around the subject. My first formal invitation to present on a purely cytological topic came in the autumn of 1994 when I was invited by the chair of the London Histology Discussion Group to give an hour lecture on the cytology of head and neck. The venue was Guy's hospital, London, and had attracted 150 biomedical scientists. (see public presentation 2 Appendix 6)

MY FIRST TASTE OF POLITICS AND THE MEDIA

During the early 1990s there was a series of high profile laboratory errors that put cervical cytology under the national spotlight (BBC News 1999, 2001) (the Independent 1994, 1998). These errors normally came to light during routine audits of the service or occasionally when a woman presented with cervical cancer. During a routine audit at St.Peter's hospital quality issues were

discovered with one of the cytology staff. The short audit showed that one of the cytologists may have issued too many false negative reports. False negative reports occur when a cytologist fails to detect abnormal cells which are present in the smear. There could be many causes for this, such as loss of concentration when screening, distraction while screening, or poor training.

This was the first time in my career that I felt work related stress. The whole department was affected as we knew we had to take drastic action which would affect everybody. There were no guidelines at the time on how to deal with major incidents in screening. It was only after 11 major incidents that appeared in the national press that the National Health Service Cervical Screening Programme (NHSCSP) produced “a guide about how to manage incidents” (NHSCSP 1999). Until then there was a varied approach to dealing with these major complex incidents.

Once we were certain that there was an issue, the Head of Department and I requested an urgent meeting with the hospital board. The Chief Executive was a forward thinking individual who made a series of suggestions. We had to take some immediate action which included further verification of the errors and further recheck of the smears. We were also concerned about the wellbeing of the cytologist whose work was under review, as the errors were quite likely to make the national news. We arranged for the Human Resources Department to offer the cytologist counselling and other support, and set out to review her work.

The reflective exercise took six months to complete and we identified 228 patients for further testing. Before we could recall a woman for testing, we ensured additional clinics were established and also communicated with the woman’s GP. We had expected the hospital to be contacted directly by anxious women and so we setup a dedicated helpline operated by trained nurses. A press statement was produced that could be provided to the media if required. Approximately two weeks after the invitations had been sent out, we heard through the hospital press office that the local paper, the Surrey Herald, had got hold of the story and it made front page news the following morning. The next evening the BBC ran the story on the 6 and the 9 o’clock news. By then many

women had already attended for testing. Although we had expected this, seeing the name of the hospital mentioned in negative terms was very upsetting. . However we were pleased that very few telephone calls were made to our dedicated hotline, as communication had been very successful. . Many women had already been tested by the time news broke and this had reduced anxiety. No woman was harmed as a result of the delayed diagnosis. We felt that we had handled the process well and could move on positively from this difficult experience.

I believe that due to the measures taken, a very difficult and stressful situation had a positive outcome. I took the opportunity to give a presentation on this topic to colleagues at Ealing hospital (public presentation 3. Appendix 6)

Cervical screening in the UK started in 1960s without any clinical trials to ascertain its risks and benefits. Although a lot of women were screened, there was no reduction in death rates from cervical cancer. One of the reasons stated by experts was that women at greatest risk were not necessarily being tested and the follow up procedures for those being tested positive were insufficient. In 1988 the Department of Health introduced the systemic call and recall of patients. This caused an exponential increase in workload for cytology laboratories. This was however not matched by the increase in the number of staff and other resources. Most laboratories had 12 to 14 weeks backlog of unreported cervical smears.

To remedy the staffing shortage, the Department of Health brought in the grade of Cytology Screener. This grade of staff was employed with basic level of general education (typically O-levels) and after a two year training period they had to sit a competence examination. This was not a long term satisfactory solution as cytology screeners were not remunerated well and there were no career prospects, even though they were involved in the very critical job of reporting smears as negative. In some ways reporting a sample as “negative” should be given the same value as reporting a sample as “abnormal” since a false-negative report removes the opportunity to detect and treat a cervical lesion for several years.

COMPLETING MY MSC

In 1994 I applied to Imperial College, London, to study for a MSc in Clinical Cytotechnology. The course director was the first Professor of Cytology in UK. This comprehensive course in cytology covered all aspects of the discipline including relevant clinical details. The course director demanded very high standards from UK students. I completed the two year part time course in 1996 with distinction.

The course director was so impressed with my achievements that she invited me back to act as an external examiner for the same MSc course from 1997-2000. It was during my visits to Imperial College that the course director suggested that I should stand for the council of the British Society for Clinical Cytology (BSCC), and she would nominate me. My previous experience of attending the BSCC council as a regional representative was not very good. But as a full member I would be present throughout the whole meeting even though I knew I would not have a vote as a non-medical member. I was elected to stand for three years.

Passing the MSc with distinction gave me the confidence to consider expanding my diagnostic role. I asked the Head of Department if I could become involved in reporting abnormal cervical cytology. Ordinarily only medical doctors reported abnormal cervical cytology, however there were rare exceptions. He asked me to find out if this practice occurred elsewhere and develop a proposal. I knew of a senior colleague in Kent who reported cervical cytology. Although he was a biomedical scientist, he referred to himself as clinical scientist. Until 2007 the title of clinical scientist was not a protected title and anyone could use it. He was a very experienced scientist and I felt at the time that I could not fully mimic his practice. I felt a compromise was necessary and suggested to the Head of Department that I should report lower grade abnormality. We jointly prepared a supporting case that was presented to the pathology management. This was supported and I changed my job title to clinical scientist. In contrast to many of my experiences with the medical community, this was extremely positive, as with the support of a pathologist I had taken a large step forward, both in my own career and for the professional development of my discipline.

JOINING THE BSCC COUNCIL AND IBMS SCIENTIFIC ADVISORY PANEL

At the first meeting, I spent most of the time listening and absorbing. I did wonder again after the meeting if it would be worthwhile being *a* member of this society as only one of two non-medical members I would have very little direct influence. However I was curious to see how the BSCC operated. There were great interpersonal differences and clashes between the council members and cytopathologists who were ex-council members. On observation it appeared that council members were all jostling for position. It became apparent that they could never agree on some fundamental issues. This was very disheartening as all the discord and bickering amongst the pathologists would preclude consideration of any alternative innovative ideas and prevented the ability to develop.

In 1999 I heard via a colleague that the IBMS had an opening for a member to join the cytology Scientific Advisory Panel (SAP). The advisory panels were separate from the IBMS main governing body, the IBMS council. The SAPs provided pools of scientific and professional expertise and gave advice to the IBMS council in determining policy. The panels met once every quarter and appeared to have a wide role including representing the IBMS on local, external, national or Government committees and working parties.

This position sounded very attractive and I applied by submitting my CV and a supporting covering letter. I was very pleased to be accepted. I was confident that this would give me the platform to propose and undertake change.
Just after joining the Scientific Advisory Panel (SAP) I was asked to take part in a debate at IBMS congress in Birmingham. The debate was with a senior biomedical scientist from Antrim, Northern Ireland. The title of this debate was "too many qualifications for cytologists" (see public presentation 4 Appendix 6)

MY LAST BSCC COUNCIL MEETING

At my last Council meeting I decided to be controversial and asked the chair if the BSCC would consider biomedical scientists reporting abnormal cervical cytology. This question caused a great commotion amongst the members. I had expected this. I also knew that I would be a lone voice on this issue. The other non-medical member had adopted a non-confrontational stance and would not support me. I was told by the chair that it was only through medical education

that the pathologist could interpret the slides and issues the correct clinical guidance. I argued that cytology was about pattern recognition. I compared cytology to bird watching; one does not need to attend university and obtain a degree in ornithology before being able to call a black-and-white bird with a long tail, a magpie! I did not mean to offend the group with this statement, which sounds derogatory today, but it was a statement from the heart. After a similar reply from another council member, I decided to let the matter rest. It was my last council meeting and I did not want to leave on a low note. I had tested the water.

In fact I did have some pleasure in hearing that in the year 2000, due to a growing shortage of pathologists, the NHSCSP had put pressure on the Royal College of Pathologists (RCPath) to develop an expanded scope of practice for biomedical scientists. It was indeed the same medical colleague who had openly argued with me about the competence of biomedical scientists in reporting abnormal cervical cytology who was now charged with developing the new qualification. The new qualification called the Advanced Specialist Diploma (ASD) in Cervical Cytology was launched in 2001which is still in existence.
During the same meeting I was nominated by the Council to represent the BSCC on a NHSCSP working party to develop a technical quality assurance system for assessment of staining. I was chosen by the council as I had been vocal about poor quality and variability of staining across UK at previous BSCC council meetings.

OBTAINING THE ADVANCED SPECIALIST DIPLOMA

The prospect of a new role being developed for biomedical scientists was very exciting. We were told that due to the imminent shortage of pathologists, the role would be developed within a year. It was difficult to believe the proposed timescale as our previous experience with the NHSCSP showed that changes generally took much longer than initially planned. The new role was called Advanced Biomedical Scientist Practitioner or AP for short. This new role would allow biomedical scientists to report all grades of abnormal cervical cytology. A new grade with an enhanced payroll was established by the Department of Health and details released by a Whitley Council “Advance Letter” (Department

of Health 2001).

The NHS asked the professional bodies IBMS and RCPath to jointly develop the assessment qualification leading to this post. Interestingly rather than working through a committee to develop the qualification, the professional bodies put the onus on two individuals; the IBMS Chief Examiner and a representative from the RCPath. This was a wise decision as within six months the examination would be available for candidates.

To administer the new exam a new examination board (called the Conjoint Examination Board) was established consisting of seven members from the IBMS and seven from the RCPath. The chair of the Examination Board was to rotate every three years and the RCPath would be holding the chair for the first three years.

The initial interest in the examination was from very senior cytologists with lengths of service ranging from 20 to 30 years. Many of these colleagues were already competent as I had argued at the BSCC council some two years earlier. Due to the overwhelming interest in the examination, multiple venues and dates were offered. I applied early and was included in the second sitting of the examination and passed. The pass rate was low. In the first year it reached approximately 55% but over the years has gradually dropped and is currently only 35%.

Becoming IBMS Deputy Chief Examiner

The IBMS soon appointed me an examiner and we gradually managed to recruit cytology examiners to the Conjoint Board. Due to the increase in workload of the Chief Examiner, it was decided to create a new role of Deputy Chief Examiner. This was advertised in the IBMS monthly publication the Gazette, and I and three other members of SAP applied. The Chief Examiner and chair of the SAP made the selection and I was appointed to the post.

This was an extremely positive step forward; biomedical scientists were employed to senior roles in a very short time, and biomedical scientists and

pathologists worked together to deliver the exam. But this honeymoon period suddenly ended – the RCPath issued a guideline to the NHSCSP that an Advanced Practitioner (AP) must always be supervised by two pathologists. This shocking piece of news came without warning. The Advanced Practitioners who were already working in post objected to the IBMS that this statement was derogatory, and due to the nature of microscopy the word "supervision" would be incorrect as APs would be working and reporting on their own. It was argued by biomedical scientists that no one can supervise another person if they are not directly working together. These complaints were ignored. The IBMS did not react to this statement. This was seen by many as a new glass ceiling put in by the RCPath to protect their members.

I was asked by the IBMS SAP to give a talk at the IBMS congress in Birmingham on the role of Advance Practitioner in Cytology. I agreed to the topic, but asked the title to include the words "personal views" as I wanted to remove myself from my employer and the IBMS, just in case the talk became controversial. (see appendix 6 public presentation number 5)

TECHNOLOGY AND SCIENTIFIC DEVELOPMENTS STARTING TO SHOW THEIR IMPACT ON CYTOLOGY

The scientific press were very hopeful that a vaccine for cervical cancer could soon be developed. It was during this time that I was asked by a committee member of Southern Cytology Society to give a presentation to try and predict the future. The title for this talk was "Cytology: A dinosaur facing extinction" (see appendix 6 public presentation number 6). This was a difficult topic as I was predicting the demise of my discipline in not such a distinct future. This presentation was a wake up call for many including myself and prompted the IBMS to ask me to expand further on the future, this time giving solutions to the workforce on how to deal with changes that technology was going to bring about. I was asked to present this at the 2005 IBMS congress. The title of this talk was "Career planning for Cytologists" which I presented jointly with the IBMS Chief examiner. (Appendix 6 public presentation number 7). This presentation was so well received that we were asked to repeat it again in 2006 at Guys hospital for

the Southern Cytology Society.

In the same year I was invited by the Scottish Association for Clinical Cytology to attend their annual meeting in Perth and talk about the role of biomedical scientists in non-gynaecological cytology. With these talks I was beginning to feel that I was influencing the future and could influence the direction that the profession should be taking (see appendix 6 public presentation number 8)

BECOMING IBMS CHIEF EXAMINER

In 2007 I was appointed by the IBMS Council to be the Chief Examiner as the incumbent was retiring from the NHS. I was eager to promote the IBMS non-gynaecological examination. This was the exam that I was responsible for since I became Deputy Chief Examiner. The standard was intentionally kept quite high with a pass rate of 60%. The first opportunity to promote the exam arose a few months later when I was invited to the BSCC spring tutorial in Manchester where I gave a presentation titled “Biomedical Scientist practitioners in non-gynaecological cytology: professional qualification, structure, training and examination format” (see appendix 6 public presentation number 9).

TAKING OVER THE CHAIR OF RCPATH/IBMS CONJOINT EXAMINATION BOARD

The chair of the RCPath/IBMS Examination Board rotates every three years and in 2010 it was the IBMS’s turn, and I became the chair. The Board has seven IBMS and seven RCPath members and is supported by an administrator, an examination officer, and attended by the Deputy Chief Executive officer of IBMS. The Board oversees all matters relating to the two practical examinations, the Advanced Specialist Diploma in Cervical Cytology and the Diploma of Expert Practice in Non-gynaecological cytology. There are a large body of people administrating these two examinations, but when this started in 2001 there was a high demand and many sittings were offered. These days the demand has decreased and the examination is only offered once a year to maximum of 12 candidates.

I was already an experienced examiner having been involved with the examination since 2001 and was fully aware of the politics surrounding them. The first chair of the examination had set a very high standard with the pass rate which was initially 55%, but over the years it had dropped to 35%. The Advanced Specialist Diploma attracted a lot of criticism from within the profession as being elitist. I was fully aware that if the pass rate continued to fall I would have to go to the IBMS examination board and defend the examination process. When I questioned the chair in 2001 about the logic of setting such a high standard, he told me that for this role to be accepted there could not be any mistakes and only the "cream" of biomedical scientists could rise to the challenge. I accepted this thinking at the time, but nine years on I was troubled by the disparity between this examination, and the much simpler cytology examination that the pathologists had to pass.

The pass rate continued at around 35% and as expected I was asked to talk about this at the IBMS Education and Professional Standards Committee. When I analysed the pass rate it became clear that the standard set in 2001 was suitable for the level of experience of candidates at the time. Almost all of them had over 20 years practical experience as cytologists, but over time the new candidates lacked the depth of knowledge that the initial cohort had. Nevertheless it was difficult to defend such a low pass rate for a professional examination.

I was invited by the International Academy of Cytology (IAC) to present a lecture at the 2010 17th International Congress of Cytology held at Edinburgh on "Extending the roles in non-gynae-A UK perspective" (see appendix 6, public presentation number 10). This lecture allowed me to showcase our non-gynaecological practice to a very wide audience that included cytologists from almost every continent.

NEW CHALLENGES

Surrey Pathology Service came into existence in April 2011. This was a merger between three pathology departments; Frimley Park hospital, Royal Surrey County hospital and Ashford and St. Peter's hospitals Foundation Trusts. As a part of this reorganisation a new post of Specialty Lead was created. This post is

normally held by a consultant pathologist, but the person specification was written in a manner that a clinical scientist was eligible to apply for it. There was a precedent for this; a senior clinical scientist was previously a Head of Department in Kent.

I was at a crossroads in my career: I could continue in the current post, but was not certain of my future role in a merged Pathology Department, or apply for the new role which brought new responsibilities. I decided to put my name forward and applied for the post.

I had to prepare a short presentation. The panel consisted of the medical director, the clinical director and a pathologist from Brighton who was acting as an outside observer. The interview lasted over an hour and I left the interview feeling that I was unsuccessful, but received a phone call later that day being offered the job.

The news quickly circulated around the cytology circles and I heard anecdotally that many pathologists in other hospitals were unhappy about my appointment.

The incumbent pathologist who was unsuccessful wrote to RCPath and asked them for support. We heard that the RCPath were producing guidelines on who should be head of a laboratory. The guidelines were produced a few months later. These were very disappointing (see appendix 2). It was not evidence based and had been produced by a group of pathologists for the sole purpose of excluding biomedical scientists from laboratory management. Many biomedical scientists expressed their displeasure about this document.

The chair of the IBMS Scientific Advisory Panel, a highly respected biomedical scientist from Northern Ireland, and myself discussed our course of action over the phone. We felt that our professional body should respond to this document. We made an appointment to see the IBMS Chief Executive Officer for a meeting at the IBMS headquarters in London. When we arrived we were met by the Deputy Chief Executive who informed us that the CEO was not available (we later discovered that she was in her office). We would be having the meeting with

the Deputy instead. We had already emailed the guidance to the IBMS so we knew that they there were fully aware of its contents. We asked that the IBMS challenge this and issue its own guidance. The Deputy CEO told us that the IBMS had a child-parent relationship with the RCPath. I was very surprised. I told her that this may have been the case 50 years ago but we have now surely grown up and this must be an adult-adult relationship. The discussion continued and became quite heated.

That day I concluded that the IBMS was not a professional body and I did not belong to a profession, because of lack of autonomy.

I call this a type of apartheid. In South Africa apartheid there was a system of laws and regulations, the sole purpose of which was to keep Africans in inferior position to the whites. So the whites could have a more prosperous life and living conditions. The foundation of apartheid was that the whites were superior to African, coloureds, and Indians, and the function of it was to entrench white supremacy for ever.

The Royal College of Pathologists were now issuing guidelines to keep pathologists forever in position of power. Black South Africans had the ANC. Biomedical scientists were on their own.

In this chapter I have reflected on conflicts within committees, the role of pathologists verses the biomedical scientists, my role as an examiner, and development of a new qualification. I have also reflected on my early attempts to influence what I consider is my discipline, cytology. In the next chapter I examine my 13 Public Works which, I hope, will support my claim that I have made and continue to make a difference within the professional field of cytology.

CHAPTER 3 MAKING A DIFFERENCE IN THE PROFESSIONAL FIELD OF CYTOLOGY – A REVIEW OF MY PUBLIC WORKS

In chapters 1 and 2, I shared my early experiences and how they have influenced my values, beliefs and learning in the developing field of cytology. I now turn to the public works I have submitted to substantiate my claim to be at the forefront of professional change in this field. There are thirteen publics works in total but in reviewing them I discuss them under five headings which reflect five areas where I consider I have had greatest influence:

Setting the standards and boundaries of cytology
Extending the boundaries of cytology
Extending education to all practitioners
Leadership
Improving diagnosis/saving resources

Further details of my public works including sources are in appendix 5

1 SETTING THE STANDARDS AND BOUNDARIES OF CYTOLOGY

Public work # 1

External quality assessment scheme for the evaluation of Papanicolaou staining in cervical cytology, protocol and standard operating procedures.

This document describes the process of external quality assurance (EQA) which has been influential in improving the quality of staining of cervical samples.

As mentioned previously, cervical screening in the UK started back in 1988 but supporting protocols and procedures were produced on an ad hoc basis, often in reaction to incidents or issues. Even today some 25 years after the inception of the screening programmes, there are still quality issues that have not been

addressed. For example there are still no formal agreements or guidelines on what constitutes an adequate cervical sample.

The cervical screening process involves removing cells from the cervix and staining these before they can be examined under a microscope. The staining process for cervical smears is called the Papanicolaou stain after George Papanicolaou, who in 1942 devised this method.

Although this staining procedure had been available for approximately 60 years, there was great variation in staining quality across the UK. There was anecdotal evidence that poor staining may have been a contributory factor in some screening errors. For a national screening programme lack of quality control and quality assurance at such a fundamental level was problematic. There were some quality assurance schemes around the country but they varied in quality and were developed by enthusiastic cytologists.

The working party formed in 2000 was made up of 12 members who were tasked with writing a document to establish a quality assurance scheme and its associated protocols. The meeting was chaired by the chairman of UK National External Quality Assurance Scheme. The NHSCSP was also represented as well as representatives from the Scottish, Welsh and Northern Irish screening programme. Apart from myself, there were only two other members who had laboratory bench experience; one from the National Association of Cytology (NAC), who had experience of running a scheme in South West of England, and a representative from the IBMS, who was a laboratory manager. There were also two pathologists; one representing the RCPath and the other who had an interest in staining quality. A key member of the group was a statistician from the Department of Health.

As there was no previous documentation, we were starting from a zero base. We agreed at the beginning that the scheme should address the following points:
provide guidance on external assessment of the quality of Papanicolaou staining in cervical cytology samples
establish minimum quality standards for staining

maintain and improve quality by achieving consistent good practice
identify substandard staining quality and the reasons for this and enable remedial action
provide advice and practical help to laboratories
promote education and training through formal feedback
achieve recognition through the appropriate accreditationbodies

This was my first experience of working in a large committee under the auspices of NHSCSP. I felt frustrated by the slowness of the whole process. The document took four years to produce. We met on numerous occasions in Birmingham to go over the same points and, although it was a large group the burden of writing the document fell on the biomedical scientists in the group. We were passionate about the scheme but differed on how we felt that it should be scored. This led to many debates and eventually with the help of the statistician, a compromise was reached and a scoring system devised that took the different views into consideration.

This was my first major publication and it was rewarding to note that it was written solely by biomedical scientists. From a personal perspective I found the constraints of working in a committee very challenging. Theoretically the synergies of many people working towards the same goal should expedite the process but in practice the reverse was true.

This national scheme was to be delivered on a regional basis through the nine regional quality assurance teams. My biomedical scientist colleague and I were also tasked with providing training for the regional scheme organisers. The training initially proved to be a challenge as, although we had written the document, the scheme was not piloted, but our assumption about scoring stainswas proved correct and the scheme was accepted by the nine regions. The aim of the scheme was to introduce consistency of staining amongst UK laboratories. There were almost 200 laboratories in 1994 providing cervical screening. It can be confidently stated that the scheme has been influential in raising and maintaining standards. The scheme has been running for the past nine years and has stood the test of time.

Personal contribution to the public work: I co-wrote the majority of section on the rationale and methodology with another biomedical scientist member and contributed to the general discussion.

Public work # 9

NHS Cervical Screening, National gynaecological cytopathology External Quality Assessment (EQA) scheme annual report

Cervical screening in the UK is highly regulated. Laboratories have to carry out internal quality control and also take part in the mandatory EQA assessment scheme. The external scheme in a nutshell involves sending cervical cytology slides to a laboratory for reporting. Once all the laboratories have completed the slide assessment, the results are analysed and those falling outside the accepted range are identified. The scheme was started in 2003. The full aim of the scheme is to:

provide an external assessment of the quality of reporting of cervical cytology samples

maintain and improve quality by achieving consistent good practice

promote education and training through formal feedback

identify substandard performance and the reasons for this to enable remedial action

respond to participant satisfaction and complaints

achieve recognition through the appropriate accreditation bodies

The EQA achieves the above aims by an independent system of checking participants' performance through an external agency. This external agency is the regional quality assurance office that provides a scheme organiser and an EQA facilitator to run the scheme. The scheme organiser is chair of the Regional EQA Committee and is responsible for ensuring that the scheme follows the national protocol. The scheme organiser contacts participants when persistent poor performance is flagged up by the scheme.

I took over the role of scheme organiser from a senior member of the profession who was in this role for 15 years. He had organised the scheme according to the

national protocol and I did not feel I could make changes to the running of the scheme. However I felt that I could improve the educational element. The scheme provided educational advice through formal feedback on the participants' performance i.e. wait until someone made an error and show them the error. I felt this process really was not adequate and I looked for an opportunity to improve this.

Part of my role was to write an annual report including detailed analysis of the results. The report has a very wide circulation; it is sent to all the participants but also many stake holders including hospital chief executives and the director of the NHSCSP. The report had to follow the national format, which in my opinion was dry and difficult to read. I decided to put my own stamp and on the report by including colour images of slides that proved challenging for the participants in the EQA.

I received good feedback on the new format. Many participants admitted that they had never bothered to read the old report, as it was full of graphs which did not make sense to them but were interested in looking at the images for educational purposes.

Personal contribution to the public work: co-author

Public work # 10

Achievable standards, benchmarks for reporting and criteria for evaluating cervical cytopathology.

This was the second time in my career that I was involved in the NHSCSP. The previous experience (public work no 1) was not good, as the last document took almost four years to produce. This time however I knew there was some urgency as the NHSCSP were about to introduce testing for Human Papilloma Virus (HPV) in April 2012.

I was aware that I would be working in a tense working party as three medical members of the group would have been involved in writing the document the aim of which was to stop a biomedical scientist functioning as head of a laboratory.

This document known as ABC (Achievable standards, Benchmark for reporting and Criteria for evaluating) had been updated twice before and represents probably the most important NHSCSP publication.

The aims of this publication were to:

revise existing guidelines for reporting cervical samples taking into consideration the changes in technology
introduce new terminology
propose new performance indicators
revise guidelines on identifying diagnostic pitfalls which may lead to misdiagnosis

The working party consisted of nine members, three pathologists, and two biomedical scientists including myself, a gynaecologist, a statistician and two executive members from the NHSCSP. I noted immediately that there was a disparity in numbers. Once again the pathologists had managed to gain the majority vote. I had come across the other biomedical scientist before and in my past experience I knew that she would not be vocal if there were contentious issues to discuss.

The work was divided and we agreed to share completed sections by email. The first draft was received and I noted terminology referring to a consultant biomedical scientist as an advanced practitioner, which was an out of date title and now seen by many as a derogatory title. I pointed this out to my biomedical scientist colleague and to my surprise she answered “that she was not bothered about a name as long she was paid adequately”. I pointed out to her that it was our responsibility as biomedical scientists to represent our profession.
We agreed that she would email the group and request a name change.
We met on another occasion but the rest of discussions were carried out as a teleconference. This was very unsatisfactory for discussing such a complicated document. I felt the NHSCSP were only interested in meeting the deadline of April 2012. In keeping with good NHS tradition the document was published in January 2013.The delay in publication received a lot of criticism from colleagues.

I fully sympathised with them; the document was rushed through to meet a deadline which was not adhered to.

The final review, in my opinion, was very disappointing. It was quite evident that it was written by multiple authors. My experience of editing the Cytopathology book (Public work # 7)taught me a valuable lesson, that a book written by multiple authors should have the same style throughout and this document was far from it. The section on statistics was particularly dry.

Another worrying feature of the final draft was the insertion of comments that were clearly written to limit the practice of biomedical scientists in cervical cytology. I brought these to the attention of the chair. He disagreed with the majority of my suggestions, became irritated and told me that he was taking chair's action.

Professionally this is an important document. Although I am very critical of its wording regarding the biomedical scientist, nevertheless the document does have an important quality agenda. Personally, it was a difficult project to be involved with. I was representing my profession and could not stand by and see pathologists come out totally in control and dictating the agenda.

Personal contribution to the public work: contributed to writing and made suggestions to ensure biomedical scientists views were fully represented in the project.

2 EXTENDING THE BOUNDARIES OF CYTOLOGY

Public work #5

Effectiveness of endobronchial ultrasound (EBUS) in obtaining mediastinal lymph node samples for immuno-histochemistry at a new district general hospital (DGH) service (poster presentation)

Endo-bronchial ultrasound guided bronchoscopy (EBUS) is a relatively new procedure used in the diagnosis of lung cancer, infections, and other diseases affecting the lymph nodes in the chest. Since the EBUS does not require

invasive surgery, recovery time is greatly reduced, therefore enabling aggressive treatment to begin sooner than traditionally prescribed.

The procedure is carried out under local anaesthetic and a mild sedative. Although the procedure is safe, it is uncomfortable for the patients and causes coughing. Repeat sampling may also cause bleeding and bruising. It is therefore important to shorten the procedure as much as possible and limit the number of biopsies taken. On-site cytology examination of the samples under a microscope can provide a provisional diagnosis during the EBUS procedure, allowing its termination when adequate material is obtained.

This service was introduced at St. Peter's Hospital following the recruitment of an experienced respiratory physician who had experience of this technique. During a casual meeting he asked me if I was willing to support him during the procedure. We already provided on-site assessment of fine need aspirations (FNAs) to clinicians in outpatient clinics, so this was an extension of an existing practice. I asked colleagues around the country if this service was provided in their hospitals. It appeared that it was only provided in a few centres in UK and supported by pathologists (Central Manchester University hospitals 2011). I was eager to show that adequately trained and competent scientists could provide this service. I decided from early on that for a service to be sustainable, it had to be provided by other biomedical scientists, and asked one of the senior biomedical scientists to shadow me. Initially the senior biomedical scientist was providing technical assistance but wassoon offering the on-site assessment.

Over a period of six months we first showed that it was practical to provide on-site assessment, and also there was a correlation between the rapid assessment and the final cytology result. The next step was to look at the impact on patient management. We analysed the results of the first 15 patients and this showed that the new EBUS service was highly effective, obtaining diagnostic material for further testing, and we could differentiate cancer types accurately. The sensitivity was 90%, but more importantly the technique was 100% specific. In many cases we had saved the patient from undergoing further more invasive diagnostic tests.

The poster was presented at European Respiratory Society (ERS) in Barcelona and was well received. It showed that biomedical scientists could safely and competently carry out this task. This project gave me the confidence to explore other areas where application of simple ideas would be of great value to the clinician and the patient.

I promoted our service at every opportunity to biomedical scientist colleagues. But I was dismayed to hear that Manchester Cytology training school who were organising a training course on EBUS, actively excluded biomedical scientists from the course. This was a very disappointing development, particularly after such a close cooperation and positive working relationship with my respiratory colleague.

Personal contribution to the public work: provided the cytology data and contributed to writing the introduction and the final conclusion.

Public work # 6

Does immediate cytological analysis at bronchoscopy lead to reduced number of biopsies? (poster presentation)

After our success in establishing an on-site assessment service for the EBUS procedure, I discussed the idea of extending this service to routine bronchoscopy service with the consultant respiratory physician.
Bronchoscopy is a safe procedure, but occasionally when taking biopsies, bleeding can occur and is desirable to minimise the number of biopsies. The British Thoracic Society guidelines (2001) for diagnostic flexible bronchoscopy in adults are currently under review. The guidelines highlight the importance of taking five endobronchial biopsies to optimise the diagnostic yield. We decided to investigate if this number of biopsies was really necessary if immediate on-site assessment of biopsy was available. Again this is a very simple concept; after the biopsy is taken it is placed on the glass slides where a few cells adhere to the glass. The cytological preparation is rapidly stained and examined under the microscope and immediate feedback is given to the bronchoscopes.

We started the service in March 2010 and reviewed the first 14 patients to see

how many biopsies tended to be first pass positive and how many biopsies in total were taken per patient. We found that the availability of an on-site cytologist within the bronchoscopy room led to a significant reduction in the number of biopsies performed without detriment to diagnostic rate or further testing, and thus minimising complications.

The poster was presented in 2011 at the Amsterdam European Respiratory Society. This simple initiative has had a direct benefit for the patient as it has reduced the number of biopsy samples at Ashford and St.Peter's hospital. We have widely publicised this new initiative as we feel it has a real benefit for the patient. We also showed that a biomedical scientist can safely deliver this service. I wrote extensively on role of biomedical scientist on assessing sample adequacy in the book (Shambayati 2011) that I edited. I also mention this when I lecture, as I see the change must come from the ground. It will take some time to bring this practice into routine use across the country but I have received enquiries from colleagues on the feasibility and the methodology.

Personal contribution to the public work: provided the cytology data and contributed to writing the introduction and the final conclusion.

3 EXTENDING EDUCATION TO ALL PRACTITIONERS

Public work # 7

Cytopathology

This project took four years to complete and represents my main public work on Cytology.

In December 2007 I received a call from the PA to the deputy chief executive of the IBMS, who had requested a meeting to discuss a project. When I went to the IBMS offices in London I had no idea what to expect. I was told that they have been approached by Oxford University Press (OUP) to collaborate on producing a book series on biomedical science, and asked me if I was interested in writing

it.

A few weeks later I received a call from the OUP Editor in Chief for Higher Education for a meeting in London. I informed him that I had never written a textbook before and although I thought I knew my cytology I would need his support. He was very reassuring and told me that, except for one author, others had no experience of writing a text book either.

At the first meeting he welcomed the group and referred to us as “experts” in our fields selected by the IBMS. These nine experts were either IBMS chief examiners or university lecturers in biomedical sciences. The editor introduced the project and informed the group that there was a gap in the undergraduate textbook market. The book series would consist of nine stand alone text books covering the following series:

- Biology of disease
- Immunology
- Clinical biochemistry
- Medical microbiology
- Transfusion science
- Haematology
- Cytopathology
- Histopathology
- Lab and professional practice

He thought the book would appeal to second and third year undergraduates. I expressed concerns with this approach as over the years the number of undergraduate had dropped, as laboratory consolidations were leading to fewer trainee positions. I told the group that this would lead to very limited sales. I told the editor that there were certainly no new UK textbook in cytology aimed at practitioners in the field. I suggested that the book could be aimed at undergraduates but also written in a format to be useful to practitioners in the field. Writing such a book could be difficult, but I explained that if we explained new “jargon” either in the text or alongside the text, the undergraduates should

not be overwhelmed by sheer amount of information.

We then discussed the book format. The editor initially showed us a toxicology book that he had recently produced. When I thumbed through this book it looked old in style and was in black and white, which I thought was not suitable for cytology. I expressed my concerns about lack of colour. The editor showed another book which was in two colours, the text and figures were in black and tables and some artwork in blue. Although the biochemists and immunologists in the group were happy with two colours, I still felt that for cytology I needed full colour. The editor checked with his production manager and confirmed that the book could be produced in colour particularly for a subject such as cytology as this is very visual.I spoke to other authors and we all felt that this was a great opportunity for biomedical scientists to write a new textbook.

The next task was the subject of authorship. The editor allowed the group to decide how we chose to write the book. He said it was easier for OUP to deal with a single author, but equally he was open to suggestions from the group. The haematology expert in the group was in favour of a multi-author textbook. I said that I could write it on my own but I also enjoyed working with other people, and probably write the majority of the chapters but invite colleagues to write other chapters.

I left the meeting feeling vitalised and hopeful for the future. My next task was to provide the OUP with a list of chapter outlines and contributors.

Before I wrote to the OUP I decided to do extensive research. I went to the hospital library and requested a dozen recently produced texts in cytology. Many of these were American; I noted that the last UK publication that included biomedical scientists as authors was Clinical Cytotechnology (Colman and Chapman 1989). This book included many pathologists as authors. I was keen to produce a book written by biomedical scientists, but the question was whether I could select a group of biomedical scientists who had enough experience, but also could write coherently to give credibility to the book.

This was more of a challenge than I had envisaged. I drew together a provisional list of 14 chapters with indicative contents covering the topics that I thought were most relevant to current cytology practice in the UK:

- Introduction
- The cervical screening process
- Normal cervical cytology
- Abnormal cervical cytology
- Management issues in cervical screening
- Diagnostic cytopathology
- Lower respiratory tract cytology
- Urinary tract cytology
- Serous fluids and peritoneal washings
- Fine needle aspiration Cytology
- Andrology
- Management in cellular pathology
- Techniques in cytopathology
- Future trends in cytopathology

The book outline was sent to the OUP who forwarded it to two external reviewers. The reviews were favourable.

The next task was selecting the authors. I wrote various names against chapters. Although some were high profile colleagues in cytology I had not seen any written material by them. I decided to write four of the chapters on my own and co-write one with a colleague. The other eight chapters I divided between five authors.

After a few days I had completed my list and contacted everyone. I was pleased to find that everyone was keen. This was not surprising, since in my experience, initial interest did not always produce results. Once I had their agreement I wrote to OUP and provided their contact details so contracts could be issued. I asked OUP to give the authors a deadline of one year for the first draft of their chapter.

Once I received confirmation that contracts were issued I wrote to all the authors and provided them with overview of the book, chapter contents, style sheet and features to include in each chapter.

On reflection I should have done this differently. I should have organised a one off meeting with all the authors so we could brainstorm and form ideas. This may have speeded up the project by one year and had avoided some of the difficulties I encountered with the style later in the project.

I maintained contact with the authors and I set out to write my own chapters so I could provide the authors with a completed example. I started with the chapter on urine cytology as I thought this was the easiest. Writing was not easy and it took over three months to write 10,000 words. Once I finished the chapter I sent it to a colleague for comments. He was a technical writer and taught technical writing at university. He was very critical of the first draft. He thought it was full of jargon as if I had written the text for experts rather than students. I had fallen into the trap that I was trying to avoid; hiding behind the jargon to avoid writing and explaining the topic.

I sent the chapter with my colleagues comments to the editor. He largely agreed with them. This was disappointing. As the editor I could not practice what I preached. I decided to go back to a plain piece of paper and start again.

The second draft also took three months to write. I followed the chapter format, fully utilised the key term feature to explain the newly introduced terms, and ensured that it was written in conversational style. My colleague received the second draft more positively. This time he only commented on grammatical issues. Once I had made the changes I emailed the editor for his comments. He was happy with the draft and I decided to share this with all the authors. I wanted to make sure all the authors had access to each other's material. For this I used the Microsoft SkyDrive and created individual folders for each chapter on the web, and gave open access to all the authors.

In 2010 I was ready to submit all the chapters and associated files to OUP so we

could go to production. I was told it would take approximately one year to produce the book from the time I submitted the files.

My role as the editor had not finished at this stage as I had to answer all queries of the copy editor regarding the positioning of the figures and provide any missing materials. The last step was to proof read the chapters and make corrections before the book went to print.

The book was printed in February 2011. It is difficult to describe the feeling of holding the book in my hand. The book culminated probably close to 3 hours of work per day for two years which was done in my own time. It made me feel that all the personal sacrifices were worth the effort.

Editing and writing this book gave me invaluable experience. Before I started writing, I read around the subject extensively. I read a large number of textbooks which greatly improved my knowledge of diagnostic cytology. I was pleased to have learned the art of editing. As an editor I had to critique other colleagues work, add and remove text, and review, whilst remaining very objective.

I thought my work as the editor was completed when the book was finally published, but soon I was contacted by OUP as they needed my input to develop an online resource for the book. I was concerned about having to do more work on this project so soon after publication, but when I was approached by a colleague from London Metropolitan University I felt it difficult to turn down his offer of collaboration.

The online resource was mainly aimed at undergraduates who had no experience of laboratory environment to help them better grasp the subject. It comprised:

- an interactive digital microscope with case studies to further demonstrate points made in the chapter
- video interviews with practising biomedical scientists
  - Interview with a consultant clinical cytologist
  - Interview with a biomedical scientist

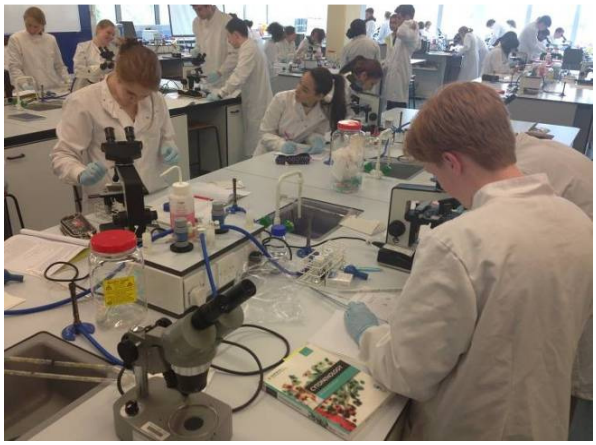
- videos of key practical techniques to introduce the student to the practical aspects of cytology
  • processing a bloody sample
  • processing a urine sample
  • processing a cytology sample

http://global.oup.com/uk/orc/biosciences/biomed/shambayati/

Once we agreed to the content, we met on a number of occasions to complete the work. I was fortunate that one of our recently qualified biomedical scientists was willing to help us with technical videos.

The book was welcomed by biomedical scientists. It has been an Amazon.co.uk bestseller in the cytology section on a number of occasions. See below for academic reviews and appendix 7 for some of Amazon.co.uk reviews. The response from pathologists has been somewhat muted. I heard indirectly that colleagues had heard a pathologist commented that “he could not believe the quality of the book”.

For me the greatest pleasure is seeing the book in use. Pictures below were taken a week apart in April 2013; the first picture shows undergraduate students using the book during a practical session. The second picture was taken a week later at a cytology course at the East Pennine Cytology Training school and shows practitioners in cytology using the book.



Cytopathology reviews

Academic reviews

Clearly written, factual and concise
Dr Patricia Gadsdon, School of Biological Sciences, Bangor University.

The flow of information is excellent and the text is well written… a good introductory text for undergraduate with an interest in cytology and for professionals in training.
Dr Lesley Walton, School of Bimolecular Science, Liverpool John Moores University

Lucid, logical coverage of material, set out thoughtfully and supported by good illustrations and learning features that make the text student-friendly... a very useful undergraduate cytopathology textbook.- Dr Nicholas Vardaxis, Endeavour College of Natural Health

I would definitely recommend this book to anyone." - Jermin Simon, student, DeMontfort University

Please see appendix 7 for some of Amazon.co.uk reviews.

Personal contribution to the public work: Involved from the inception of this project. Wrote four chapters, co-wrote a chapter and edited all the chapters.

Public work # 8

Self assessment in lower respiratory tract cytology

Diagnostic Histopathology is a review journal aimed at practising diagnostic pathologists and trainee pathologists with invited reviews on histopathology and cytology.

I was invited by a consultant cytopathology at Royal Liverpool hospital to write this educational self-assessment on respiratory cytology. I felt this was a very positive gesture that a consultant pathologist had recognised my knowledge of the subject and had put my name forward to write for a medical journal. As far as I know this is the first educational article written by a non-medical cytologist in this journal.

I produced three case studies for the self-assessment. The answers to the case studies were revealed at the end of the article. The format that I followed was very similar to the case studies that I had written only a short time ago for the OUP Cytopathology textbook. The level of detail was also very similar. I was interested to find out if the editor of the journal would ask me to vary the format, but I was told that the article was accepted without any changes.
I received a one year subscription to the journal, which contributed to my continuing professional development.

Personal contribution to the public work: author

Public work #13

Scientific Training Programme learning guide in cytopathology

I was invited in 2012 to co-author the cytopathology section of the learning guides for the newly developed Modernising Scientific Careers (MSC).

MSC is a UK wide government initiative led by the UK Chief Scientific Officer to address the training and education of healthcare scientists in the NHS. The idea is to standardise training for 50,000 plus healthcare scientist in UK. The process began in 2008. The final policy document was published in February 2010 in the document Modernising Scientific Careers: "The UK way forward" (Department of Health 2010).

The document outlined the goals of the MSC:

- meet future service needs by ensuring scientific and technological advances are incorporated into emerging models of integrated care
- provide an improved approach to workforce planning and development of an appropriate skill mix
- bring the education and training of the healthcare science workforce more into line with that of other healthcare professionals;
- create clear career pathways and education and training programmes in a common framework for the whole of the scientific workforce
- ensure the focus in education and training programmes is on training and enhancing the training experience rather than on trainees being required to deliver service
- include greater flexibility in skill and knowledge development in initial training, rather than an emphasis on extensive uni-disciplinary experience
-

The proposal had overall broad support. However it had a very tepid response from the IBMS who felt that the MSC will ultimately damage its membership base. In 2010 the IBMS issued a statement (IBMS 2010) stating its concerns over the structure of the MSC project for biomedical scientists. It felt that biomedical scientists belonged to a mature regulated profession with a defined

educational pathway that produced individuals fit for purpose. The IBMS felt that the MSC would lead to service destabilisation if the IBMS career structure is dismantled.

This was quite typical of what had occurred over the years from the IBMS, being reactive rather than being proactive and trying to shape the future. The IBMS Chief Executive at the time told me that the MSC would fail and we should not worry about it. The main concern of the IBMS was that the new structure did not take into account any of the established IBMS examination pathways, including the IBMS accredited degrees. The new structure included four career levels as outlined below:

- Associate /Assistant

The grade would be similar to the current Medical Laboratory Assistant (MLA) grade, but would include formal training. Assistants and associates would be supervised and undertake task based roles. The associates would undertake more complex laboratory tasks.

- Practitioner Training Programme (PTP) – undergraduate level

This 3 year BSc (Hons) integrates academic and workplace based elements. This would be equivalent to the current basic grade and specialist grade biomedical scientist grade. It would allow progression to the scientist training programme.

- Scientist Training Programme (STP) – postgraduate entry, pre-registration training

This 3 year workplace-based programme would require part time attendance at a university to obtain an MSc. This grade would be equivalent to the current clinical scientist grade.

- Higher Specialist Scientific Training (HSST) – doctorate level

This is a 4/5 year work based training programme similar to the medical consultant training, leading to medical college examinations where these exist, and a doctoral award. This grade currently does not formally exist in the UK.

I saw the MSC as a great opportunity for the biomedical scientist profession to progress and possibly develop into a new profession. I was however under no

illusion that the HSST would not be supported by the RCPath and they saw this grade of staff as a direct challenge to their own profession.

In September 2012 I received a personal invitation from the chair for the Cellular Science Board, to join the National School of Healthcare Science (NSHCS) to represent the NHS South. The NSHCS was setup as part of the MSC programme to oversee the delivering of the training, overseeing a national system of assessment and general co-ordination of the training programmes.

The NSHCS could be described as a virtual school as all the assessments are carried out online. The assessments take many different forms but all are recorded on an Online Learning and Assessment Tool. This allows the school to monitor the progress of the trainees.

I was asked by the Head of School to co-author the cytopathology section of the learning guides, I saw this as an opportunity to shape the future. I discussed our approach with a colleague who had agreed to co-author the section. I told him that I believed this was a unique opportunity and we must push the boundaries to show that a STP trainee is clearly different to a biomedical scientist. We both agreed that there was more scope in the diagnostic cytology section of the learning guide, as cervical cytology was heavily regulated and we may encounter resistance from the NHSCSP.

I had previously worked with this colleague as he was one of the authors of the OUP Cytopathology book. I was familiar with his strengths and weakness and was confident that we could complete the task as soon as possible. Our work was accepted without any editing.

It is too early to say if this piece of work has had the desired impact, as the trainees are still in the process of completing their training. The first cohort will finish in 2014 and this would be the ideal opportunity to receive feedback from employers, training officers and trainees.

Personal contribution to the public work: wrote the diagnostic cytology sectionof the guide and contributed to the section on cervical cytology

Public work # 2

Institute of Biomedical Science (IBMS) record of laboratory training for the Specialist Diploma in Cytopathology.

I was invited in 2005 by the IBMS Chief Examiner, to co-author this document. She was an experienced cytologist, but had not practiced cytology for some time as her career path had taken her away from the microscope to quality assurance. Her past experience was also limited to the field of cervical cytology therefore my expertise in diagnostic cytology was required.

The IBMS specialist diplomas are aimed at newly qualified biomedical scientists who develop a portfolio to evidence their training, practical skills and their competency in the first two years after registration. Prior to the creation of this document there was no other means of assessing or proving competency of newly qualified biomedical scientists. Many employers have since used this benchmark when considering promotion to the grade of specialist biomedical scientist. The attainment of Specialist Portfolio permits the newly qualified biomedical scientist to progress up the membership class and become a member. The relationship of Specialist Portfolio to other IBMS qualification structure is shown in the table below:

Examination	Membership class	Notes
Higher Specialist Diploma	Fellow	Five years of professiona experience and attainmer of Higher Specialist Diplo
Specialist Diploma	Member	After two years experienc and attainment of Special Diploma
BSc (Hons) and attainme of certificate of competen to enable registration	Licentiate	Entry to the profession
Whilst studying for a BSc	Student	

Our remit was to write the portfolio so the following learning points could be demonstrated by a newly qualified biomedical scientist:

- knowledge of complex scientific and technical aspects of their discipline
- procedures for handling specimens before, during and after analysis
- maintenance of routine equipment
- manipulation of simple data
- awareness of quality control/assurance procedures
- knowledge of the scientific basis of the laboratory tests and the disease process under investigation

This was my first piece of work for the IBMS as the Deputy Chief Examiner. I was keen to make a positive impact. Due to variation in laboratory practice in UK, it was difficult to write a specialist portfolio to encompass all the tasks. I decided to focus on a range of work performed by most routine laboratories in UK, and included tasks such as diagnostic cytology to give a strong message to employers that they needed to provide training and development for their staff. I purposely included elements of works such as screening of diagnostic cytology samples that in many hospitals was only carried out by pathologists.

The portfolio has been updated twice and is now in the third edition. Consolidation of laboratories, which has occurred in the past three years, will most likely change the nature of future cytology laboratories, and a specialist portfolio may need to be rewritten completely to consider these changes.

I asked for verbal feedback from post registration biomedical scientists who have completed the portfolio. They all felt that the portfolio gave them a clear direction for training. It also helped the training officers in the department to design a training package. The feedback on the format was generally positive, especially the reflective reviews at the end of each section. The completion of the portfolio has given confidence to many to continue with in-service education and pursue the IBMS Higher Specialist Diploma. The major criticism was that it was too time consuming, particularly in the new NHS where limited time is available for in-service education.

Personal contribution to the public work: wrote the diagnostic cytology section of the guide and contributed to the section on cervical cytology

Public work # 4

Using Lean to lead change (poster presentation)

In 2009 I saw an advert for a Department of Health sponsored leadership programme titled “Influencing the future-a leadership programme for senior scientists”. This was delivered by Phoenix Consultancy, a leadership and development consultancy based in the US. I applied for the programme and was interviewed by the president. She said that they were looking for people who were willing to make changes to the health service. I was asked if I could commit to their schedule as attendance at the whole programme including the five residential days was mandatory. It was also mandatory to take part in a service improvement project. I confirmed my commitment and also agreed to a project. I was accepted on the programme.

My project was to test if “Lean” methodology could be used to bring in culture change. Lean is used extensively in the NHS. Lean is an improvement approach to facilitate work flow and eliminate waste. It was initially developed by car manufacturer Toyota. Lean is about minimising waste. For it to be successful participants need to be flexible and open to change. I wanted to explore if the concept could be used to be applied not just to improving the process but also to improve staff morale.

I read extensively around the subject of staff motivation. There were theories that suggested staff involvement in projects contributed to increase in their motivation.

In 2008 I applied for the laboratory to take part in a project sponsored by the NHS Improvement. The NHS Improvement was one of many NHS quangos (quasi-autonomous national governmental organisations) that was axed by the Health Secretary in 2010 to save money. Prior to its closure it worked with ten cytology laboratories to improve the turnaround time of cervical smear results. The project was called “achieving a 14 day turnaround time in cytology”. The background to this project was the 2006 Review of Pathology Services in

England by Lord Carter (Department of Health 2006). He recognised Lean as the method of choice for improving processes in pathology services.

I was chosen as the local clinical lead and asked to bring together a multi-disciplinary team of all parties involved in cervical screening to work together collaboratively. These included colleagues from the primary care agency who wrote to the patient with the invitation letter and results, the practice nurse taking the smear, and the laboratory staff. I purposely included many relatively junior laboratory staff in the project as I wanted their involvement in ideas to change practice. I noted that other clinical leads had chosen higher numbers of senior staff in their teams.

The project involved attending three residential workshops where we were trained on Lean methodology. I noted that there was some overlap between the Lean and leadership principles in terms of involving staff in the decision making:

Some leadership principles (Kouzes and Posner 2008):

- Challenge the system (openly challenge the status quo, experiment and take risks)
- Inspire shared vision (values and beliefs)
- Align constituencies (involve outsiders, informal structure, encourage goals)
- Encourage the heart (trust others to act, encourage experiments, celebrate achievements)

Some Lean principles (Liker 2004):

- Empower staff to make changes
- Daily meeting to problem solve
- Visual management to aid communication
- Information/data to support the process
-

The aim of the project was to improve turnaround time of smears, but I was keen to see if staff morale could be improved by their involvement in a project which promised to bring tangible changes to turnaround times of cytology results.

To access the impact of the project on the team morale, a short survey was designed. A simple rating scale of 1 to 5 was used (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree and 5= strongly agree). The table below shows the result of the survey which was given to staff at the beginning of the project and the same survey repeated towards the end. Although the survey results was not scientifically analysed it showed a modest improvement in some of the responses, and considerable improvement to the question asking aboutmorale.

Survey Questions	**October 2008**	**July 2009**
I am clear what my duties and responsibilities are	4.2	4.3
I can cope with my workload and what is expected of me	3.9	4.4
I have everything I need to do my job	3.7	4.2
My work is interesting	4.1	4.2
I get help and support I need from colleagues	2.9	3.4
My opinions really seem to count with my manager and colleagues	2.9	3.4
There are opportunities to learn and develop	3.9	3.8
I am listened to	2.9	3.6
I feel valued	2.8	3.4
I am empowered to make changes in my work environment	2.8	3.4
I feel valued	2.8	3.4
I am empowered to make changes in my work environment	2.8	3.4
I am consulted and I know what is going on	2.8	3.4
Since the project started in my morale improved Yes No	12.5%` 87.5%	63% 37%

Our team redesigned the service and delivered significant improvement in productivity. We cut out waste from the process whenever possible, and comparison of data in March 2010 showed that we provided the fastest turnaround of smear results amongst the ten laboratories in South East Coast region.

The whole team learned a lot from this project. It noticeably boosted interpersonal relationships amongst team members. The effect of the project was long lasting and team members took pride in telling colleagues from other laboratories about their achievements.

I presented my poster at the graduation meeting of the NHS leadership programme “Influencing the Future” in July 2010 and was awarded the prize for best presentation

The project helped me to further to develop my leadership style. I felt that a democratic leadership style was effective in that scenario.

Personal contribution to the public work: author

5 IMPROVING DIAGNOSIS AND SAVING RESOURCES

Public work # 3

Collection fluid helps preservation in voided urine cytology

This paper following on from a MSc project that I supervised was published in a peer review journal, has a quality theme. I was keen to improve the quality of urine cytology samples.

A urine sample is one of the commonest sample types received in cytology laboratories. It is often used for diagnosis of bladder cancer, but it may also detect kidney cancer and cancer of the ureter. If abnormal or cancerous cells are detected most patients undergo a cystoscopy (fibre optic tube with a camera for examination of urinary tract).

The Achilles heel of cytology is an “unsatisfactory” or an “inadequate” cytology report. In these cases a result cannot be issued and the test has to be repeated. Unsatisfactory samples in urine cytology are common. In a recent publication 2.3% of samples were classed as inadequate (Mishriki SF et al 2013). This is usually due to the nature of the chemicals present in the urine. Degeneration and contamination can lead to false negatives and false positives in diagnosis, and so their prevention should improve cytological assessment. This fact has been known for many years but the cytology community are generally slow to take action to remedy issues. I was aware of this problem when I started my career in cytology and now some 21 years later we are still receiving unfixed urine samples (unfixed means without a preservative solution to slow down cell breakdown).

The opportunity to make a positive change came when I was asked by one of my cytology colleagues, who was studying for an MSc, to suggest and supervise her project.

Generally funding for MSc projects in the NHS is very low and supervisors struggle to develop a project that would satisfy the university regulations and can be funded from the pathology budget. The project I had in mind was to scientifically assess the effect of a variety of commercially available fixatives (preservative) on the market. There was anecdotal evidence that these worked, but to change practice I felt an evidence based approach was more effective.

I discussed the issue of inadequate urine results with one of my consultant urologist colleagues. He also agreed that an inadequate report was a waste of resources and we needed to reduce the numbers if possible. My colleague agreed to discuss this with three other colleagues who used our service. This also involved communication with at least seven urology nurses who were in charge of obtaining urine samples. To reduce the cost we asked the manufactures to sponsor the project by donating pots of their fixatives, but told them this would be the limit of their involvement.

Once all parties agreed to take part we provided the clinics with four different pots. One pot was empty to mimic the routine practice, and three contained fixative collection fluid. The urine sample was divided by the nurses once the patient had produced the urine. The pots were sent to the laboratory and processed in the same way. The slides were assessed for the level of degeneration by two biomedical scientists in a blind trial (without knowing the type of collection fluid used for each slide). Ten cellular features were chosen for assessment and these were tabulated. We discussed our project with a statistician who suggested a ranking system for each patient's sample. The scores for each sample were ranked and these values were compared against one another using Friedman's test (a statistical test for comparing sample characteristics).

The statistics showed a significant diagnostic difference between the routine method and the three collection fluids. This meant that the preservation had been effective. No significant difference between the three collection fluids was found as all three preserved equally well.

We discussed our findings with the users and we all agreed use of fixative to collect urine samples. To facilitate this we asked a manufacturer to prepare adequately labelled pots and distributed this to the users.

As this would benefit all cytology labs, we decided to promote our findings. In September 2009 the first author presented this paper at the bi-annual IBMS meeting in Birmingham. The message was clear; that the use of fixative would reduce the number of inadequate samples, inconvenience for the patients, and in delay in diagnosis. The other important message was that fixatives increased the sensitivity of the urine test.

This was an innovative project with a very low set up cost which has benefited the patients, the requesting doctors and the laboratory. Personally I learned a great deal from this small project. It was my first experience of supervising a MSc project. I learned that for a successful MSc project it must have a well-defined goal that is realistic given the time available to the students. I have since

supervised two other projects and applied the learning.

Personal contribution to the public work: Initiated the project and provided supervision throughout. Contributed to the introduction and the conclusion.

Public work #11"Mesothelioma diagnosis in a district general hospital" (poster presentation)

Public work #12"Retrospective audit of malignant mesothelioma diagnosis in a District General Hospital" (poster presentation)

The public works 11 and 12 are very similar in theme; therefore I will discuss them together.

Malignant mesothelioma is a rare cancer affecting cells of the mesothelium, the cells which cover many internal organs of the body. Diagnosis can be suspected from radiological appearance but must be confirmed either by examining serous effusion cytology (fluid accumulated around the lungs) or with a biopsy (removing a small piece of tissue for histological diagnosis). Sometimes a thoracoscopy (endoscopy procedure to examine the pleura and take larger biopsies) is needed.

Cytology is the least invasive method of obtaining a diagnosis, but sometimes cellular features can quite subtle and differentiating cancer cells from normal cells is not possible. We have noticed this many times when diagnosis of mesothelioma is confirmed by other means such as a biopsy, and when we retrospectively examine the cytological slides.

The problem with a rare disease such as mesothelioma is that cytologists tends to lose diagnostic competence, as they may only come across this condition once a month or so. To avoid this I made extra cytological preparations and examine these periodically to remind myself of the cytological changes. This proved to be a very useful tool, and I still use this method to maintain competence.

I had anecdotal evidence that we had improved our cytological diagnosis. To

prove this we analysed the effectiveness of various diagnostic modalities including pleural fluid cytology, ultrasound guided biopsy and thoracoscopically guided pleural biopsy between 2007 and 2011.

There were 55 patients in our study period that were diagnosed with malignant mesothelioma. Of the 33 patients that had fluid examined by cytology 17 (51%) had the disease diagnosed via cytology. Other patients were diagnosed using combination of biopsy or biopsies obtained via thoracoscopy. However it was interesting to note that that cytological diagnosis had improved year by year from 2007. In 2007 just over 20% were diagnosed by cytology, this figure rose to 38% in 2008, 42% in 2009, 58% in 2010, and 80% in 2011. The study numbers are probably too small to be scientifically significant, but it confirms our anecdotal evidence that our cytology diagnosis had improved by applying newly learned techniques.

Service improvement has motivated me over the years to improve the cytology service at Ashford and St.Peter's hospitals. This project showed that we had indeed improved our diagnosis of malignant mesothelioma and thusavoid the need for the majority of patients to undergo more invasive testing.

The result of this study was presented as posters and presented at two scientific conferences and from the questions asked during the presentation it showed there was genuine interest from the participants in the result of our study.

Personal contribution to the public work: provided the cytology data and contributed to the writing the introduction and the final conclusion.

This completes my review of my public works to support my claim of making a difference in my profession. In the final two chapters I reflect on what it means to be a professional, how cytology measures up as a profession and how what I have learned through this account has changed me and my profession

CHAPTER 4 WHY IS BIOMEDICAL SCIENCE A PROFESSION AND HOW HAVE I HELPED IT BECOME ONE

DO BIOMEDICAL SCIENTISTS CONSTITUTE MEMBERS OF A PROFESSION?

According to Lester (2010) "Profession derives from the Latin word 'profiteor,' to profess, which can also have the connotation of making a formal commitment in the sense of taking a monastic oath. This root might suggest that a professional is someone who claims to possess knowledge of something and has a commitment to a particular code or set of values, both of which are fairly well-accepted characteristics of professions".

As Lester suggests, knowledge and a code of values are attributes of a profession.Brante (2011) also considers knowledge is a necessary attribute but believes it is not a sufficient condition. Freidson (1988) believes autonomy is a defining attribute. He also suggests that occupations organised around medicine which are ultimately controlled by a doctor have a "paramedical status" or supporting role, and it is only the doctors who have full autonomy in their practice.

I will consider the following attributes authors have used to define a profession: autonomy, knowledge and training, continual professional development, having a professional body and a code of practice.

AUTONOMY

Autonomy is derived from the Greek words 'autos' and 'nomos' meaning self and to rule. The Oxford Dictionary of English defines autonomy as the right or condition of self government and freedom from external control or influence.

Biomedical scientists in the early 1900s had a supporting role to the pathologist and originally they could only work under the direction of a pathologist. They had very little autonomy. But gradually over the years and mostly since the 1980s as

laboratory techniques expanded, they started taking some degree of responsibility for carrying out the tests. However it was not until 2001 that a biomedical scientist in cytology could claim autonomy in practice when they could report on all aspects of cervical cytology.

The argument that medical doctors have full autonomy in their practice no longer holds true. In the NHS, doctors are subject to control, regulation, and increased accountability by the hospital management. Even when treating patients they have to follow guidelines issued by various regulatory bodies. They can no longer make decisions on their own and have to follow an agreed treatment plan.

As can be seen professional autonomy which was once considered an essential attribute of a profession in my opinion is no longer valid, as employment and organisation constraints have largely removed it. In this respect biomedical scientists in cytology are no different.

KNOWLEDGE AND TRAINING

Brante (2011) considers specialist knowledge is a necessary but not a sufficient condition for defining a profession. It derives from training and experience.

Biomedical scientist have strict entry criteria and undergo years of training. The entry route to the profession is via obtaining an IBMS accredited undergraduate honours degree in biomedical sciences. In addition to meeting this entry criterion the candidates must undergo a period of laboratory training (usually 12 months) and complete the IBMS registration portfolio.

This is considered to be the entry point to the profession and the biomedical scientist can register as a licentiate. At this point the licentiate can start to work towards obtaining the IBMS specialist diplomas which normally takes a minimum of two years. The next membership class is the class of the member. The members have the opportunity to study and prepare towards the IBMS higher specialist diploma. Obtaining this qualification after at least three years of professional experience allows the member to register as afellow. After seven years post registration experience fellows have access to the IBMS advanced

specialist diploma in cervical cytology that allows practice at the highest level..

CONTINUING PROFESSIONAL DEVELOPMENT (CDP)

Knowledge also comes from continuous professional development (CPD). CPD is lifelong learning that allows the professional to maintain their knowledge and skills, and keep pace with the new developments in their field. CPD may include 'formal' activities such as attending courses, conferences and workshops, as well as self-directed activities including writing essays, directed reading and reflective practice. Although CPD may be voluntary in many professions, it is a mandatory requirement for biomedical scientists to maintain their registration with HCPC.

PROFESSIONAL BODYAND CODE OF PRACTICE

Membership of a professional body is considered one of the attributes that characterise a profession. Most professionals belong to a professional body which seeks to further the particular interest of the profession and regulate it.

Biomedical scientists belong to a well established professional body, the IBMS. One of the aims of IBMS is the development of biomedical sciences and maintenance of professional standard of practice for patient care and safety (IBMS 2011). The IBMS has evolved over the years. The timeline below shows some key dates in this evolutionary journey:

Pathological and Bacteriological Laboratory Assistants Association (PBLAA)	1912
Institute of Medical Laboratory Technology (IMLT)	1942
Institute of Medical Laboratory Sciences (IMLS)	1975
Institute of Biomedical Sciences (IBMS)	1993

It started in 1912 as an association for the laboratory assistants (PBLAA). This association could not be described as a professional body as it had a very basic examination and membership structure. By 1942, the IMLT was formed. The IMLT redesigned the membership grades, produced new examinations and established an exam board to deliver the new examinations. In my opinion the IMLT still fell short of full professional body status as the examinations were still

administered by pathologists and not its own members.

In 1975 with the increase in scientific element of the work, the IMLT changed its name to the IMLS. It also saw the first appointment of a non-medical person as its president. The examinations were now administered by senior members of the profession and the early shoots of an emerging professional body could be seen. Advances in the science and the changing role of biomedical scientists necessitated a further name change in 1993 to the IBMS. By this time it had matured to a professional body with committee structures working with its governing body to deliver the professional agenda.

The IBMS code of practice (IBMS 2011) is written specifically for biomedical scientists and sets out the ethical standards that a biomedical scientist must adhere to. Biomedical scientists are required to fulfil their professional role with integrity, refrain from misuse to the detriment of the patients, and take steps to safeguard patients and others.

CONCLUSION

Knowledge is a necessary but not a sufficient attribute of a profession. Other attributes such as a code of practice, membership of a professional body and CPD are also required. Biomedical scientists do not have complete autonomy, but this is not a defining attribute. Therefore in my opinion the occupation satisfies the necessary attributes to make it a profession.

MY PROFESSIONAL VALUES

In the next section I will describe how my actions and values have contributed to developing the profession of biomedical science.

CHALLENGE THE SYSTEM –ASK QUESTIONS

Living through and experiencing the 1979 Iranian revolution in my teenage years had a deep effect on my personality and instilled the habit of asking questions and challenging the existing mindset. Traditionally the biomedical sciences have been regarded as a technical subject; however due to the evolution in laboratory methodology and science, in my opinion, the focus should be more clinical. This is demonstrated through procedures and practices accomplished by myself and our team at the cytology department at Ashford and St.Peter's hospitals where I have encouraged my team ro take broader roles. This has resulted in improvements and a more flexible delivery of the service, reducing waiting time for test results for direct benefit of the patients. Public work number 4 describes such an example when challenging the existing work practises resulted in improvement to cervical cytology services.

PERSONAL RESPONSIBILITY

I have always believed that I must take personal responsibility for my own actions. Although it is not possible to control every situation in life, taking personal responsibility allows one to create a path ahead, and shape the future. As an example: during my tenure as the IBMS chief examiner I have been criticised for setting a high standard in the examinations when there were occasions when examination pass-rates were low. I have always stood by my decision of keeping the standards high, as I believe it is through increasing knowledge that a biomedical scientist can progress further in the field of cytology.

PASSION FOR EXCELLENCE

Working at the Royal Postgraduate Medical School was an instigator of this value at the beginning of my career in 1983. I became associated with esteemed pathologists who were internationally known as experts in their particular field in pathology. I was impressed by their refreshing approach to strive to achieve the

highest level in research and teaching. Their insatiable drive was not for monetary gain but to extend their knowledge for the benefit of the science. This kindled the fire within me to follow their teaching and their principles in my discipline. For example at Ashford and St.Peter's hospitals, I have continually worked with colleagues to ensure that we are at the forefront of the field often developing new techniques. Some of these recent initiatives were described in earlier public works 4, 5 and 6

PUTTING PATIENTS FIRST

Putting patients first must be a central objective to all people who work in the NHS. For laboratory disciplines, where direct contact with patients is limited and the focus of the work is with their samples, it is easy to forget this point. I apply this value in my daily work, and emphasise its importance when I teach cytology to new trainees. My public works have benefitted patients directly (public work no 3, 5, 6) or indirectly by either education (public works 2,7,8,13) and raising the standards (public works 1,2,4,9,10,11,12).

COLLABORATIVE WORKING

I learned from very early on that one can achieve considerably more if it is achieved through teamwork. This is evident by my public works as the majority are written in collaboration with colleagues. And in particular it is true of how I invited other authors to collaborate with me in writing the Cytopathology textbook (public work no 7). Although I was given the opportunity to write the cytopathology book as a sole author, I decided that it would benefit the profession more effectively if it was delivered via collaborative working with other colleagues. The success of the book has shown that this was the correct decision.

COMMITMENT TO EDUCATION

I believethat my personal involvement in the professional scene in the past 10 years has contributed to increasing the knowledge and ensuring the continuing professionalization of biomedical scientists in cytology. As the chief examiner for

the past seven years I have had the responsibility of setting the examination papers for the higher scientific diploma (HSD). The HSD is set at postgraduate level to tests the candidates' competence to practise professionally at the highest level. I have ensured that each year the standards reflect the changing professional scene. As a member of the IBMS SAP for the past 15 years, I have been involved in organising the scientific content of seven IBMS congresses and also contributed by presenting papers in these conferences.

My main public works have an education theme which I also believe have contributed to knowledge. Public works 2 and 13 are training guides aimed at biomedical and clinical scientists respectively. Public work number 8 is an educational self assessment aimed at raising the knowledge of pathologists and pathologists in training.Public work number 7 "Cytopathology" has the potential to increase the knowledge of non-medical cytologists in the UK.

CHAPTER 5 REFLECTIONS ON THE JOURNEY AND DIRECTIONS FOR CYTOLOGY IN FUTURE

I had not fully appreciated the benefits of reflecting on past activities. Reflection has unexpectedly produced new insights and knowledge. Reflecting back, however, has proved to be a very difficult process. Because of its nature it is highly personal, subjective and emotive. It requires various characteristics such as sensitivity, emotional intelligence and the ability to be self-critical and to provide a balanced analysis of events. I have tried hard to be honest and disclose events as they occurred and portray what I felt at the time. Most of us feel uncomfortable disclosing our personal frailties. I am not dissimilar to most in this respect.

My workplace, in the past 30 years, has been a medium for learning that I can confidently say would equate to anacademic research based qualification. Although my experience in pure academic research has been limited, many of the 'real-life' practical projects or public works that I have undertaken have directly influenced my own professional practice and those of others. And many of the works have improved service quality for the benefit of the patients.

My public works have either a quality, educational, or service improvement theme. Although I have described each in detail before, below I have summarised how I believe they have made an overall contribution to my profession.

The public works numbers 1 and 10 are quality documents produced by the NHSCSP. These documents have been influential nationally and all laboratories in England taking part in cervical screening refer to these publications.

Public works numbers 2, 8 and 13 have a training and educational focus. Public works 2 and 13 are training guidelines that set the scope of expected practice from biomedical and clinical scientists respectively. Public work number 8 is an educational self-assessment aimed at consultant pathologists and pathologists in

training. These works show that I have the ability to communicate clearly in writing by adjusting the content to reach different audiences to ensure different messages are understood.

Public works numbers 3, 5 and 6 are in-house projects that have directly benefited the service and the patient. They are very similar in nature; exploring simple ideas in a novel way which show a measurable impact.

Public works numbers 11 and 12 are clinical audits that show improvement in diagnosis, which has been clearly beneficial to patients.

Public work number 9 is a formal report that I have to produce every year as part of my role as the regional external quality assurance scheme organiser. The process is quite mechanical in that I have to include participants' performance figures. I tried, and feel that I have succeeded in adding educational elements to what would have been a very "dry" and formal report.

Public work number 4 explores the concept of Lean to improve services, but also how Lean was used to improve team morale.

Public work number 7 "Cytopathology" is a project which I am most proud of. It was my longest project. When I started the project, I really knew nothing about writing or editing. This was an incredible learning experience. I am excited when I meet trainee biomedical scientists who have read the book and they tell me how it has contributed to their learning. This book has the potential to influence the future of non-medical cytology education in the UK.

From very early in my career Inoted a lot of incorrect assumptions about qualifications and competences that had not been challenged. The assumption in cytology has been that a doctor is competent and a biomedical scientist can never become competent, no matter how much training the person has undertaken or experience they have gained. I have shown through my own practice that this is an incorrect assumption and competence can be gained through professional practice. And indeed I now conclude that continuous

updating of knowledge is the main attribute of a profession.

THE FUTURE FOR BIOMEDICAL SCIENTIST AND THE EMERGENCE OF NEW GROUPS OF SCIENTIFIC WORKERS

The profession of biomedical science has continued to evolve in response to the changes in laboratory technology and the political and professional scene. In the early 1900s, with a limited repertoire of tests available in medicine, laboratory workers were employed with minimal qualifications to assist pathologists. By the 1940s the range of laboratory tests expanded and the laboratory workers became technicians involved in carrying out these tests.

By the 1970s, the role had become more scientific and the designation of laboratory technician was no longer appropriate; laboratory workers were now named scientific officers. Throughout the 1990s and 2000s, there were great strides in medical technology and most laboratory tests were carried out by automated analysers. This shifted laboratory medicine to become the clinical interpretation of test results.

Cytology as a laboratory discipline has mostly survived the technological changes that have affected other pathology disciplines. Technology, however, promises to change the practice of cytology in the next five to six years (Public Health England, 2013) which will lead to a large scale reduction in the scientific workforce.

In addition to the advances in technology, cytology has not escaped the effects of government policy on large scale centralisation (Department of Health 2005). Centralisation and changes in policy regarding scientific education (Department of Health 2010) has led to issues with recruitment in both the scientific and the medical sector, thus provoking the scientists and pathologists to engage in power plays in order to establish territory.

The pathologists, who see the changing conditions undermining their original position, are employing tactics to retain and regain territory from biomedical scientists. On the other hand, the biomedical scientists feel overwhelmed and threatened by changes in technology and are thrown into a defensive posture.

The prospect of machines taking over from the biomedical scientist has adversely affected recruitment in cytology. In six to seven years time,it is possible that cytology will revert back to a sub-specialty of histology, employing a small number of scientists and pathologists.

The biomedical scientist may need to evolve further to survive these changes. Indeed the promise of clinical scientists taking more responsibility in the interpretation of test results may need to be explored further.
The AHCS (see appendix 4) is currently in the process of granting "equivalence" to existing biomedical scientists to become clinical scientists (AHCS 2013). It is difficult to predict the impact of granting equivalence but it may rapidly increase the number of clinical scientists .The emerging clinical scientists could then be in a position to establish a new profession with extended roles in cytology.

This will have a direct effect on the IBMS that until now has been a professional body for the biomedical scientists. The IBMS should extend its hand and openly invite clinical scientists to its membership or the clinical scientists will choose to form a new organisation and network and gain support from the Department of Health to self-regulate and in time form an all scientists profession delivering specialist cytology service. I feel the former should be the route followed by the IBMS and the clinical scientists, and I believe that my contextual statement will contribute to this transformation.

As I hope this context statement has shown challenging these existing assumptions has not been easy; it has been an uphill struggle with various professional bodies including my own professional body the IBMS who have failed to recognise that professions change over time.

ACTION PLAN FOR THE FUTURE

In the next 10-15 years I intend to help the biomedical science profession to evolve further. I will:

- work with the National School of Healthcare Science to ensure the cytology curricula of the scientific training programme (STP) meets the needs of the

service

- work with the Academy of Healthcare Science (AHCS) to ensure biomedical can achieve clinical scientist equivalence and gain registration with the HCPC

- work with the IBMS council to ensure it develops into a stronger professional body to represent and defend the needs of their members

- work with the RCPath cytopathology subcommittee members to develop curricula for the Higher Scientific Training Programme (HSTP) in the next five years to ensure clinical scientists can practice at consultant level

- publish the second edition of the Cytopthology textbook to reflect changes in cytopathology since the first edition

- teach on the MSc and BSc courses to pass on knowledge and practical experience acquired over 30 years.

I consider that the recognition of this work at doctorate level will also help to continue to champion further change in the profession. Although I am fully aware that changing the mind set of established medical professions will not be easy, I hope in the next ten years to see the role of clinical scientists in the UK to become the norm and gradually step-up to share diagnostic roles with medical doctors. This may be expedited as cytology is undergoing immense change technologically and this may dissuade newly qualified medical doctors from entering the discipline and leaving this void to be filled by clinical scientists.

The main lesson I draw from the values I have been at pains to develop and apply over the years is that we are more likely to extend the boundaries of cytology by including pathologists in our future negotiations rather than by excluding them. In a way this is a contradiction of one of the characteristics often cited for a profession viz that profession protects its boundaries by exclusion. Nevertheless I will continue to do what I have always done which is to include all

colleagues, including pathologists; through collaboration we will all extend boundaries of “our profession”.

I hope that by the time I end my career in cytology, my role as a Head of Department will not be an exception, but an accepted career path for senior clinical scientists.

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APPENDIX 2 CLINICAL RESPONSIBILITY FOR CYTOLOGY SERVICES

Clinical responsibilityfor cytologyservices

March 2012

Unique documentnumber	G121
Documentname	Clinical responsibilityfor cytologyservices
Version number	1
Produced by	DrJohnHF Smith, Chair oftheCollege'sCytopathology Sub-Committeeof theSpecialty Advisory Committeeon Histopathology
Dateactive	March2012
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Comments	Council endorsedthisstatementin March2012on behalfof the Cytopathology Sub-committee,inresponseto arequest foradvice from theDirectorof theNHS CancerScreeningProgrammes. **DrPeter Cowling**

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Introduction

The Royal College of Pathologists, through its Cytopathology Sub-Committee, has reviewed currentguidance regardingclinicalleadershipandresponsibility forcytopathology services[1].In reviewingthisguidance,theknowledge and competencies required to make clinicaljudgmentsand delivereffective management have been considered.

Cervicalcytology

Itisnow tenyearssincethejointInstituteofBiomedicalScience/RoyalCollegeofPathologists AdvancedSpecialistDiplomainCervicalCytology wasintroduced.[1]Biomedicalscientistholders of this qualification,whoseexpertise iswell recognised and who arevaluedmembers of the cytology workforce,arereferred toas‘AdvancedPractitioners’.Insomecases,thoseholdingthis qualificationhavebeen appointedbylocalemployerstoconsultantbiomedicalscientistpostsin cervicalcytology.However,sincethereisnotastandardisedapproach

tosuchappointmentsas thereis forconsultantmedicalstaff,'AdvancedPractitioner'isused forconsistencyinthis document.

- TheCollegecontinuestosupportandendorsecurrentguidanceissuedjointlywitht heNHS CancerScreeningProgrammes (NHSCSP)thatamedically qualifiedconsultantpathologist must takeresponsibilityfortheissueofallcervicalcytology results,eventhoughabnormal resultsmaybeissuedbyAdvancedPractitioners.

- TheCollegecontinuestosupportandendorsecurrentguidanceissuedjointlywitht he NHSCSPthatatleasttwomedically qualifiedconsultantpathologistswhoactively practise cervicalcytology areinvolvedintheserviceprovidedby anNHS Trust,a managed network coveringanumberofTrusts,oraprivatelaboratory,so thatone consultantpathologistis alwaysavailabletoprovidedirectiontostaff,includingconsultantbiomedicalscient ists.[2-4]

  Furthermore, thatdirectioncanonly beeffectively providedifthe consultantpathologists practiseincervicalcytology atthelaboratory wherescreeningofcervicalcytology samplesis undertaken.

Diagnosticcytology

Theclinicalleadfordiagnosticcytologyservicesina Trustorotherserviceprovidermustal ways beamedically qualifiedconsultantpathologist, whomusttakeresponsibilityfortheissueofall diagnostic cytology results, although reports on some specimen types may be issued by biomedical scientists.[5]

Justificationand reasoning

Reasonsastowhy amedicallyqualifiedperson appointedat thelevelofconsultantis requiredto clinically lead acervical cytology laboratoryservice have been considered asfollows:

1. Abroadknowledgeof clinicalpracticeandbasic science areregarded as essentialto effectively undertake the direction and individual case decision-making in a cervical screeninglaboratory. Thisbroadknowledgeisacquiredduringamedical trainingfollowedby

achievingFRCPath(orequivalent),leadingtoawardofaCCTin histopathology.The training andcertificationofAdvancedBiomedicalScientistPractitionersincervicalcytology(APs) does not extendtothisbroadknowledge of clinical practiceand basicscience.

2. WhilstAPsareawareofcytology-histologycorrelation,andcantherebycontributetoMDT

discussions, they are not trained to interpret and report histology specimens that may emanatefromthecervicalscreeningprogramme,aswouldamedicalpractitionerappointed at thelevel ofaconsultantin histopathology.

3. Thepersonleadingaservicewouldberequiredtomeetregularlywithmedicalcolleaguesto review theircompetenciesandworkingpractices andseekimprovementintheirperformance if necessary.Theclinicalprofessionalperformance management ofmedicalconsultants should beperformedbyanother medicallyqualifiedpersonofequivalenttrainingandgrade.

4. All medical consultants will be requiredto presentevidencein relation totheirclinical practice suitable for revalidation.APs arenotsubjectto revalidation,whichis believed to be an important qualitymeasureforstaff managingaservice.

5. ThereisariskthatifAPsprovideclinicalleadershipofcervicalscreeninglaboratories,it could resultinasignificantlossofexpertise,researchandinnovationthatmedical consultant pathologistsbringtothecervical screeningprogramme.

6. ThereisariskthatifAPsprovideclinicalleadershipofcervicalscreeninglaboratories,it wouldmakespecialisationincervical cytologyalessattractivecareeroption formedical traineesincellularpathology.Theabilitytorecruitmedicalstaffintothisareaofclinicalwork isdeemedessentialat a timewhen thereisa move tofewerlarger cervical screening laboratoriesutilisingadjunctivemoleculartesting(HPV), requiringa cadreofhighly trained consultantcytopathologists. Thisis the rationale behindtheintroductionby theCollegeofthe Certificatein Higher Cervical CytopathologyTraining.

7. Use ofAPsto provideclinical leadership ofcervical screeninglaboratorieswould bea unique managerialmodel in histopathologyandcytology.

8. Allthesepointsapplyalsotodiagnosticcytologylaboratories.Thesecond,thirdan dfourth pointsabove areevenmorepertinentto diagnostic cytology; forexample,APshaveno trainingintheinterpretationofbiopsies other thancervical biopsies.

9. Thespecificrequirementforconsultantstopractiseincervicalcytologyatthelabor atory wherescreeningofcervical cytologysamplesisundertakenisinformedby the factthat problems with cervical cytology laboratory management, governance and clinical performancearisewhereconsultantsarephysically separatedfromthelaboratory forwhich they areresponsible.Thiswasmostnotably highlightedintheSERHAreportintoeventsat Kent&Canterbury hospitalin thelate1980s/early1990s.

APPENDIX 3 PROPOSAL TO FORM AN ASSOCIATION OF ASSISTANTS IN PATHOLOGICAL AND BACTERIOLOGICAL LABORATORIES AND MUSEUMS (LETTER)

remuneration of assistants, and thus lead to the abolition of the professional 'blind alley'.

At its meeting in Oxford in July 1911 the Pathological Society appointed an official Sub-Committee 'to consider the formation of an employment bureau for laboratory assistants'. Soon after this definite steps were taken to arrange the co-operation of the Society with the founder of the projected Association and his colleagues. A number of assistants representative of the various University and Research laboratories throughout the country were asked to join in issuing the following circular letter addressed to all assistants who could be traced, setting forth the aims of the Association and inviting them to become Original Members:—

A PROPOSAL TO FORM AN ASSOCIATION OF ASSISTANTS IN PATHOLOGICAL & BACTERIOLOGICAL LABORATORIES AND MUSEUMS

DEAR SIR,

We beg to ask your consideration of the proposal to form an Association of Assistants in Pathological and Bacteriological Laboratories and Museums.

Some of the objects of the Association would be (i) to form a means of communication amongst the assistants in these laboratories, (ii) to supply to the members information regarding appointments, and (iii) to assist members by circulating information regarding the most recent methods, modifications of methods, and matter of general interest.

At present there is no recognized means of dealing with any of these objects, and the difficulties connected with them would, it is hoped, be in a large measure solved by means of the proposed Association.

It is further suggested that the Association should work in conjunction with the Pathological Society of Great Britain and Ireland, the Council of which has appointed a sub-committee to assist in its formation.

A large number of assistants have already agreed to the proposal, but before giving the matter more definite shape we are endeavouring to ascertain the views of assistants in all the Pathological and Bacteriological laboratories and museums in the country.

We should be glad to hear that you are willing to join the Association as an Original Member, and should welcome any suggestion you may have to make as to the Constitution of the Association.

A provisional committee will be elected to draft the Constitution of the Association, and in the event of your deciding to become a member, we should be glad if you will suggest six names for this committee.

It might be pointed out that, although at first it is proposed to confine the membership to assistants in Pathology and Bacteriology, it is hoped eventually to have an Association which shall include all laboratory assistants.

As we are anxious to hold the first Committee meeting at Liverpool on January 6th, 1912 when the Pathological Society meets there you will greatly oblige by replying to this circular at your earliest convenience, so that necessary arrangements may be made.

We are,

Yours faithfully,

F. G. HALLIDAY, Liverpool; F. A. IZZARD, Cambridge; WM. MANEY, Manchester; W. A. MITCHELL, Cambridge; J. MOSS, London; R. MUIR, Edinburgh; A. NORMAN,

APPENDIX 4 A SHORT HISTORY OF BIOMEDICAL SCIENCES

I have referred extensively to Farr (1982) and Petts and Harding (2012) whilst preparing the text below.

Biomedical scientists initially began as laboratory assistants employed to assist in histopathology and microbiology laboratories. They were often employed with minimal qualifications by hospitals and universities. Although highly valued by the pathologists, laboratory assistants were viewed as unskilled by the boards of hospitals and other controlling bodies, and as a result were often poorly paid when compared to other workers who enjoyed protection of trade unions (14). At that time the relationship between the head of the laboratory and the assistants could be described as paternalistic; the assistant's salary being supplemented directly by the pathologist.

1912 to early 1960s

The first formal organisation for non-medical staff was formed in 1912 by Albert Norman. The society was called the Pathological and Bacteriological Laboratory Assistants Association (PBLAA). Albert Norman, the son of a Cambridge farming family, started work in a laboratory at the age of 14. He was aware of the low regard given to his occupation, with poor prospects and remuneration. This situation was his motivation and by the age the 29 he had recognised the need for a body that represented laboratory assistants. The paternalistic relationship between the pathologists and assistants is shown by the tone of the letter that was sent to the eminent pathologists at the Pathological Society asking for their permission to form the society (Appendix 3). The first president the new society was the pathologist, Professor James Lorraine. This trend of appointing medical doctors as presidents continued until 1975.

By 1921 the PBLAA founder members had established an examination structure providing a qualification for laboratory assistants. Once again there were pathologists involved in the society as examiners. For this exam there were two

pathologists and a member from the PBLAA who acted as an assessor. By 1929 an expanded syllabus was introduced to include the addition of pathological chemistry. This represented the first acknowledgement by the PBLAA that the scope of medical laboratory science was expanding. Six years later a two–stage qualification structure was introduced. A “Part I” based on elementary knowledge of routine duties. After passing the Part 1 the candidate became “member” of the PBLAA. The members could take the “Part 2” examination after a further two years of in service training before they could be Fellows of the Association. Possession of the Part II certificate became a condition for employment to senior posts. Holders of the certificate found themselves in a better position, with improved status within the laboratory. This was an important moment in the history of biomedical sciences when a manual trade was being elevated into an embryonic scientific profession.

After the First World War and the expansion of healthcare provision during the 1920s and 1930s, the membership grew. This period also saw the emergence of new disciplines of haematology and chemical pathology. By the late 1930s plans were already in hand to restructure the PBLAA into a “professional” institute which would more properly reflect the high level of technical skill that was required in medical laboratories.

In 1942 the Institute of Medical Laboratory Technology (IMLT) was formed. The IMLT redesigned the membership grades, together with producing new qualifications. Examination boards were established to deliver the new examination. The names of the examination were also changed. The Part 1 was named Intermediate, with its own examining body consisting of Fellows of the Institute. Part 2 was named the Final examination with an examination board consisting of examiners (pathologists) and assessors (Fellows of the institute).

Laboratory medicine was undergoing an expansive phase. New skills were required from laboratory workers, and the laboratory assistants became known as technicians.

With expansion of the NHS, the government saw the need to regulate various

emerging professional groups. Various committees were established to enquire into the education, training and qualifications of various groups of staff. In 1960 the bill to bring in state registration passed into law. This was called the Professions Supplementary to Medicine Act, 1960. The act established a regulatory council called the Council for Professions Supplementary to Medicine (CPSM). Its role was to supervise the activities of the boards established to represent the range of health professions that the CPSM regulated. The CPSM responsibility included providing registration of members, regulating their professional education and conduct and cancelling registration in cases of misconduct. The Medical Laboratory Technicians Register began in 1963 and statutory registration became condition of employment from 1964.

The 1960s

During the 1960s the IMLT considered other qualifications for medical laboratory technicians including the National Certificate System. It was however reluctant to introduce this as there were concerns about loss of control over qualifying examinations. However it was agreed that changes in complexity of laboratory medicine that introduction of basic science was important. This and other changes in education in the NHS led the council to consider the introduction of a national certificate system. The Ordinary National Certificate was introduced by 1966 and Higher National Certificate by 1968. The award of HNC lead to admittance to the class of Associate and holder could become state registered after three years employment in an approved laboratory. In 1964, the IMLT council approved an advanced examination for Fellowship which was to be assessed at a higher level in the subject that the candidate had qualified in. This examination became known as the Special Examination for Fellowship and was introduced in 1966. The last intermediate exam was awarded in 1970 and the last Final examination in 1975. This is the time that the institute changed its function from a qualifying one to a professional body.

The1970s

Since the formation of PBLAA in 1912, the President had always been an eminent pathologist. In the 1962 WH Valentine, then the chairman challenged

this position. It took until 1974 for “the articles of association” to be amended to allow for any Fellow of the Institute to be appointed as the president.

In 1976, Frank Baker became the first non-medical President of the IMLT. He was passionate that the Institute should be in charge of its own direction and destiny without reliance on the medical profession.

The Institute had also pursued a change of designation of qualified staff from technician since 1956. In 1972 the Institute issued a policy statement entitled “Staffing in Medical Laboratories” where an increased scientific element in the laboratory was described. The paper compared the job roles to the Scientific Civil Service. In 1974 at a scientific conference held in Sheffield the president, Professor George Dick described the high level of qualification required of the profession, and argued that the term of technician was no longer appropriate for the members and they should be known as scientific officers. In 1975 the Institute changed its name to Institute of Medical Laboratory Sciences (IMLS).

In 1976 the Institute was invited to give evidence to the Royal Commission on the NHS on the staffing of pathology laboratories. These resulted into two Department of Health and Social Security (DHSS) publications. The Institute highlighted the outdated and unrealistic management structure. The comment attracted hostile comments from the pathologists as they felt threatened by the IBMS statement. The institute soon published a statement titled “Pathologists and ourselves” to quell the animosity. The Institute had not challenged the clinical issues but there were disagreements regarding the laboratory management.

The Institute tried to maintain a cordial relationship with the Royal College of Pathologists through holding regular meetings. But the relationship with the Association of Clinical Biochemists (ACB) and Association of Clinical Pathologists (ACP) were not harmonious during this time as these organisations openly stated that only senior scientists or pathologists should undertake laboratory management. In 1978 an acrimonious dispute developed in Scotland regarding the management arrangements in the Fife Health board. This resulted in a bitter dispute between the two unions: the Association of Scientific, Technical

and Managerial staff (ASTMS) and the British Medical Association (BMA).

The 1980s

The Institute council had been debating changing the membership structure for years. The previous structure consisted of two classes; the class of Associate and the class of Fellowship. It was not unusual for many of the members to obtain the Fellowship by examination early in their careers. This made the Institute different from other societies in that it had too many Fellows and this devalued the status of the Fellowship. The suggested changes would allow the existing Associates and Fellows to retain their class of membership and continue to use the post-nominal letters of AIMLS and FIMLS after their names. The new structure was suggested in 1983. It proposed four classes of "non-corporate" class of membership; Affiliate, Student, Associate and Licentiate, with two classes of "corporate membership", Member and Fellow. However it was not until 2008 that this membership structure was implemented.

There were moments in the history of the Institute that a biomedical scientist raised issues about the professional relationship between biomedical scientists and the medical profession. Once such person was Jim Cloke who was appointed to the council in 1985. He noted that the need for a hospital pathologist to interpret data was rapidly declining and so was their consultative role. He said that this evolutionary process was becoming a handicap to the scientific profession as pathologists were in many cases trying to take on the managerial and administrative responsibilities to supplement their diminishing role.
Another scientist was R l Ward, who in an article in September 1985 published in The Gazette entitled "As others see us", summarised the issues confronting the profession. He noted that the government viewed the medical laboratory scientists as "back water" professional as they "did not deal with patients". He felt that this was a handicap as it did not give the Institute enough negotiating powers. He believed that the Institute should raise its profile and engage in public relation activities. This opinion was however at odds with the council on two fronts; first, adopting a confrontational stance was alien to the Institute policy and secondly, it had no experience in public relations. In 1986 the Institute decided to engage a professional public relation company research this issue.

The organisation and its members were experiencing increasing levels of attack on their professional position. This was mainly from the government who failed to see the vital role the biomedical scientists played in diagnosis. The government also did not acknowledge that senior members of profession were performing effectively in their managerial position. The Institute attempted to address this by continued communication with the Secretary of State for Social Security and also by establishing management courses.

During 1987 there were several issues that drew adverse publicity. A disclosure about misreporting of cervical smears in Liverpool; and an article published in The Daily Telegraph on 14 July 1987 reported that British Society for Clinical Cytology (BSCC), a medical society, stated that "poor or non-existent training of laboratory technicians contributed to 2000 deaths a year". This article was factually incorrect and a direct attack to Institute members. The true extent of errors surfaced when a report published by Liverpool Health Authority entitled "Internal Review into Laboratories at the Woman's hospital, Liverpool". The report stated that there were 911 false negative errors and these misdiagnoses were attributed to two pathologists Dr Kathleen Lodge and Dr Percy Jones. The report praised the action of medical laboratory scientific officers and said "in the absence of their initiative this problem would have remained undisclosed". The Institute undertook an intensive press relations campaign to explain the role of medical laboratory scientist.

During the 1980s there was increasing political and public mistrust of self regulation amongst professional bodies. Although biomedical scientists were registered, there was no formal system of ensuring that they kept their knowledge up do date. In 1989 the Institute set out objectives for a Continuing Professional Development (CPD) scheme. This scheme was officially launched in March 1990, and revised in 1992 and again in 2002 when a new credit system was introduced that included reflective learning. The CPD scheme became mandatory in 2006 for members continuing registration with Health Profession Council (HPC-replaced CPSM in 2001).
The Department of Health introduced a new grading structure for the NHS

pathology staff at the end of 1988. This reduced the number of grades from seven to five. It also introduced the new grade of Medical Laboratory Assistant (MLA); a non-career grade for support staff. There was concern that this new post could undermine the status of the role of qualified staff. The new structure potentially had severe implications for the Institute as senior grades were no longer required to hold the Fellowship of the Institute. In reality most employers continued to require these qualifications for senior grades. New entrants however did not see the need to join the Institute and as result between 1988 and 1990 total membership fell by nearly 20%.

The late 1980s and early 1990s were an era of great change and upheaval for both the Institute and the profession. The change in staffing structure, and the introduction of the internal market in the NHS caused further insecurity. Many members felt that the Institute was impotent and unable to influence events.

The 1990s

The first graduates became members in 1936. From then on a steady trickle joined the institute. By 1949 the number of graduates entering the profession had risen. It was agreed to allow exemption from the Final examination to the science graduates who had one year's experience in an approved laboratory. There was initially some opposition to graduates, mostly by senior members of the profession who felt the graduates did not have the equivalent practical abilities to the traditional laboratory scientist. This attitude however changed in time. By 1974 about 10% of those joining the Institute and 20% recruited as medical laboratory technicians were graduates.

The universities began to explore the possibility of offering degrees with curriculum broadly equivalent as an honours degree in biomedical science. The two pathways of HNC and degree continued until the early 1990s. The Institute took the view that they should move to an all graduate entry. The CPSM also took a similar view and from September 1993 required all new registrants to have an appropriate science degree. The role of the Institute in formal education changed again and its involvement in formal education became approving BSc and MSc courses.

In 1993 at the Annual General Meeting the president, David Browning, proposed a special resolution to change the name of the Institute from IMLS to the Institute of Biomedical Sciences (IBMS). The president said that the new name would reflect more accurately the Institutes broad membership base and widen its influence.

In the early 1990s there were a series of high profile legal cases in cervical screening that highlighted problems with laboratory quality and service. This was partly due to a shortage of pathologists who were not willing to participate in the cervical screening programme. This shortage was partially fulfilled by ad-hoc appointment of clinical scientist; but at that time there was no statutory regulation of clinical scientists; but and this was not a satisfactory long term solution. In 2000, the NHSCSP asked RCPath and the Institute to setup a training programme and qualification structure for biomedical scientists involved in reporting of cervical smears. The new qualification named the Advanced Specialist Diploma in Cervical Cytology became mandatory for appointment as an Advanced Biomedical Scientist Practitioner in Cytology.

In 1996 the Department of Health proposed changes to the PSM act. The draft bill was completed by 1997. One of the requirements of the new acts would require registrants to keep up-to-date with their profession by maintaining evidence of Continuing Professional Development (CPD). Although the bill was ready by 1997, it was not until 2002 that the Health Profession Bill became Act of Parliament.

The 2000s

In 2002 the Health Professions Council (HPC) became the registration authority. The IBMS took over the responsibility of issuing a certificate of competence to new registrants. This new activity and the mandatory participation in CPD led to an increase in number of members.

One aspect of the consultation with the HPC was “protected titles”. As the name

suggests, a protected title is protected by law, and anyone using these titles must be registered with the HPC. In September 2004 title of Biomedical Scientist was accepted and became a protected title.
In 2004 the Science Council awarded the IBMS Licensed Member body status. This allowed the IBMS to award Chartered Scientist (CSci) designation to appropriately qualified and experienced members.

In 2005 an Independent Review of Pathology Services was established. The review was chaired by Lord Carter of Coles. The first report published in 2006 examined issues relating to quality, timeliness, reliability, capacity, and efficiency of current pathology services in England. It also investigated the feasibility and benefits of arising from wide-scale service reconfiguration, innovation and modernisation, and involvement of the independent sector.

The IBMS response to this report was varied. Although it welcomed the focus on quality, it could see that large service reconfiguration would reduce staffing numbers and ultimately its membership. In its formal response published on the IBMS website acknowledged that potential savings could be realised by mergers between pathology laboratories, but expressed its concern about the potential loss of quality, or loss of existing skilled staff. In practice, mergers have led to loss of expertise as many members have left the profession or taken early retirement when faced with prospect of change.

In 2008 the Department of Health announced a new staffing structure under the direction of Chief Scientific Officer, Professor Sue Hill. The scheme called ‘Modernising Scientific Careers’ (MSC) originated from a report called ‘A high quality workforce’ published by Lord Darzi’s Review of the NHS. The scheme provided a single framework for all the healthcare science. This led policy consultation document which outlined a revised training structure for the 50,000 plus healthcare scientists in the disciplines. The final policy proposals were published in February 2010 in the document 'Modernising Scientific Careers: The UK way forward'.

The MSC initiative promised the introduction of a new simplified four stage career

pathway, new education and training programme, identification of regulatory implication and support for delivery of the proposed changes. The four new MSC career pathways consisted of :

- Assistants and Associates
- Practitioner Training Programme (PTP) - Bachelor-level education
- Scientist Training Programme (STP) - Masters-level education
- Higher Specialist Scientific Training (HSST) - Doctorate level
-

The IBMS response to the initial 2008 paper was rather muted as the initial DoH paper did not give sufficient details on the proposals. In 2009 the MSC team produced the next consultation paper titled 'Modernising Scientific Careers: The Next Steps'. The IBMS response to this paper was stronger in tone. IBMS saw the MSC as challenge to its established proven education and qualification systems. This was not without reason as the MSC proposals did not give sufficient detail. The IBMS argued that the current education and training system for biomedical scientists had delivered a safe, well regulated, fit for purpose profession that met the needs of the service. The final policy document was published in February 2010 in the document 'Modernising Scientific Careers: The UK Way Forward'. The IBMS felt frustrated that the MSC had not considered any of its proposals and was about to dismantle a mature profession with an established career structure. The IBMS council was so concerned about MSC in relation to biomedical scientists, their HCPC registration, and protected title that it felt compelled to write directly to ministers to highlight the potential consequences to service delivery and patient safety. In 2011 the IBMS recognised that it would still need to continue with its previous education programme for the foreseeable future. It continued to assess biomedical science degrees that would lead to HPC registration as a biomedical scientist.

It is now five years since the initial paper on the MSC was published. It has become clear that not all career levels promised have been fulfilled.
The uptake for the PTP has been low. The STP has had marginally better interest. This is partly due to central funding as trainees receive a salary and funding to attend university leading to masters qualification.

The fourth career pathway the HSST which would lead to a doctorate has hit the

buffers. The development of this programme depended on the cooperation of medical societies and yet again the medical profession protectionism has prevailed, and in cytology and histology this route has been blocked by the Royal College of Pathologists. This will have a major impact on recruitment of cytologists into the MSC programme, as candidates are quite likely to choose one of the other pathology disciplines that will allow career progression.

The ramifications of the MSC programme will not be known for sometime, and sadly there is always a gap between theory and practice when policies are made in the NHS. Models are unrealistic and there is poor support to turn desired practices into reality.

In 2012 the Academy for Healthcare Science (AHCS) was established as a joint initiative between the UK health departments and the professional bodies.

The academy's role includes developing regulation for voluntary registration in healthcare science disciplines where none existed. The AHCS is also developing a system for assessing equivalence that may be beneficial to the biomedical scientists. Equivalence in this scenario refers to the education, training, qualifications, and experience that a scientist may already have which is comparable to the new MSC qualifications. The process of assessing equivalence will allow biomedical scientists who have qualifications or considerable experience relevant to the MSC programme have their experience and qualifications assessed and be granted a Certificate of Equivalence,which could allow them to register as a Clinical Scientist with HCPC.

It is too early to predict the impact of AHCS awarding Clinical Scientist equivalence on membership of the IBMS. The membership of IBMS has up to now consisted mostly of biomedical scientists. It is not certain that once biomedical scientists can gain registration as Clinical Scientist, they would wish to continue their IBMS membership.

The IBMS started life as an association for laboratory workers 100 years ago. Its stated aim in 1912 was to improve communication amongst its members. The

development in medical technology over the last 50 years has had a profound effect on the laboratory medicine. Analytical procedures and equipment have increased in complexity and the IBMS has reacted through involvement in education and setting professional standards. However in the past 10 years all medical professions have been under increasing pressure from various government initiatives. In my opinion the IBMS has not been proactive in its actions in positioning itself in the changing world of pathology, and unless changes are made its future remain uncertain.

With its aging membership demographic, the next ten years will see a reduction in its membership, unless new members can be recruited its activities in its current form will not be sustainable.

APPENDIX 5 LIST OF PUBLISHED PUBLIC WORKS

1**External Quality Assessment scheme for the evaluation of Papanicolaou staining in cervical cytology, protocol and standard operating procedures.**National Health Service Cervical Screening Programme (NHSCSP) Publication No. 19 2004

Available from:
http://www.cancerscreening.nhs.uk/cervical/publications/nhscsp19.htm

2 **Institute of Biomedical Science (IBMS) record of laboratory training for the Specialist Diploma in Cytopathology**. 2005

Available from:
http://www.ibms.org/go/qualifications/specialist-diplomas/application-reference

3 **Collection fluid helps preservation in voided urine cytology.**
Cytopathology Raistrick J, Shambayati B, Dunsmuir
2008 Apr,19 (2) 111-7

Avaialble from :
http://www.ncbi.nlm.nih.gov/pubmed/18352862

4 **Using Lean to lead change.**Poster presentation carried out as part of NHS leadership programme “Influencing the future”-B.Shambayati 2010

Available from:
http://www.phoenixconsultancy.org/uploads/files/Using_LEAN_to_Lead_Change..

.-B_Shambayati_(pdf).pdf

5 **Effectiveness of endobronchial ultrasound (EBUS) in obtaining mediastinal lymph node samples for immunohistochemistry at a new district general hospital (DGH) service**. Gulammehdi H, Shambyati B,Wood MPoster presentation.European Respiratory Society annual congress, Barcelona 2010

6 **Does immediate cytological analysis at bronchoscopy lead to reduced number of biopsies?** C. Eruchie, M. Manalo, B. Shambayati, P. Murray

Poster presentation.European Respiratory Society annual congress, Amsterdam 2011

7-**Cytopathology**, Shambayati BEd, Oxford University Press, Oxford. 2011

8**Self assessments in Lower respiratory tract cytology**, Shambayati B

Diagnostic Histopathology Volume 17:2 February 2011

Available from :
http://www.sciencedirect.com/science/article/pii/S1756231710001891

9 **South East Coast Region, NHS Cervical Screening, National Gynaecological Cytopathology External Quality Assessment (EQA) Scheme Annual Report**. May 2012

10 **Achievable standards, Benchmarks for reporting and criteria for evaluating cervical cytopathology.**(2013)

Available from:
http://www.cancerscreening.nhs.uk/cervical/publications/nhscsp01.html

11- **Mesothelioma diagnosis in a district general hospital.**
Poster presentation-European Respiratory society annual congress , Vienna S. Sharma, K. Wimble, B. Shambayati, M. Wood (Chertsey, United Kingdom) 2012

12-**Retrospective audit of malignant mesothelioma diagnosis in a District General hospital**. Poster presentation at the British Association for Cytology annual scientific meeting Keele S. Sharma, K. Wimble, B. Shambayati, M. Wood 2012

Available from:
http://www.ers-education.org/ersMade/abstract_print_12/main_frameset.htm

13 -**Scientific Training Programme learning guide in Cytopathology**
Department of Health Modernising Scientific Careers (MSC), 2012

Available from:
http://www.nshcs.org.uk/assessment/learning-guides-2/

APPENDIX 6 PUBLIC PRESENTATIONS

Public presentation #1 Computers in cytology
Southern Cytology Society, Worthing Hospital. November 1991

This short talk was given to 70 cytologists on setting a computer system in cytology. Until early 1990s all pathology laboratories worked on a purely manual "day book" and card file system. The daybook system worked well, but it was very difficult to gather data for management purposes. In the early 1990s computing was a relatively new concept in pathology and there were very few "off the shelf" systems. Most databases had to be built by the user with very little help from an IT company. St.Peter's hospital worked with the regional computer IT team to develop a pathology IT system. The IT team, after consultation with the users, set out to develop five pathology modules; histology and cytology, chemistry, haematology and microbiology. The cytology system was well written well and was user friendly. However this project proved to be another NHS IT white elephant as its funding was removed before the microbiology module could be completed. The system could not be sold as a complete pathology system and we also had to abandon our module after five years and purchase a new system. This talk was well received and gave me the confidence to get more involved professionally.

Public Presentation #2 Fine needle aspiration of head and neck
Cellular pathology update. Guys Hospital, April 1994

The cytology of the head and neck is a broad subject and it would have been difficult to cover this complex topic in one hour. Instead I decided to briefly discuss the cytology but concentrate on running of our FNA clinic. This proved to be a wise decision as I had many requests for protocols and procedures from the delegates. I was rather surprised by the responses I received even weeks after the talk, as although many worked in London

teaching hospitals, the practice of running an FNA clinic by a biomedical scientist was foreign to them. In most hospitals it was the pathologist who provided support for the FNA clinic. This gave me an indication that maybe, by presenting good practice, I could influence and facilitate change.

Public Presentation #3 Wise before the event
Thames Valley Cytology Society, Ealing Hospital. November 1994

This presentation told the story of the St.Peter's Hospital screening incident from the time it was discovered until its conclusion. It detailed the actions that were taken from the time of discovery of errors to it's conclusion when affected women were treated.

It was not an enjoyable lecture to give. I suspect the audience also did not like what they heard, as it was too close to home for many. What happened at St.Peter's hospital and many other hospitals throughout the late 80s and 90s was the result of increasing workload, staff shortages, and lack of adequate quality assurance measures.

Public Presentation #4 Too many qualifications for cytologistsIBMS Congress, International Conference Centre, Birmingham. September 1994

This was a debate with a biomedical scientist colleague. I firmly argued the case that it was through education and proof of competence (qualifications) that biomedical scientists could progress in their careers and take on additional responsibilities. I quoted from Nelson Mandela's autobiography, Long Walk to Freedom: "Education is the great engine of personal development. It is through education that the daughter of a peasant can become a doctor, that the son of the mine worker can become head of the mine, that a child of the farm worker can become the president of a great nation. It is what we make out of what we have, not what we are given that

separates one person from another".

My colleague argued the opposite; that we have made a rod for our own backs by creating too many qualifications. She said that these hurdles had put off many biomedical scientists from entering the profession. Other biomedical science disciplines, such biochemistry or haematology did not have as many post registration examinations.

My colleague's arguments were valid; in the 1990s cytology laboratories were grossly understaffed and departments had backlog of work of up to 12 weeks. New graduates chose other biomedical science disciplines in preference to cytology.

The situation in 2013 is similar to the 1990s; the laboratories are short staffed and very few new trainee cytologists are entering the profession. This time though, the main reasons are changes in automation and technology that has questioned the need for cervical screening using light microscopy, and employing staff to read them manually.

The debate was well received as it made the delegates think about the future.

Professionally for me this was the first time that I debated on a politically charged issue. It felt different to the usual scientific lecture that expressed facts.

Public Presentation #5 Advance Practitioner in cytology personal views.

IBMS congress,International Conference Centre, Birmingham. September 2001

I described my exciting new role as an advanced practitioner reporting abnormal cervical cytology in a District General hospital. The profession was encouraged to respond to this development but at the end of the talk I alluded to the RCPath statement that was

deliberately written to limit the career opportunities for this new grade of staff.To to my surprise I did not get the responses that I had expected. I felt that the audience were politically naïve, and not looking to the future. It appears that most AP's accept being supervised by medical colleagues and are unwilling to argue that their professionalism and qualifications are more than adequate to the task.

Public Presentation #6 Cytology: A dinosaur facing extinction Southern Cytology Society, Kingston hospital. October 2004. Thames Valley Cytology Society, St.Mary's Hospital. December 2004 ""

Diagnostic cytology as discipline has been in slow decline since the 1960s. In my talk I referred to the 1960s as the "golden age" of cytology. In 1960s the clinicians were "experimenting" with cytological sampling and Fine Needle Aspiration (FNA) was used extensively to sample different tissue sites. The laboratories were inundated with varied cytology samples that made the job interesting and challenging. This however changed over time as different treatment regimes for cancer demanded a more specific diagnosis that cytology could not offer. Clinicians slowly replaced the cytological samples with tissue biopsies. This change in practice had a major impact on the workforce as in the 1980s the cervical cytology workload increased exponentially due to introducing cervical screening programme.

Cervical screening in 2004 was also undergoing transformation.
All medical advances begin with technological change; indeed it was the invention of the microscope, shifted that diagnosis from the patient to tissue level.

The technological changes facing cytology in 2004 were based around the introduction of digital imaging, which promised to replace the workforce, and the introduction of prophylactic vaccines, which would stop cervical cancer from developing and should theoretically remove

the need for cervical screening.

Dinosaurs were slowly undergoing background extinction as they were too slow to react to changes in the environment. But it was a catastrophic event (Alvarez meteoroid impact theory) that caused mass extinction. Are cytologists the pathology dinosaurs?

I concluded that cytologists can avoid extinction if they adapt to change and gain new skills.

Public Presentation #7 Career planning for cytologists
IBMS Congress, International Conference Centre, Birmingham. September 2005.
Repeated for Southern Cytology Society, Guys hospital London. October 2006

This joint presentation with the Chief Examiner at the IBMS Congress was given to help raise the awareness of biomedical scientists, so they could plan for changes that were facing the profession in 2005.

I introduced the talk by with a historical look at cytology as a discipline and changes that have occurred in the past 20 years. Then I looked at the immediate future such as introduction of new liquid based technology and changes in recall period of patients that would lead to decrease in cervical smears. Lastly I examined the major impact of introducing molecular testing for Human Papilloma virus (HPV) DNA. This has resulted in a huge improvement in cervical cancer screening, but would lead to a reduction the number of people required to read the smears.

My colleague looked at the NHS Plan (Department of Health 2000) which promised to modernise the workforce and the pay through linking pay to the skills and competence. The NHS Agenda for Change also promised to remove professional boundaries (in 2013, this has not occurred). She then discussed the IBMS' qualification strategy that was being developed to evidence knowledge,

skills and competencies.

The conclusion looked at a future that would offer new opportunities but would require acquisition of new skills and developing new networks and alliances.

Public presentation # 8 BMS role in non-Gynaecological cytology

Scottish Association for Clinical Cytology, Perth May 2006

I was invited to give a talk on the role of biomedical scientists in non-gynaecological cytology at the Scottish Association for Clinical Cytology. The talk described my role at Ashford and St.Peter's hospitals and offered various possibilities for biomedical scientists to get involved in diagnostic cytology.

To my surprise I discovered that not a single biomedical scientist in Scotland was involved in any aspects of non-gynaecological cytology. Pathologists in general undertook the majority of the work at the expense of the biomedical scientist. Unlike England there was no shortage of pathologists in Scotland. Was this difference in practice purely due to a different economical model?

My scope of practice in non-gynaecological was unusual (with the exception of a colleague in Kent). But it did not happen by chance; I nurtured and developed it over many years. Talking to colleagues who also had a limited role in reporting non-gynaecological, it came to light that they had also developed it.

I concluded that my Scottish colleagues had not yet considered the technological changes that were to come which would affect the screening programme

Public presentation # 9 Biomedical Scientist Practitioners in non-gynaecological cytology: professional qualification, structure, training and examination format

BSCC Northern Spring Tutorial, Manchester Royal Infirmary, March 2007.

This was not the first time that I was urging the biomedical scientists to diversify. Although the prospects of molecular testing for cervical cytology was still some years off, I was still concerned that many biomedical scientists were still only focusing on cervical cytology. I was alarmed when during the break I talked to newly appointed graduates who told me that non-gynaecological cytology in their departments was solely practiced by pathologists. I hoped that my presentation would inspire some reflection on current practice.

Public presentation # 10 Extending the roles in non-gynae-A UK perspective

17th International Congress of Cytology Edinburgh, Scotland, May 2010.

This talk given to an international audience celebrated the UK's achievement in involving biomedical scientists in non-gynae cytology. In many European countries and in the US, the role of biomedical scientist is still limited to the screening of cervical smears, as pathologists have managed to totally exclude biomedical scientists. During the break I spoke to many European colleagues who felt frustrated by a lack of progress in their counties, and felt threatened by changes that technology was about to bring.

APPENDIX 7 CYTOPATHOLOGY REVIEWS

Amazon.co.uk reviews

Excellent modern text book written in a conversational style. Very different to other text books, lots of references and a great resource. Self assessment questions as you go along and further reading questions at the end of each chapter to help you understand each topic. Suitable for anyone interested in cytology, lots of pictures will make an excellent reference atlas.

A well written and structured text on cytopathology. It takes you on a journey in cytology, bringing the subject to life with numerous colour photographs and drawings. It covers the basic topics, and the last 7 chapters cover the more complex subjects including molecular pathology. The layout is good and easy to read; it does not cloud you with heavy jargon and explains every new termed introduced to ensure the subject is understood, quite different to other books in cytology.

This book is a must have for anyone who practices cytology whether it be in the UK or from overseas. The book is very well presented with easy to read text with key points, summary features, self assessments, case studies and definitions of terminology and procedures throughout. The book is full of high quality diagrams and photographs to support the text and aid the learning process. This book is suitable for cytoscreeners/cytotechnologists, biomedical scientists, trainee pathologists and consultants. It is an excellent reference book for anyone studying City and Guilds Diploma in Cervical Cytology, Advanced Specialist Diploma in Cervical Cytology, Diploma in Expert Practice and FRCPath. This book is excellent value for money and certainly fills the gap in the market.

I read this book when I was working on my placement in a cytology lab. It's really easy to read, and to understand for anyone, who like me, knows only very basic cytology from what they've done on their degree. The many pictures make it very easy to understand what the text is describing. It's really bright, which for a science-based book is really impressive, as so many

books on similar subjects look so boring. It gave me enough information to have a good understanding of the subject, and to make the most of my placement. I would definitely recommend it!!

This book hits the spot! Many text books are far too daunting for the average trainee cytoscreener or trainee biomedical scientist. This, however, covers the basics of gynaecological and non gynaecological in just enough detail to enable trainees to gain the knowledge needed. The diagrams and images are clear and contribute to the quality of the text. The self check questions and discussion questions serve to ensure understanding and promote further study. The content of the gynaecological section will be invaluable to those studying for the City & Guilds Diploma and the non-gynaecological section is equally as useful to biomedical scientists wishing to complete their Specialist portfolios or Diploma in Non-gynaecological cytology. I would recommend this book to every lab as a useful addition to their library.

A really great new cytology book that is definitely the best on the market. Loads of excellent photographs to bring the subjects to life and the text is presented in a clear and logical manner. It even covers semen analysis very comprehensively, while chapter 13 entitled "Advances in cytopathology" ensures the material is bang up to date. Every lab must have a copy of this book on the shelf!

As the title suggests, this book covers all aspects relevant to the subject of cytopathology and makes for easy and interesting reading. The layout is excellent with clear and good quality photographs. The keyword boxes in the margins give concise definitions and are a great help. This book is an excellent aid for students and practicing cytologists and I would definitely recommend it. Great value!

APPENDIX 8 CURRICULUM VITAE

CURRICULUM VITAE

BEHDAD SHAMBAYATI
MSc CSci FIBMS

Email:
Behdad.Shambayati@asph.nhs.uk

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Present Post: Specialty Lead /Hospital Based Programme Coordinator/Person Responsible for HFEA

Employer: Ashford and St. Peter's Hospitals NHS Foundation Trust

EDUCATION AND QUALIFICATIONS

RCPath/IBMS Advanced Specialist Diploma in Cervical Cytology	2001
IBMS Examination in Interpretive and Diagnostic Cytology	1998
MSc in Clinical Cytotechnology, (Distinction)	1996
Imperial College Diploma in Cytology	1995
Diploma in Management Studies (DMS)(Merit)	1992
IAC Registry Examination (Recertified)	1991
BSCC Certificate of Competence	1989
FIBMS by examination	1988
HNC in Medical Lab Sciences	1986

AFFILIATIONS

Health Profession Council (HPC) Clinical Scientist registration CS09983

Chartered Scientist 109/000087

Fellow of Institute of Biomedical Science (00123536)

Member of British Society for Clinical Cytology (88003583)

CPD

I take part in both the Royal College of Pathologists and the Institute of Biomedical Sciences CPD schemes.

AWARDS

Cytology Team; winner of Ashford and St.Peter's Hospitals Staff awards "Pride in Our Team" award - March 2011

Personal Nominee for Ashford and St.Peter's Pride in Our Team Award. March 2010

Best Presentation – DOH "Influencing the Future Leadership Progarmme"- June 2010

NHS Improvement Certificate of Excellence "for outstanding performance and exceptional commitment to team work" - 2009

EMPLOYMENT HISTORY

September 2011-present

Surrey Pathology Service, Ashford and St. Peter's Hopsital NHS Trust

Job title	Specilaty Lead-…Consultant Clinical Cytologist
Responsibilities	Service provisions across three hospitals; Ashford and St.Peters Hospitals Foundation Trust., Frimley Park hospital Foundation Trust and Royal Surrey County Hospital

Achievements	Integration of cytology services. Implementation of HPV testing in Surrey

September 2006- September 2011

Cytology Department, Ashford and St.Peter's Hospitals NHS Foundation Trust

Job title	Consultant Clinical Cytologist /Hospital Based Programme Co-coordinator
Responsibilities	Successfully combine a managerial/clinical role within the department. Nominated scientific lead and Hospital Based Programme Coordinator across the cytology and colposcopy services. Report abnormal cervical smears and non-gynae samples including Fine Needle Aspirate and EBUS samples
Achievements	In collaboration with NHS Improvement agency redesigned cervical cytology service using Lean methodology Setup onsite microscopical assessment of sampling adequacy for all FNA, Bronchoscopy and EBUS procedures

April 2001-Sept 2006

Cytology Department, Ashford and St.Peter's Hospitals NHS Trust

Job Title:	Clinical Cytologist
Responsibilities:	In technical charge of the Department to include clinical reporting of abnormal cervical smears and selected non-gynaecological cytology samples

Achievements	Lead a seamless merger of Ashford and St.Peter's laboratories to a single site.
	Successfully tendered for cervical screening backlogs and provided services for 28 laboratories in the UK, providing significant income for the Pathology department.

Nov 1997- April 2001

Cytology Department, Ashford and St.Peter's Hospitals NHS Trust

Job Title:	Clinical Scientist Grade B
Responsibilities:	In technical charge of the two cytology departments with some clinical duties
Achievements	Unification of the two laboratories' procedures prior to single site working
	Setting up a fine needle aspiration service at Ashford Hospital
	Setting up a rapid same day breast cytology fine needle aspiration service at Ashford Hospital

Oct 1989- Nov 1997

Cytology Department, St. Peter's Hospital, Chertsey, Surrey.

Job Title:	Chief Cytologist (MLSO 3**)
Responsibilities:	In technical charge of the cytology department
Achievements:	Expanding cytology services from a small diagnostic unit to a full cervical screening service for North West Surrey Health Authority
	Computerisation of the cytology department
	Involved in successful tendering for cytology work from two local private hospitals

	Setting up a fine needle aspiration service at St.Peter's Hospital
	Setting up a rapid, same day, breast cytology fine needle aspiration service at St.Peter's Hospital
	Setting up a rapid, same day, fine needle aspiration service at a local private hospital
	Implementation of full quality control procedures in line with current guidelines

1988- 1989

Ravenscourt Laboratories Chiswick, London Department of Histology and Cytology

Job Title:	Senior MLSO
Responsibilities:	Provide a diagnostic cytology and histology service underthe direction of the laboratory manager
Achievements:	Setting-up a comprehensive cytology service to this newly opened pathology laboratory
	Setting-up a diagnostic immunocytochemistry service
	Involved in successful tendering for cytology services

1983-1988

Department of Histopathology Royal Postgraduate Medical School - Hammersmith Hospital

Job Title:	Trainee MLSO/ Basic Grade MLSO
Responsibilities:	To train in all aspects of diagnostic Histopathology including, electron microscopy, histology, neuropathology, immunocytochemistry and cytology

Achievements:	Trained in all aspects of routine histo/cytopathology and obtained the relevant qualifications

PROFESSIONAL ACTIVITIES

Board member of Academy of Healthcare Science (AHCS), Cellular Sciences (2012-date)

Board member for Cellular Science representing NHS South; National School of Healthcare Science (NSHCS) (2012-date)

Chair of RCPath/Conjoint examination board; (2010 to 2013- three year fixed term)

IBMS representative on NHSCSP “ABC 3” working party (2010-2012 project completed)

QA Scheme Organiser for Cervical cytology and Technical Quality Assurance Scheme for South East Coast (October 2010 - date)

QA team member South East Coast; (2007 - date)

IBMS Chief Examiner (Jan 2007 - date)

IBMS representative on NCCETC (2005 – 2010)

IBMS Deputy Chief Examiner for Cytology (2002 – 2007)

Member of NHSCSP Working Party on Technical EQA in Cytology (1999-2000)

Examiner for NHSCSP Certificate Gynaecological Cytology (2000-date)

Examiner for IBMS Examination in Interpretive and Diagnostic Cytopathology (1999-2000)

Member of IBMS Scientific Advisory Panel (1999 - date)

Examiner for RCPath/IBMS Certificate in Advance Practice (2001-date)

CPA inspector (1997-2001)

External examiner for the MSc course Clinical Cytopathology of the University of London (1997-2000)

Member of BSCC council (1997-2000)

BSCC regional representative for Southern Cytology Society (1993-1998)

Thames Valley Cytology Society meetings secretary (1994-1998).

TEACHING EXPERIENCE

Part-time lecturer on the IBMS FIBMS course at Bromley College of Technology (1992 – 1996)

Invited lecturer for the MSc courses at University of Westminster and BSc courses at University of Surrey (2007 – date)

Training and mentoring of cytology students at all levels; from experienced pathologists to trainee cytology screeners, at many training schools in UK including; Northwick Park Cytology Training School, the Welsh Cytology Training School, the Sheffield cytology training school, the Birmingham and the South West Cytology Training School (2001 - date)

PRESENTATIONS

Histopathology Study Day, London Deanery, 8 March 2013 “Serous effusions”

British Association for Clinical Cytology, Keele University, September 2012 “debate – Cytologist an endangered species”

IBMS Congress ICC Birmingham September 2011 “case studies”

IBMS Congress ICC Brimingham September 2011 Breakfast session A Molecular Future for Cellular Pathology – an interactive debate (panel member)

17th International Congress of Cytology May 2010 Edinburgh, Scotland “Extending the roles in Non-gynae-A UK perspective”

IBMS Congress ICC Birmingham September 2009 “BMS role in reporting non-gynae”

East of England Cytology Training Centre-March 2008 “Serous effusions”

IBMS Congress ICC Birmingham September 2007 “The importance of cancer MDTs”

BSCC Northern Spring Tutorial-Manchester Royal Infirmary, March 2007 "Biomedical Scientist Practitioners in Non-gynaecological Cytology: professional qualification, structure, training and examination format.

Southern Cytology Society- Guys and St. Thomas's Hospital October 2006, "Career planning for cytologists"-(Jointly with Mrs E Hewer)

Scottish Association for Clinical Cytology, Perth May 2006 "BMS role in Non-Gynae Cytology"

IBMS Congress ICC Brimingham September 2005 "Serous effusions"

IBMS Congress ICC Brimingham September 2005 "Career planning for cytologists"-(Jointly with Mrs E Hewer)

IBMS Congress ICC Brimingham September 2005 "Case presentations"

Birmingham Cytology Training Centre, July 2005 "Biomedical Scientist training"

Thames Valley Cytology Society, St.Mary's Hospital Dec 2004 "Cytology A dinosaur facing extinction"

Southern Cytology Society October 2004-Kingston Hospital "Cytology; A dinosaur facing extinction"

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