

Good Practice in University Chemistry Departments



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The Athena Project is based at the Royal Society. Athena's aims are the advancement and promotion of the careers of women in science, engineering and technology in higher education and research and to achieve a significant increase in the number of women recruited to top posts.

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Foreword

We are delighted to present the findings from this joint initiative by the Royal Society of Chemistry (RSC) and the Athena Project. The RSC and Athena have worked together since 1999 when the Athena Project started. The aim has been to identify and validate and to develop, support and disseminate good practice in the recruitment, retention and career progression of academic chemists.

This report is an extension of that cooperation. It builds on previous work by both organisations; in particular the RSC's two reports, its 2000 *Study of the Factors Affecting the Career Choices of Chemistry Graduates* and its 2003 report *Recruitment and Retention of Women in Academic Chemistry*. The aims of the Athena Project are 'the advancement and promotion of the careers of women in science, engineering and technology in higher education (HE) and research and the achievement of a significant increase in the number of women recruited to top posts.' In support of these aims Athena has published 24 reports based on the good practice developed by its partner universities.

What has emerged from our work is that whereas good practice benefits all, men and women, staff and students alike, bad practices seem to prejudice incrementally women's career progression. This report, although specific to chemistry, offers a valuable insight for other science and engineering disciplines. We commend its findings to all who take responsibility for, are interested in, or who are pursuing careers in academic chemistry.

The staffing situation in chemistry is changing with a slowly improving trend in women's representation at all levels against a background of a decline in the number of chemistry departments. In terms of women's career progression, chemistry has improved its position in comparison with other physical and engineering sciences, but what remains a concern is the smaller proportion of women than men choosing to make the move from post-doctoral research to university lecturer.

In the best departments there is much good practice. Many of the changes in practices and procedures that they have successfully introduced were not expensive, but required understanding and planning. In retrospect, the changes now seem simple and make common sense to those who made them, they are just 'how we do things round here'.

Over the next two years the RSC and Athena are planning a UK dissemination programme to 'share the best'. Towards the end of 2006 we will revisit this report and review the good practice in UK chemistry departments. We hope that all the departments who took part in this study will take the opportunity to review their progress; and that others, who have learnt from this work will do the same. We hope to find that this and the earlier reports have made a difference to the enjoyment of careers in academic chemistry - a difference which will benefit women and men in chemistry, and their families, and help to secure the future for the next generation of chemists.

Simon Campbell, FRS
President, Royal Society of Chemistry

Nancy Lane
Chair, Athena Project

Summary

The purpose of this joint initiative by the Royal Society of Chemistry and the Athena Project was to collect and disseminate information on the good practice in academic chemistry departments. The information collected and the examples described here provide a baseline against which future progress can be measured.

The introduction describes the background, approach and methodology and the 25 departments who contributed to this study. The departments all demonstrated good practice and an awareness of the keys to the enjoyment of successful and rewarding careers in academic chemistry. Their progress to date and the foundations they have for future progress is clear. The RSC and Athena now have a baseline against which to measure that progress. The study does not offer a window onto those departments who choose not to take part. However, it is hoped that they will use this report to benchmark themselves and will take part in the planned re-run of the checklist in 2006.

The completed checklists, the follow up discussions with heads of departments and the five departmental visits, all produced a wealth of good practice, some in plan, perhaps as a result of this initiative, some new and some well established. This made it difficult to attribute fairly the good practice described. The device used to showcase the good practice that is in place in many UK chemistry departments is the 'Chemistry Department, University of Utopia.'

The section on sustainable careers explores both structural barriers and individual constraints on career progression in chemistry and HE. Together they make it difficult even for the best departments to appoint and retain the small number of women chemists in the supply chain. The issues are discussed in the context of individuals' opinions and experiences and the characteristics displayed by the best departments.

A brief statistical overview places chemistry in the context of other science, engineering and technology (SET) disciplines. A fuller picture of the staffing changes year on year, which underpin this and the RSC's earlier reports, is available on the RSC website (www.rsc.org). There has been an improvement in the last five years but there is still a long way to go before chemistry achieves what Athena sees as the long term goal for all SET disciplines, when the percentage of women at all career levels reflects that in the level below, down to and including the undergraduate intake. Chemistry, with an average of 40% plus women at undergraduate level, compares well with some other science disciplines, but the supply chain breaks down at lecturer level when so few women choose to apply.

In the penultimate section of the report Key Performance Indicators (KPIs) for chemistry departments are proposed. They are based on the findings of the RSC's two previous reports and the work of Athena's partner universities. The KPIs' validity is endorsed by the experiences of the departments and academics who contributed to this study. However, their usefulness can only be tested in practice. It is hoped they will be tested and their utility reported by Pro Vice Chancellors, senior managers, Deans of research, faculty principals, heads of departments, and those responsible for the career progression of junior colleagues.

The final section, Next Steps, focuses on the key challenges for departments who wish to become, or to retain their status as, the employers of choice for young chemists, be they male or female. To achieve this requires a considerable and sustained effort to make the department's arrangements and procedures open, flexible, accessible and transparent, and for some will necessitate a significant change of culture. It is hoped that this report will open the door for discussion and for change.

The analysis of the returned checklists is presented in Appendix A. The checklist, which was completed by 25 university chemistry departments, is analysed under the headings of:

- good practice in personal and professional support and development
- appointment and promotion processes
- the departments' arrangements, structures and culture.

The analysis provides a snapshot of the state of UK chemistry departments and, with material from the follow up discussions with heads of departments and departmental visits, points up the areas where action can be taken to ensure a level playing field for women and men progressing their careers.

Finally, the checklist that was distributed to chemistry departments is reproduced in Appendix B.

1. Introduction

1.1 Background

In her foreword to the RSC's 2003 report *Recruitment and Retention of Women in Academic Chemistry*, Professor Julia Higgins, then Chair of the Athena Project and the RSC's project working group for the report, stated that the problem for chemistry is that it 'compares well with other science, engineering and technology (SET) subjects in the proportion of women undergraduates and postgraduate student it attracts (approximately 38%), but the proportion of women at post doctoral level falls to around 25%. Only around 2% of chemistry professors in the UK are women, which is one of the lowest proportions in any subject'. She concluded, 'we must move from a situation where some of the best chemistry departments can attract young women at a ratio of one woman to three men at postgraduate level, but then for whatever reason fail so that by the post-doctoral stage they have only one woman to twenty men. If these young women are leaving chemistry completely, the waste that this represents for chemistry and for the women themselves is unforgivable. If they are simply leaving academic research, the loss to chemistry departments of all that trained competence is unacceptable.'

The work described here picks up suggestions, from that report and the earlier RSC report a *Study of the Factors Affecting the Career Choices of Chemistry Graduates*, on the good practice which characterises a supportive culture in chemistry and offers a broad analysis of a range of UK university chemistry departments.

Thanks are due to the many individuals who contributed to the completion of the checklist and the follow up, who illuminated the issues through their personal experiences, who organised and took part in the departmental visits, and who contributed to the career progression case studies and to the examples of good practice included here.

1.2 Contributing Departments

The checklist was completed by 25 departments; those marked with an asterisk were also visited:

Bath *	Huddersfield	Salford
Birmingham	Imperial College London	Sheffield
Cambridge	Leicester	Strathclyde
De Montfort	Loughborough	Surrey
Durham *	Manchester	University College London
Edinburgh *	Nottingham	Warwick *
Exeter	Nottingham Trent	York *
Glasgow	Oxford	
Heriot Watt	Queen Mary London	

Of the 25 above, eleven are Russell Group universities, and three are post '92 universities. Of those in the last RAE, five departments were graded 5*, seven departments were graded 5, seven were graded 4, and five were graded 3a or b.

1.3 Methodology

In January 2004 the good practice checklist (Appendix B) was sent to heads of chemistry departments and their Vice Chancellors. Checklist returns were generally made by the head of department, but occasionally the questionnaire was filled in by another member of the academic staff or by a member of the administrative staff. A few checklists were filled in during a telephone interview with the head of department, and in one case the head of department was visited. The 25 departments for which completed checklists were obtained were followed up by telephone calls, mostly with heads of departments. Based on the information collected, five departments were selected for visits. The career progression issues thus identified were further explored in telephone calls with eight chemists, both men and women.

1.4 The Good Practice Checklist

The checklist was based on one used by Athena in 2003 to identify good practice in UK universities. It gave background and specific examples of good practice work from the Athena Project and the RSC. The sections covered:

- personal and professional support and development - covering career development, networks and mentoring
- appointment and promotion processes – the identification and support of candidates, appointments and promotions
- departmental arrangements, structures and culture - including workload, roles and responsibilities and departmental organisation and style

A number of the areas were not specific to women, and most respondents referred to their fairness in good practice. It was not clear whether in some cases ‘gender-blindness’ might obscure the understanding of the differences between men’s and women’s approach to their careers.

From follow up discussions it appeared that departments which had developed an understanding of the issues were likely to score their performance lower than others. Their usual response was that what they had done was just common sense, the changes made had not been large and they now needed to move onto the next and bigger problems. Departments found the checklist useful and:

- had used it to promote awareness of career progression issues
- had circulated it to female staff and this had prompted the raising of concerns which otherwise might not have been aired
- had used its arrival in the Vice Chancellor’s and the head of department’s offices as an opportunity to flag issues for chemistry
- had been prompted to look at their processes and take action (in one case to invite an external female academic onto their promotions committee and, in several, to review the integration of post-doctoral staff in departmental arrangements)
- had been prompted to make comparisons of their departments with ‘the best’, which gave them an idea of how their department ‘ranked’
- several heads of department had asked junior colleagues to complete the checklist to ensure it reflected reality and practice, rather than rhetoric and policy

Few heads of department had read either of the RSC reports; two who had commented that by the time they did, they had little to learn from it. However, one department, a major contributor of the good practice in the 2003 report, had set up a working group to consider the RSC’s second report, the *Recruitment and Retention of Women in Academic Chemistry*, and make recommendations.

1.5 The Site Visits

The completed checklists did not provide sufficient specific examples of good practice that might be useful to other departments as the checklists had been designed to allow departments to rate their achievements in specific areas rather than to collect instances of good practice. Consequently visits were arranged to five departments with what appeared to be good employment practices and a culture which supported career development. The final selection was dictated by time, others could have been included had diaries allowed.

The visits gave the opportunity to pursue some of the themes that were emerging with different groups of staff. The staff involved had varying lengths of service and experiences of working elsewhere. Where possible heads of sections and research groups, and academics with significant administrative responsibilities and recent successful experience of appointment and promotion processes, were included in discussion groups. The staff were sent a briefing document in advance of the visits which identified:

- their department as one with good employment practices and a culture supportive to the career development of its staff
- the purpose of the visit: to identify the realities behind the rhetoric; to explore their department's practices and processes; to get a feel for the impact these had on individuals' enjoyment of their careers in academic chemistry; to try to get behind what had been described as the department's welcoming, supportive and open culture; and to identify the changes that had taken place and what brought them about
- the RSC/Athena interest in what could be achieved at a practical, departmental level, what changes the culture for the better, what makes academic chemistry an enjoyable career and one that they would be happy if their son or daughter followed them into

Where practicable visits started and ended with short meetings with the head of department, and included separate discussions with professorial staff, senior lecturers/readers and lecturers. Sometimes professorial staff joined the head for the first meeting, and, when numbers were low, the senior lecturers/readers and lecturers were seen together. The meetings ranged around the theme of what made the department a good place to work and:

- their appointment, promotion, appraisal, training and development processes
- how staff and their contributions are supported, encouraged, valued and recognised
- the allocation of responsibilities and resources, and communications and committees

Post-doctoral researchers were the one group for whom, where possible, the meetings for men and women were separate. The focus of the discussions was different from those with the academic staff and included discussion on:

- their induction to department, whether mentoring and/or networking was encouraged and what information they had been given on who does what/where to go for what
- the extent of their involvement in the academic life of department
- the career counselling and development opportunities available to and taken up by them
- the level of support and encouragement to raise their profiles internally and externally
- their interest in continuing as an academic or in a career in chemistry

1.6 The Role Models

The telephone discussions with heads of departments and the departmental visits identified a number of potential 'role models' who were 'interviewed' on the telephone. Not all the contributions were individually written up, but the section on sustainable careers reflects their experiences.

2. A window into the future: the Chemistry Department, University of Utopia

Note: No one chemistry department displays all the features described here, but all the examples presented below are taken from one or more of the departments who participated in the study.

Some of the best local authority primary and secondary schools are a few minutes by car from the university. Many staff choose, and can afford, to live within a half hour's journey by car and those with children find it relatively easy to combine the school run with their commute to and from work. The campus is well-served by public transport so staff have a choice as to whether or not to drive. The day nursery on campus is well-regarded and well-used by parents.

The university campus is in a pleasant part of the city with open views and plenty of trees. The department occupies a much-adapted building with a welcoming entrance hall. The department's new annex is at one end of the main corridor and contains state of the art synthetic facilities. A broad central corridor links laboratories and offices, and this common space is much used for informal meetings and discussions. Staff pigeonholes are located outside the recently refurbished common room whose comfortable chairs and free tea and coffee assure good use by staff of all levels and research students. The original proposal to spend money on the staff room facelift out of the equipment budget was not popular, but most now agree that the department's management committee was right to push ahead with the project.

The notice board in the entrance hall is kept up to date with photographs of all staff, their office numbers and emails and a note of any significant period when they are out of the department, including the days not worked by part-timers and job-shares. Photographs in departmental publications reinforce and recognise the success of women at all levels from the mature second year woman student featured in the undergraduate prospectus, through the photograph of the mixed department cricket team on the corridor wall, to the departmental annual report giving pride of place to the woman professor recently awarded an FRS. Staff members' full names rather than initials are used on notice boards, and on telephone and email lists.

The allocation of staff offices is on the basis of need and the office of a professor of physical chemistry is next door to post-docs in one of the new interdisciplinary research groups. Office doors stand open when occupied. The departmental secretaries are in an open plan office with the technical and teaching support team, the departmental administrator and finance officer.

The process of change took time. A review in the late 80s recommended the merger of inorganic, organic, physical and theoretical chemistry but not a lot happened for ten years until the university forced a change in the arrangements for the head of department. The current Head of Department is in a different mould from his predecessors, who had the job for life or rotated it slowly round the heads of the main research groups. Now the headship is for three years with the possibility of a further two-year extension.

To the surprise of some, one or two academics who never got on with the previous head are now making a significant academic and administrative contribution to the department. The rotation of senior

management posts now means that there will be at least two academics with experience from whom a successor can be appointed. Bearing in mind the coming pattern of retirements, the head of department has made sure that younger members of staff are being given administration experience and is also thinking of having shadows for the two biggest departmental jobs.

The department now has an open review and reallocation/balancing of duties and responsibilities at the beginning of each academic year. There were initial disagreements about the fairness of the allocation of responsibilities, sharpened by the need to improve the RAE rating, and an unexpected crisis which showed how difficult it was to find out in a hurry who did what. Now individuals' contributions can be easily accessed via the intranet which makes it easy to arrange cover for most eventualities. Crises are a thing of the past. Recently two staff, previously on the receiving end of the benefit, stepped in and between them covered a colleague's teaching and administrative responsibilities, not just while he was away, but for the first six weeks of his 'return to work'.

The younger staff enjoy teaching more than they expected mainly because of the high quality of undergraduates attracted to both the university and the department. A strong signal that teaching is given a high priority is the awarding of an annual teaching prize.

However, the department's performance in the last RAE rating was at the time an unpleasant shock to the department and university alike, but has proved to be the catalyst for bringing together the department's new young academics in a campaign for team success. The lower than expected RAE score also served to focus everyone's attention on the constraints under which the department operated and what had to be done to turn the department around. The staff now joke about their previous complacency having been replaced by an air of realism (and business language) and an understanding of the concept of customers and their differing needs, be they students, or from industry, or from the research councils.

A task the Head of Department initially found difficult was feedback to staff unsuccessful in the promotion round. To help in this process he examined the facts and produced a list of the promotion successes of the two previous years, and recorded individuals' scores against the factors in the promotion criteria. Thus armed with the facts on publications, teaching, grant applications and successes, he was able to give useful feedback. This information is now available on the department website along side the university promotion criteria and is featured in the annual open meeting for staff which the head of department holds before the start of the promotion round.

The potential for a conflict of interest between principal investigators and their post-docs has recently come to the fore with the legislative changes on fixed term contracts and annual appraisals. The provision of career advice for post-docs is now a university requirement.

The department is big enough for good science but not so big that people don't know each other. It has not become sectionalised, and people have time for each other. The younger academics, although given a lot of support, are made to feel they are fulfilling the role of an independent academic but with a safety net in place. They are encouraged to make decisions and are allowed to make small, but not big, mistakes. The department gives new lecturers a start-up grant of £20K over three years and a postgraduate studentship.

The recent job-share in one of the administration posts took time to settle down but the department can now see the benefits of having two people with different skill sets for not much more than the price of one. Recently one academic has chosen to go part-time. The Head of Department left the 'saving' with the academic's group to use whatever way would help to fill any gap and to allow for a future return to full time should she so wish. The Head of Department works from home when he needs to take his share of child care duties. The age-range of the department and their offspring have prompted a thriving cottage industry in 'baby-sitting'.

Rather than burden the small number of women academics on the staff, the department sent one of their senior administrative staff on a counselling course so that she can support the department's welfare tutor.

The department has good technical and general support and equipment is carefully looked after. It is not taking up space, buried in locked rooms to prevent others from using it. Technicians and academics alike are prepared to spend time teaching others, including post-docs, how to use equipment to get the best results.

3. Sustainable careers: the issues

This section explores issues of career progression, the structural barriers in chemistry and HE and the constraints on individuals which make it difficult even for the best departments to appoint and retain the small number of women chemists in the supply chain. The experiences of one man and four women with different trajectories to their present positions near or at the top of the academic career ladder are highlighted. Their experiences, and the influence of opportunity, location and luck recounted by others who contributed to this study, suggest that for many the career ladder may be more realistically described as a greasy pole. Their opinions varied on the significance of:

- a PhD or post-doc position in the right department with the right person
- time abroad at post-doc level working in a new culture with different rules, different ways of thinking and doing, and different goals
- the gulf between a post-doc and first lecturer post (a gap which in the 60s and 70s was covered by a range of ad hoc arrangements that would not be acceptable today, and in the 80s and 90s by fixed term demonstrator and temporary lecturer posts which again would now be regarded with suspicion)
- identifying your niche and being able to 'sell it' and 'sell yourself'
- the support and encouragement of being in a cohort of academics of similar age /stage
- size and powerfulness of department and research group (in terms of successful grant applications set against comfort factors)
- the importance of establishing industry links
- bringing in big grant income rather than publication rates

Alison Rodger

Reader in Biophysical Chemistry at the University of Warwick

Alison, with a first degree from Sydney in 1982, came as a post-doc to Cambridge with her husband, also a chemist. Cambridge was the first place that offered them both opportunities to work. In Australia at the time overseas experience was seen to be important. Alison had plenty of teaching experience at Cambridge and later at Oxford. Her work has taken her across a number of disciplines but she had no post-doc experience in an 'established' big research group. She has not had any one individual positioned to mentor and look out for her career, but she has a number of good colleagues, including her husband, who have supported and encouraged her. Alison was appointed to a lectureship at Warwick in 1994. She was promoted to senior lecturer in 2000 and to reader in 2004. Her husband, previously at Reading, joined her at Warwick in 1999 and was recently promoted to professor. Being able to live as a family (with two children age 8 and 6) and close to their work has been a definite plus in recent years. Last year Alison was appointed to head the university's EPSRC funded (£5 million for eight years) MOAC Doctoral Training Centre.

- the need for women to over-achieve to get to the top and the consequent high standards they set for their younger colleagues

On some issues there was unanimity:

- the importance of having a passion for your science is the key driver of a sustainable career
- the importance of taking every opportunity that arises - you can usually make something out of it or where it leads you
- the importance of good referees - their reputes and their understanding of your area and what makes a good reference
- the importance of mobility particularly for dual career families exacerbated by the closure of departments
- the value of the EPSRC first grants scheme as a valuable first 'leg-up' for young academics
- the value of senior colleagues (in the right places and of the right age) who teach you the rules and look out for you
- a generous attitude by senior academics not going for every grant but encouraging junior colleagues to access funds/get grants in their own name
- the difficulty, if not the impossibility, of taking time out of science and getting back into a research career

It was notable that the departments visited displayed similar characteristics:

- a sense of belonging, empowerment, common purpose and ownership of the department's value set
- an open, informal, welcoming, generous and supportive culture that fostered independence
- staff who recounted with a certain pride those few colleagues who had left, lured to 'plum jobs' elsewhere
- a cohort of young academics with young children so 'presentism' was not an issue - men and women alike had family responsibilities to go home to

Claire Carmalt

Reader in Inorganic Chemistry at
University College London

Claire took her first degree in 1992 at Newcastle and completed her PhD there in two and a half years in order to take up a post-doc in Austin, Texas. Working there for an FRS, getting a new lab up and running for him, in a different culture where she was younger than colleagues at the same stage, was valuable, as was the number of papers she wrote and co-authored. Knowing how few posts were available in the UK, Claire applied for and was awarded a Royal Society Dorothy Hodgkin fellowship which she took up at University College in 1997. There, with lab space, an office and the opportunity to do some teaching, Claire has been well supported by three heads of department. While on her research fellowship she got through her three-year probation and became an accredited teacher. UCL offered her a lectureship in 1998 to start in 2001 at the end of her fellowship. In 2002 she became a senior lecturer and a reader in 2004. She came back from maternity leave at the beginning of the 2002 academic year not having written all the papers she planned. However, she did have a colleague who looked after her group and now has a colleague who covers her late labs which do not fit college day nursery hours. Claire juggles a child, with whom she shares a longish commute by train, and a husband (a chemist in industry) with a tedious commute in the opposite direction. She hasn't attended as many conferences as she used to. Her strike rate on grant applications has slowed down, and although she managed this summer to catch up on her paper writing she expects a slow down with new people in her lab not yet ready to publish. For Claire the future balance of her priorities, her family, her research and her career progression, is not absolutely clear.

- staff who know what is needed for promotion and a high success rate for those put forward
- no prima donnas or overly dominant research groups but a recognition of the importance of interdisciplinary work
- ease of access to equipment and expertise engendering a team approach
- heads of departments who consistently downplayed their role but whose influence in changing the culture was recognised by their staff
- a regular rotation of the headship of department and other senior roles which gave more staff experience of the responsibilities of power
- a relaxed approach to everything except the importance of their science and that of their department as a whole

Susan Gibson

Professor of Chemistry at
Imperial College London

A dual-career couple, Susan has two children age 6 and 4 and a husband recently appointed FRS working in the same department. After a degree in Cambridge in Natural Sciences, a PhD and post-doc in Zurich, Susan got one of the last round of 'new blood' lectureships at Warwick in 1985. She was one of three 'new blood' chemists appointed, the trio formed a group who lunched together and supported each other. In 1990 Susan went to Imperial. She married in 1993 and a year or so later was joined by her husband who moved from Durham. Susan was promoted to reader in 1996 and in 1999 was appointed to a chair at Kings College London. The close of King's chemistry saw a move back to Imperial in 2003 with her team of 9 researchers. In 2003 Susan won the first Rosalind Franklin Prize and has just finished a busy year as prizewinner. Her family's needs means that she has to put her work behind her when she gets home. One unsung benefit of working in London means she has not had to move house as she shuttled to Kings then back to Imperial.

Ivan Parkin

Professor of Inorganic Chemistry at
University College London

A dual career family, Ivan has a wife who is also an academic chemist, a daughter of two and a half, and a second child on the way. After a first degree and PhD at Imperial and a NATO fellowship in the States, Ivan took a temporary lecturer post at the Open University. With grants from Leverhulme and EPSRC, two post-docs and a prolific publication record he was offered a lecturer appointment at UCL, but found getting his laboratory established there hard going as a probationary lecturer with a full teaching load. He turned a serendipitous contact with Pilkington Glass into a valuable established relationship. Promotion to senior lecturer in 1997, then reader and, in 2000, professor, with a continuing high publication rate now makes it somewhat easier to sustain his research funding. Ivan is not sure if his career would have progressed as it did, had his daughter arrived before he became a professor, and currently is even less certain about the combined effects of two children, and the RSC's recently awarded Beilby medal

A long hours culture/ 'presentism' and competitive pressure - were not seen as issues by staff in the departments visited. Nor was there an emphasis on results at the expense of process leading to macho attitudes or any suggestion of the departments functioning as male club.

Although clearly hours worked were long when research dictated; this was balanced out by the ability to work at home and take time when family needs had to prevail. The level of support and encouragement offered to young lecturing staff, the strong team spirit of the departments, the openness and the feeling of involvement in the running of their departments all militated against an overly competitive environment.

An improvement in the way lecturers were supported in their first appointment was observed on the visits. New appointees were not left to their own devices. Departments went to considerable lengths to protect probationary lecturers from overburdening teaching

and administrative workloads, while they were developing their research, and provided support and mentoring and encouraged, or required them, to gain teaching qualifications.

In some departments clear and demanding standards of performance in terms of research publications, successful grant applications, and student supervision were laid down for probationers and probation periods were extended if the standards were not met. It was apparent that where the challenging demands are matched by support and encouragement - 'young' lecturers flourish.

However, the improvement in the experiences of lecturers was not mirrored for post-docs. Even in the best departments post-docs fell betwixt and between. Whereas the success and welfare of undergraduates and postgraduates was seen as key to the department's success, with a variety of departmental 'officers' charged with specific responsibilities, the career development of post-docs was left to their 'principal investigators', despite the recognition by heads of departments that the interests of post-docs and their PIs were not the same. Post-docs often appeared isolated and few were encouraged to take up training and development opportunities, or given any 'departmental' induction.

There seemed to be a difference between men and women. Male post-docs seemed to have lower expectations and thus a greater satisfaction with their lot by comparison with their female colleagues, whose expectations had been higher and who 'needed' to be sure of where they were going over the next five years or so. The men described a post-doc as something that had to be got through - a part of the apprenticeship. They took a more relaxed approach and assumed a successful outcome, given that they were good enough. In contrast, the women's higher expectations lead to frustrations which men either choose to ignore or did not recognise. The women, and some men, referred to their partners' careers as a significant factor in their career planning and in their career outcomes. Young men and young women shared a concern about the practicalities of women having children and maintaining the momentum of their careers in academic chemistry.

An issue raised by post-docs at all the meetings was the combined uncertainty of short-term contracts if one stayed in research and the difficulty of getting academic posts. Post-docs also observed that, if you did get an academic post, you then faced the constant battle to raise grant funding and the conflicting demands of teaching and administration, all of which took you away from research.

One department, where in the event the visit did not go ahead, was reluctant for the meetings to include their post-doc staff. The concerns that emerged from the sessions with post-docs in the departments visited made this reluctance understandable and served to emphasise that, if the number of women coming through to lecturer level and above is to increase significantly, the post-doc issues must be tackled with the openness and energy that has gone into the support of new lecturers.

Lesley Yellowlees

**Reader in Inorganic Chemistry at
*Edinburgh University***

Following a first degree from Edinburgh in 1975, Lesley decided against chemistry and went into NHS management. Marriage to a chartered accountant, and two and a half years in Australia caused a change of direction and Lesley came back to a PhD completed in 1982 followed by post-docs in Edinburgh and Glasgow. She accepted a three-year fixed term demonstrator post at Edinburgh. This gave the department the opportunity to find out if she was serious about her career and her ability to deliver, and gave Lesley the opportunity to see if she could balance teaching, her own research and a second child. Lesley was offered a lecture post at the end of her demonstrator contract. She accepted the advice not to go part-time, coupled with the opportunity to work at home when she needed, provided that she was in telephone communication. Promotion to senior lecturer and then to reader followed. A three-year 40% secondment to associate dean of the faculty gave Lesley valuable connections and insight into university planning and procedures, but she decided her research would suffer if she continued for a second term of office. She is now using her university experience to benefit the department as a member of its senior management team.

4. Fifteen years of statistics: progress yes, parity when?

This section updates the data first presented in the report *Study of the Factors Affecting the Career Choices of Chemistry Graduates* published in February 2000. This analysis, like the 2000 analysis, is based on data from the Higher Education Statistics Agency (HESA). That report analysed HESA data for the years 1994/95 to 1996/97. The full data set from that report and equivalent statistics for the years to 2002/03 is available on the RSC web site (www.rsc.org).

4.1 Chemistry Students

The original analysis showed that a higher proportion of women studied chemistry at first degree and postgraduate levels than either physics or engineering but that chemistry was less successful in subsequently attracting women into academic careers. The increase for undergraduates, from 33% women in 1988 to 37% in 1997, has continued with 42% women in 2002. At postgraduate level the proportion of women rose from 22% in 1988 to 33% in 1997 and to 39% in 2002 but remains well below the average for all subjects (in 2002 women represented 56% of all undergraduates and 48% of all postgraduates)

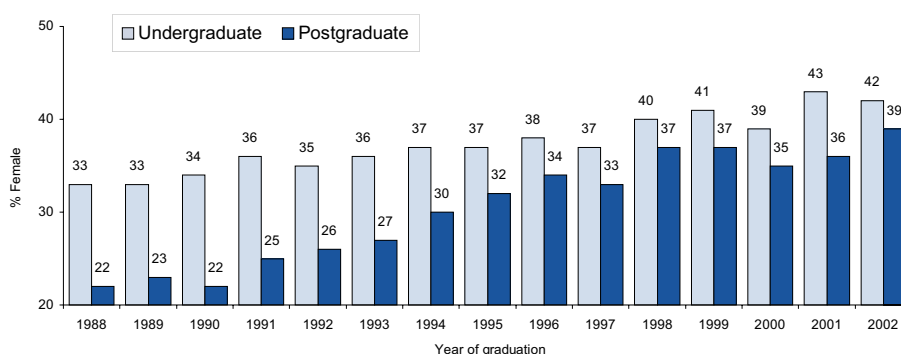


Figure 1. Percentage female chemistry students

Although there has been an increase in the proportion of women at both undergraduate and postgraduate level, the annual rate of increase has slowed. The proportion of female chemistry undergraduates is now increasing at just 0.25% a year, suggesting that it will be thirty years before parity is achieved (2033). The proportion of female postgraduates is rising at a higher rate, but again the growth has slowed to 0.54% annually. On this basis parity will not be reached for twenty years (2023).

4.2 Chemistry Staff

In 1997 3705 staff were employed in chemistry of whom 585 were women (16% compared with 33% in all subjects). By 2002 the overall number had increased slightly, with 3785 staff employed by 69 higher education institutes (HEIs) of whom 810 were women, with women now representing 21% compared with 39% in all subjects.

¹ HESA cannot accept responsibility for any inferences or conclusions derived from the data by third parties.

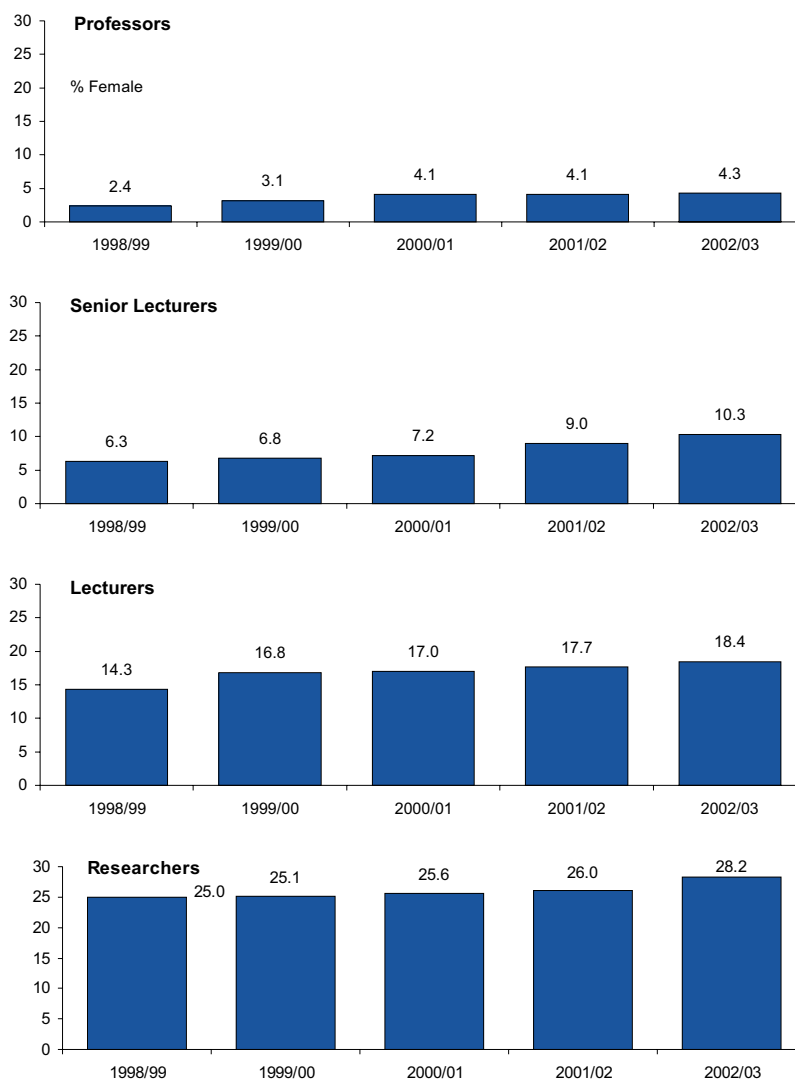


Figure 2. Percentage female chemistry staff 1998/99 to 2002/03

In terms of vertical segregation in 1997 the percentage of women fell dramatically the higher the grade (women represented <1% of all professors, 4% of senior lecturers, 13% of lecturers and 22% of all research staff) the situation shows an improvement with women in 2002 representing 4% of professors, 10% of senior lecturers, 18% of lecturers, and 28% of researchers)

4.3 Age and Status

Unlike academia as a whole, in 2002 female staff in chemistry were on average younger than their male counterparts:

- women: averaged 37 years (compared to 42 for all subjects)
- men: averaged 44 years (compared to 45 for all subjects)

There were important differences by grade:

- professors: 73% of women are under 50 years (men 42%)
- senior lecturers: 70% of women are under 45 years (men 41%)

-
- lecturers: 17% of women are under 30 years (men 14%)
 - researchers: 13% of women are under 25 years (men 11%)

4.4 Conclusion: towards parity

Across all subjects the analysis suggests a small but steady improvement in the proportion of women in academic grades. From 1994/95 to 2002/03 the increase is about 1.3% a year. If this trend continues, women will form 50% of academic staff in approximately 2013/14. The trend has accelerated a little: a previous analysis based on 1990s data suggested that parity would not be achieved until 2020. The rise in professorships for women has been slower, about 0.8% each year. Again this has accelerated slightly since the 1990s - but it will still take a half century to reach parity in approximately year 2050.

In chemistry, the proportion of female chemists is increasing at 0.8% per year. The annual increase varies by grade and is just 0.6% a year for professors.

The proportion of female staff in chemistry is increasing by 0.8% each year. At the current rate, chemistry will achieve parity (all grades considered together) in 2028. This compares with 2102 for physics and 2237 for mathematics. However, parity in chemistry professorships is not likely for eighty years. The rate of increase in female staff may also be affected by the reduced rate of improvement in undergraduate and postgraduate numbers – on current trends parity for postgraduate chemistry students is predicted earlier than that for undergraduate chemistry students - further delaying the “Athena moment” of gender parity in staff.

5. Key Performance Indicators for Academic Chemistry Departments

The RSC’s 2003 report on the *Recruitment and Retention of Women in Academic Chemistry* suggested the characteristics of a supportive culture. The following Key Performance Indicators (KPIs) are freely adapted from these on the basis of work by Athena’s partner universities and the good practice identified during this study.

Although the focus for this work is women’s career progression, the indicators recognise the value of good practice for both men and women. They flag what departments need to have in place if they wish to be employers of choice and to provide an environment in which their academic staff can enjoy successful, sustainable and rewarding careers.

Three key indicators are suggested:

- An appointments process that encourages women and men to apply for academic posts at all levels
- Departmental career progression arrangements that encourage women and men to remain in academic chemistry
- A departmental organisation and culture that is open, inclusive, transparent and supportive of its staff

It is hoped that departments will use these indicators and report on their utility. Departments interested in testing them should start from a basis of fact, by reviewing their gender profile from undergraduate to professorial and should include all departmental staff not just the academics. Then it is for the department to discuss and decide how it measures itself against these indicators and demonstrates its commitment to their achievement. The following are suggestions to help start that discussion.

5.1 An appointments process which encourages women and men to apply

The Head of a grade 5* department commented:

Departments should not be complaining that they would appoint women if they were available, but there are too few out there. They should be asking, “Why are women not applying here?”

The measures used for this could be:

- the percentage of women candidates at each stage of the appointment process – completed applications and short listing through to final selection and acceptance, with a year on year comparison of the results
- whether the department receives applications from women candidates at a percentage which reflects that in the labour pool, that is, in the grade below in the department and/or in the departments from which they would normally recruit

The encouragement needs to be positively demonstrated. For example:

- suggestions to existing staff who are eligible that they should apply – this reinforces their value to the department and the skills they have been developing
- the active engagement of all staff in publicising vacancies, suggesting potential candidates and reminding them of their role as talent scouts and ambassadors at conferences etc
- making sure the selection process allows all candidates to demonstrate their achievements, skills and potential
- ensuring that those involved in selection are aware of the differences in the way women and men ‘sell’ themselves in terms of their achievements
- using the selection process to ‘sell’ the department and what it can offer to candidates
- the inclusion of an external member, a non scientist, and a women on the selection panel
- the offer of positive feedback to unsuccessful candidates (to be given by the head of department to internals)
- selection criteria that state that in the event of more than one candidate reaching the requisite academic and research criteria, the final decision may take account of the staff profile of the department and the extent to which it reflects the student population

This indicator recognises that women apply and are not appointed, either because there is a better candidate or because when offered the post they decide against accepting it. The second of these reasons may or may not be solely due to the department. The other two indicators suggested cover areas which can be changed by departments and also apply to departments which are not recruiting new staff.

5.2 Departmental career progression arrangements which encourage women and men to remain in academic chemistry

The measures for this could include:

- the percentage of staff at all grades, including post-docs, who are included in a regular positive review of potential for promotion
- the percentage of staff trained as appraisers and appraisees

-
- the percentage of women and men put forward for promotion compared with the population
 - the percentage success rate for men and women put forward for promotion

The 'encouragement' needs to be positively demonstrated. For example:

- invitations to high profile women speakers to departmental symposia
- identifying women within and outside the department as role models
- the encouragement of staff who are ready for promotion to apply, while making clear to those who are not, what they need to do
- the provision of career counselling for all for whom promotion in the foreseeable future is unlikely
- holding open meetings at the start of each promotion round to clarify both procedures and criteria
- offering a mentor to all new appointees, not just probationary lecturers
- celebrating staff successes including those leaving to take up 'prestigious' posts and the successes of their partners and offspring
- keeping in touch with staff who have left
- a clear expectation on all academic staff to take responsibility for the career development of their junior colleagues
- a requirement on all research group leaders and supervisors to provide, or arrange for career advice to all research postgraduates and staff on time-limited contracts
- the Head of Department's own appraisal with their 'manager' includes a review of the career progression of junior staff

Much of the above apply to all staff at all levels. The 'supply chain' starts at undergraduate level. It is when moving from postgraduate student to post-doc that proportionately more women than men leave chemistry.

5.3 A departmental organisation that is open, inclusive, transparent and supportive of its staff

The measures could include:

- an objective assessment/measurement of the workloads of all departmental administrative roles and responsibilities, with a comparison between the workload and the prestige/value of the roles and responsibilities in terms of career development and progression
- a review of the gender and ethnicity of departmental staff holding, or of those who have held, positions of responsibility in the department, in the faculty and in the university
- a review of the gender and ethnicity of departmental staff who have not held positions of responsibility and who have not been nominated by the department for faculty/university positions and responsibility including committees and project teams
- a review of the gender and ethnicity of those eligible to attend departmental meetings

This could be demonstrated by:

- regular, open discussion of allocation of responsibilities to take account of equality of opportunity for career development
- the rotation of all posts, with set lengths of office which are publicised
- open access for all to information on workload
- a departmental induction for all which includes information on the culture of the department, including the unacceptability of any treatment or behaviour that denigrates or prejudices any minority within the department
- open departmental meetings
- the circulation of agendas and minutes of departmental management committees on the web/to all staff
- the inclusion of non-professorial staff in important committee roles
- ensuring that professorial appraisals take account of individuals' contributions as 'guardians' of departmental culture
- an open-door policy from the head of department down
- access to equipment, space and resources on the basis of need
- the inclusion of information on schools and childcare in further particulars for posts
- an indication in further particulars/departmental handbook that proposals for part-time working/job shares are welcomed
- the senior staff and men in the department taking advantage of the department's work-life balance policy and encouraging others so to do
- the full involvement of staff on fellowships in the opportunities provided by the department

6. Next Steps

The previous sections provide a snapshot of academic chemistry in mid-2004. The picture is not complete. It focuses on the best, the rest may have some way to go before they get into the frame.

In terms of the key challenges for departments who wish to become, or to retain their status as, the employers of choice for young chemists, be they male or female, a lot needs to be done. To achieve and to sustain this requires openness, flexibility, accessibility and transparency in departments' arrangements and procedure. For some departments this will necessitate a significant change of culture. It is hoped that this report will open the door for discussion and change.

6.1 Athena Project

Athena has started the next stage of its work. The checklist used for chemistry departments has been integrated with the university checklist and is being used by the universities that are taking part in Athena's 2004 Survey of Science, Engineering and Technology (ASSET). The findings from the survey will be published in 2005 together with case studies drawn from HE and research.

Work is starting to develop the key performance indicators suggested for chemistry into a set of indicators for use by employers across all SET disciplines and employment sectors.

6.2 The RSC

The RSC working with Athena will review the findings of this report and identify an action programme that will include a two-year dissemination programme based on this report. This is intended to bring together departments who contributed the good practice and some of the departments who did not. At the end of 2006 all UK academic chemistry departments will be invited to complete a checklist the results of which will be used to evaluate the impact of the RSC's work.

6.3 Chemistry departments

Many departments are doing the right things but only a few have positioned themselves as employers of choice for women chemists. It is hoped that this report will be discussed in every UK chemistry department and be used to formulate a local action agenda.

Departments are invited to test and comment on the suggested key performance indicators and to measure and report their progress.

Appendix A: the Analysis of the Checklist

Checklists were completed and returned by 25 departments. The checklist covered:

- personal and professional support and development, covering career development, networks and mentoring
- appointment and promotion processes – the identification and support of candidates, appointments and promotions
- departmental arrangements, structures and culture, including workload, roles and responsibilities and departmental organisation and style

A1 Personal and professional support and development

A1.1 Career development

Most departments (22 of the 25) expected or encouraged staff to participate in centrally provided **development programmes**. Some had systems to identify training needs (appraisal and mentoring), and to track training taken. Approaches ranged from the informal to an expectation that all staff would participate:

Part funding is available for external courses and membership of ILTHE (Institute of Learning and Teaching and in Higher Education) is encouraged with the application fee refunded

All staff (including post-docs) included in performance appraisal scheme which encourages staff to take responsibility for, and to reflect on, how they can develop themselves further and the annual appraisal provides the opportunity to discuss relevant training/professional development activities that might help them achieve their aims.

Seventeen (of 25) indicated that development opportunities included **entrepreneurship, IPR, people and financial management and other transferable skills**:

Staff are encouraged to develop spin off companies.

... highly active in business and entrepreneurship support and development with its own business partnership unit.

The innovation and enterprise unit provides information on, for example, intellectual property, business plan development, research, consultancy, and knowledge and skills transfer.

Departments were asked whether the responsibility for providing **career advice to junior staff** was allocated to specific individuals or post holders. The majority (22) allocated the responsibility for staff, fewer (17) for post-docs. The recent changes to fixed-term employment requirements was focusing attention:

There is a specific career management scheme for post-docs.

Post-docs get support from their academic supervisors in developing their careers... we have not engaged in a monitoring exercise, but this may be implemented.

... for researchers the appraiser would normally be the supervisor unless the appraisee objects. The number of appraisals an individual can carry out is restricted so a change of appraiser can be engineered without it being seen as the result of an objection.

The HoD sees agreed objectives, and specific requests for career development, he will arbitrate if agreement between the parties cannot be reached.

Junior academics are encouraged to take on departmental responsibilities which will help their CVs and improve their promotion prospects.

Academics are encouraged to foster a positive attitude towards professional development and in recent years staff have made extensive use of the staff development programme particularly the training courses for new academics.

The question as to whether women and junior staff were encouraged to present at, and contribute to, **departmental research seminars** met the almost universal response that all staff were treated equally and were encouraged to do so. The question on encouraging women to raise their profile externally met with a similar response on the importance of this for all staff:

Where appropriate staff are supported financially to attend and present at major national and international conferences.

Very strong support for female staff to raise the profile of women in chemistry.

Participation in local RSC section and attendance at conferences is strongly encouraged. All academic staff can apply for partial funding of travel grants which encourages attendance at meetings. All staff are encouraged to take a full part in the running of professional societies.

The use of **exit interviews** was reported by 17 departments, but this was usually a university function and one that was infrequently used and which provided little useful feedback to departments. In the follow up telephone calls two heads of department referred positively to exit interviews as a way to ensure they kept in touch with former staff and to provide a window onto their department's arrangements.

A1.2 Networks

Nine (of 25) departments have 'established' systems to encourage peer or buddy support and for junior staff to act as role models, or to mentor post-docs, eight had informal arrangements:

It is common practice for post-docs to help postgraduate students and final year project students with their research. Likewise postgraduates are encouraged to help undergraduates.

We are currently piloting a scheme where more experienced undergraduates are helping the first years develop study skills.

Senior graduate students mentor junior incoming students.

Sixteen departments actively encouraged women to network externally but only nine encouraged network members to provide feedback to them.

A1.3 Mentoring

All 25 departments had mentoring as part of the university probationary lecturers arrangements. Some had additional provision:

Mentoring is also in place for all postgraduate students, and post-docs.

When appropriate, as identified in the appraisal process, a mentor may be allocated for staff development purposes.

Formal mentoring for probation, but in reality continues beyond via annual appraisal.

Sixteen departments 'formally' encouraged staff to act and to train as mentors (6 informal):

A university handbook for both mentors and mentees is available.

Staff are trained by Staff Development and each mentor is appointed by the Head of Department.

All academics take part in the department's peer mentoring scheme for teaching. Each year pairings change so over time all benefit from the advice of a range of colleagues.

Fifteen departments encouraged their women academics to act as role models/mentors (7 informal):

Women are encouraged act as mentors in Chemistry and to participate in school visits, external talks, and the faculty "Girls get SET" scheme to encourage schoolgirls to think about a career in science and engineering.

We expect our female academics to be role models at all levels. They are amongst the top academics in the country and we are eager to see further increases in our female cohort.

We like to involve female members of staff in a prominent senior role when we have school parties visiting to provide the girls with a positive role model.

Seventeen departments made use of mentors and others to feedback on career progression issues:

Mentors feedback information to the HoD and to the probationers committee, confidentiality is preserved.

As HoD I work with my female academic coordinator who keeps me aware of gender issues.

A2 Appointment and promotion processes

A2.1 Identifying and supporting candidates for appointment and promotion

All 25 departments encouraged men and women to apply for appointments and promotion when they were identified as ready or approaching readiness:

The department places great emphasis on supporting staff for promotion when they are ready and guiding them towards successful applications.

The performance of all staff, their teaching, research and administration, is reviewed annually by the faculty management group.

Senior staff are consulted for their views and colleagues are encouraged to apply for promotion when there is wide support. Equally importantly, staff are not dissuaded from taking the initiative and applying for promotion when they feel they have a good case.

Fourteen departments supported women through the promotion procedure with, for example, mentoring, mock interviews, and feedback. Most indicated that they treated men and women equally:

We normally expect our staff to be independently capable of preparing for interview, but we have in the past identified those who may need help and encouraged them to attend appropriate courses.

Seventeen departments gave feedback on career development needs for internal unsuccessful applicants:

The Dean of the Faculty (who sits on the promotions committee) provides verbal feedback to unsuccessful applicants for promotion if requested.

Twenty one departments reported their procedures for appointments and promotions as openly communicated with guidance for potential candidates, two that their procedures needed review:

HoD talks to all applicants about criteria before application.

Guidance given by line managers.

A2.2 Appointments

Fifteen departments reviewed their staff profile and attempted to identify appropriate women candidates internally and externally. Most stated they would always appoint the best person for the post regardless:

Any potential candidates are approached, not just women.

When making recent academic appointments it is true to say that all things being equal we would have wished to make a female appointment (reflecting the student profile).

Only one department disagreed with the statement that their selection criteria and procedures were reviewed for bias and were clear to all. The majority reported this as a university requirement/the responsibility of HR.

Twenty two departments had women and/or externals on their selection panels included; this was often a university requirement but not at all levels:

Women mandatory at professor and reader level but always at least one non chemist.

Selection panels routinely have both female and external (to department) representation – this places a heavy burden on women academics.

They include external people and may include women. There is currently no deliberate inclusion of women.

All staff involved must have attended the University's training on recruitment and selection or they are ineligible to serve on a panel.

Ten departments monitored the percentage of women at all/some stages of the appointment process:

Not formally done as percentage, but always query if few women on long- or short-list.

The percentage of female applicants is always monitored.

We always strive to increase percentage of female applicants.

Anecdotal evidence suggests that more women than men withdraw at the interview stage.

Candidates who withdraw may be asked for reasons to inform future procedure.

Formal statistics are not kept, but qualitative assessment is made when short-listing.

Women only colleges used to headhunt their world-wide old girl network when university appointments were advertised; their demise has changed things.

A2.3 Promotions

Nineteen of the 25 departments reported their criteria as clear, consistent and fair in application. Two were reviewing theirs. Twenty one departments said their procedures were clear, open and effectively communicated, reviewed and compared with others. One was reviewing their procedures. In most cases the procedures were the university's. Twenty departments reviewed the outcome of promotions against the criteria and celebrated their successes:

Promotion committee chairman and departmental management committee oversee cases and ensure feedback direct to all involved.

Whether the criteria are clear to everyone is debatable, but normally this is because they have not read the guidelines for promotion properly!

There is an annual opportunity for individuals to make a case for their promotion or for award of accelerated increment. These are then considered by the department, who support the front runners but anyone can put themselves forward.

Section heads and mentors will support individuals preparing their case, and advise on the selection of referees and CV development needs.

Comments of HoD in support (or otherwise) of candidates are seen by the candidates.

HoD seeks the views of the senior staff in the department before forwarding recommendations.

Promotions seminar held before the promotion procedure begins.

A3 Departmental arrangements, structures and culture

A3.1 Workload

Eighteen (of 25) departments had systems for work allocation including regular open discussion, meetings with new staff and appraisals (three had informal arrangements). Many commented on the difficulty of balancing departmental and individual needs:

HoD surveys of workloads have not produced noticeable results - but interests of department means that those who are good at raising research funding will be given the time to do so and those who are good teachers will get the most teaching.

Many staff have young families and have adopted lifestyles so they can meet both home and work commitments. Understandably, these are some of the first to complain if others are given special treatment in the allocation of duties.

There is inevitably a tendency for jobs to be allocated to those who have the skills/aptitude to best undertake them but this is not gender related.

Most departments try to protect new staff's research time by lightening teaching loads, although this is increasingly difficult with low and reducing staff numbers:

The workloads of all staff are assessed annually to ensure fairness.

Our prime consideration with new staff is to help them to get their research up and running as soon as possible. We initially give them a very light teaching and administrative load which gives them considerable flexibility in organising their work.

This is an area where most departments either have recently, or are currently trying to, improve their arrangements:

Workload model is being extended beyond teaching loads and is published on the web.

HoD does development reviews of new staff and oversees allocation of workloads.

Workload model looks at all internal and some external duties. Essential to have a woman welfare tutor, otherwise administrative duties rotated without regard to gender.

Workload balance of all staff is reviewed by line managers. Development of all staff's CVs crucially important.

Teaching and administrative duties are allocated as fairly as possible. Reviews are carried out periodically, reflecting changed staff circumstances. Teaching is often allocated by expertise and experience (probationers would not get large year 1 service classes).

We have no disparities at present, and I would be appalled if we allowed it to happen. We review this for all staff and we take action where such imbalances occur. I had not thought of this as a specifically female issue I will keep a watching brief on this.

Department's workload model allows a comparison of responsibilities and workload and we have just developed a management document which makes duties transparent.

A3.2 Roles and responsibilities

Seventeen of the 25 departments rotate roles and, for example, committee membership, for staff to gain experience (four had informal arrangements):

Yes, but tried to reduce rotation frequency to allow efficiency gain as role is 'learnt'.

To achieve balanced CV (for promotion) this must happen – line managers organise.

The structure and membership of all committees is reviewed periodically to ensure relevance and effectiveness.

Chairs are occasionally changed but membership of department management committee changes every three years.

Rotation of committees/lectures/work loads to keep the department from getting stale.

Fixed terms of office and gender balance on key committees.

Twenty three departments stated that they recognised, valued and rewarded individuals' contributions to department administration and teaching in various ways:

Contributions are very much valued informally but not recognised in any formal procedures.

All departmental activities (admin/teaching/research) are assessed and credited.

We are creating a database to estimate every contribution. This will form part of the indicator for promotion as well as internal resourcing and job allocations.

All staff are valued and without the strong teaching base the department will not survive.

A teaching prize is awarded annually. Administration and teaching is critical for promotion.

A3.3 Departmental Organisation and Style

Eighteen of the 25 departments stated there was openness in their departmental management and communications and, for example, in the allocation of resources of space, funding and research support:

Change of head of school altered practices and a more transparent scheme is being introduced.

Management style is very open - all funding, space, support information fully available to all.

Information freely available, allocation of lab space agreed in department. Limited research funding available but procedures for application are disseminated to all.

Regular discussions between administration staff, academic staff and support staff take place.

The departmentally-provided element of research funding is allocated on the basis of a published algorithm which considers size of individual's research group and productivity factors for which they receive a financial bonus (publications, grant applications, etc.).

As far as possible, space is allocated on the basis of group size, but also takes account of the needs of particular types of research activity.

Minutes of meetings circulated to all academic and related staff and non-professorial staff on many of the committees.

A formal and transparent resource allocation policy is being implemented – this is not universally popular!

Eighteen departments involved research associates and part-timers in the 'life' of the department and kept in touch with staff on sabbaticals, career breaks, long-term sick leave or on maternity leave:

Several women recently have taken maternity leave and returned either full or part-time.

Post-docs are represented on all committees.

There is regular social contact between admin, academic, support staff, RA's and post-graduates

Academic staff on career breaks are emailed the same information as other academic staff.

Post-docs are not greatly involved in decision-making but are important in its social life.

Eighteen departments said there was a recognition and practical demonstration of work-life balance practices by staff at the top and in the middle of the department. There was concern at balancing the needs of individuals and the department as a whole and many arrangements were informal:

Management is supportive of flexible working practice, for example, in timetabling teaching.

We will try to work round family/religious/professional commitments etc. but severe timetabling constraints mean there are limits to the extent to which this can be done.

The University has a flexible working policy, but it is little used to date by academics; section heads respond with sensitivity to occasional flexible working requests case by case.

There are doubtless still some in-built prejudices among staff who cannot see beyond the 'all work, no play' concept as the only one which matters.

Currently women staff have reduced to pro rata appointments to accommodate family life style.

Informal examples established but no formal guidelines exist.

Fifteen departments timed meetings to take account of caring responsibilities, for example, school runs:

I have moved meetings to times that are more appropriate for staff with children. I see this as the HoD's responsibility and not something to ring-fence with rules.

Early morning and evening meetings only with agreement of staff involved so no-one is disenfranchised.

Where practicable teaching duties and departmental meetings are not scheduled at unfavourable times for academic members who have responsibilities for young children.

Departmental meetings scheduled a year ahead, published online and available to all. Meetings take account of child care responsibilities, work commitments (e.g. teaching classes) and the impact scheduling has for student representatives.

We have tried to vary days/times so that we do not regularly exclude any individual.

Normally held from 2.00-4.00.

Following discussions with women scientists and administrators here and elsewhere, I plan to make the department's activities and actions appropriately family-friendly rather than positively discriminating in favour of women.

Sixteen departments had induction programmes including 'how we do things round here' and there was an awareness that better provision was needed:

The department needs an introductory handbook for new appointees.

Our provision is patchy and we are trying to provide departmental documentation and more focused support for newcomers.

New staff attend a formal university induction programme. In the department they are allocated an adviser but in practice much advice is sought from other recent appointees.

Eleven departments confirmed that their staff profile was monitored and the results reported. However a number were small and some had made no recent appointments:

We report from time to time, but only in terms of the age profile and the distribution of academic posts. Annually we report to Faculty, with details of work and future plans.

Occasional reporting through ad hoc committees

Six departments reviewed the membership of research groups and interdisciplinary groups.

Twenty one departments ensured that the images used, for example, in publicity, photographs, newsletters and job particulars reflect the contribution of women to the department:

Our publicity people see the female as portraying a positive image and use this where possible.

Appendix B: the Checklist



Academic Chemistry Departments Good Practice Checklist

INTRODUCTION TO THE CHECKLIST

This Chemistry Good Practice Guide Checklist is the first of a number of subject-specific checklists on good practice in SET employment that the Athena Project is producing. These subject checklists follow on from an institutional checklist which was completed by 28 UK HEIs in 2003. Chemistry has been chosen as the first discipline for which a subject checklist is produced because the Royal Society of Chemistry and the Athena Project have been working together to identify good practice in the recruitment and retention of staff since the launch of the Athena Project in 1999. The production of this checklist was an obvious extension of that cooperation.

The RSC and Athena are strongly encouraging departments to complete the checklist so that data can be collected to benchmark the current situation with respect to good practice in academic chemistry and enable any future changes to be monitored.

A report will be produced based on the chemistry checklist returns, but the identity of individual departments will be protected. Where good practice is identified, the approval of the department will be sought for the inclusion in the report of a short case study.

The RSC and Athena thank departments for the time taken to look at this checklist and would urge heads of departments to ensure that the checklist is completed and returned. In making the case for science and chemistry to government it is important that issues such as equal opportunities are seen to be taken seriously by the SET community. By completing this checklist your department's commitment to equal opportunities issues will be demonstrated.

Electronic proforma checklists are available from athena@royalsoc.ac.uk to which address they should be returned or they can be posted to the Athena Project, the Royal Society, 6 to 9 Carlton House Terrace, London SW1Y 5AG.

THE ATHENA PROJECT

The aim of the Athena Project is the advancement of women in science engineering and technology (SET) in higher education and research. Athena also seeks a significant increase in the number of women recruited to top posts. Athena works with partner universities to develop, share, encourage and disseminate good practice, to increase the number of women working in SET at all levels and to improve the career development, recruitment, participation, progression and promotion of women in SET.

Athena's programme is funded by BP, the DTI and the Royal Society, with support from the Engineering Technology Board and the Royal Academy of Engineering. The objective of the programme, as suggested by the Government Chief Scientific Adviser Professor Sir David King in his foreword to Athena's Guide to Good Practice 1999 to 2002, is for every UK HEI and research institution in the UK to embed Athena's good practice within their organisation and culture. An additional objective is for a significant number institutions to make a commitment to achieving Athena's targets. These are:

- Short term - the percentage of female applicants for academic posts to reflect the percentage of women at the level immediately below (in their own institution and/or the 'pool' of institutions where they usually recruit)
- Medium term - the percentage of newly appointed and newly promoted women in academic posts to reflect the percentages at the level below

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- Long term - the percentage of women at each career level to reflect the percentage at the level below (including the undergraduate intake)

Further information on Athena, including the text of the Good Practice Guide 1999 to 2002, and the preliminary report on the findings from Athena's Survey of Science Engineering and Technology (ASSET), is available on www.eteachb.co.uk/athena or email athena@royalsoc.ac.uk

THE ROYAL SOCIETY OF CHEMISTRY

Two reports on work by the Royal Society of Chemistry (RSC) [<http://www.rsc.org/lap/polacts/womeninacademia.htm>] address the culture of academic chemistry and its influence on women's retention and progression rates. The report published in 1999, *Study of Factors Affecting the Career Choices of Chemistry Graduates*, concluded that the situation of women in chemistry was among the worst in SET in HE, that retention was the key issue and that if the position was to improve enough to make women want to stay in chemistry, the culture had to change.

The RSC's 2003 report, *Recruitment and Retention of Women in Academic Chemistry*, recognised that the difficulties for women, of sustaining academic careers and progressing to the level which reflects their abilities, often relate to the organisation and culture of SET, the departments and the institutions in which they work. The report identifies what it is about the culture in certain departments and/or universities which causes women to apply for and accept posts and subsequently encourages them to remain in these departments and/or universities.

The areas where Athena and the RSC recommend changes and the good practice their work has identified are described in the sections which follow on personal and professional support and development, appointment and promotion processes and departmental arrangements structures and culture.

THE USE OF THE CHECKLIST

The checklist flags what Athena and the RSC have identified as the key issues for career progression for departments, heads of departments and research groups, and the men and women who work in and/or leave academic chemistry. The checklist is based on the:

- work of Athena's partner HEIs who have contributed to Athena's programmes and publications since 1999
- findings from ASSET, which ran in 23 universities early in 2003, to which over 2000 academics in science, engineering and technology and related disciplines contributed their experiences and perceptions of career progression.
- *Study of Factors Affecting the Career Choices of Chemistry Graduates*, RSC 1999
- *Recruitment and Retention of Women in Academic Chemistry*, RSC 2003

The good employment practice referred to was developed in universities by practising scientists and engineers working with colleagues in administration and staff development. The good practice is evidence-based and has been demonstrated to work and make a difference to the working lives of academics and their enjoyment of their chosen careers. Very little is institution-specific and most can be adapted to local circumstances and resources.

The chemistry department checklist is a development from Athena's HEI Good Practice Check List, which was used for Athena's report to the DTI in December 2003 on the development and embedding of good practice by HEIs (good practice case studies from which will be available on Athena's web site later this year).

Work funded by the Royal Society and BP is now underway to develop checklists for other SET disciplines and for use in industry. Athena and the RSC see the checklist as a useful tool for departments, those who complete it, the men and women working in their departments, and colleagues elsewhere who are looking for examples of good practice to adopt or adapt for their own departments.

Comments on the user friendliness and utility of the checklist will be welcome; please email athena@royalsoc.ac.uk

Departments wanting feedback should similarly contact Athena.

The completion and return of the checklist by UK university chemistry departments will enable a report on the UK position and the good practice that is in place in academic chemistry. The resulting report will focus on good practice. Text relating to individual departments will be checked and agreed with departments prior to publication.

² The web based survey of 2,172 male and female academics in 23 UK HEIs ran in Spring 2003, the areas covered by the questionnaire were those which the work of Athena's partner HEIs had identified as important to academic/research progression in SET and where there appeared to be significant differences between women and men. 70% of respondents were male, 66% of respondents were in Russell Group universities, 381 respondents were physical scientists.

The timetable for this work is:

End January 2004 checklist distributed

End February 2004 checklist returned electronically to Athena athena@royalsoc.ac.uk

March 2004 returns checked and feedback provided

PERSONAL AND PROFESSIONAL SUPPORT AND DEVELOPMENT

Developmental activities and programmes can encourage women (and men) to stay and progress their careers in science, clarify their career goals and strategies for achieving them and prepare them to create and take advantage of opportunities for career enhancement. Such activities provide the access to mentoring, role models, shared experiences, career advice and support, and the opportunity to network that may not otherwise be available. The good practice in this area, which was developed by Athena's partner HEIs, is described in Athena Reports 1-4, 6, 18 and 19 and is drawn together in Athena Reports 7, 8, 14 and 22.

Results from ASSET show that, across SET, of those currently at lecturer level, 45% of men and 31% women had received encouragement to apply for a senior lecturer/reader appointment and of those currently at senior lecturer/reader level, 48% of men and 37% of women had received encouragement to apply for a professorial post.

ASSET also looked at the external activities and contributions to professional societies, which might influence career progression. It found that women's and men's membership of professional societies was similar, however 76% of women were ordinary members, compared to 62% of men, and only 19% of women were fellows compared with 34% of men. 19% of men were on editorial boards of their professional organisations compared with 9% of women, and 21% of male lecturers and 15% of female had been keynote/plenary speakers at a national or international conference in the last three years.

RSC's 1999 study suggested that women who doubted their own abilities, particularly at the post-doctoral stage, might as a result expect to be treated differently (unfairly). It also suggested that women were better able to acquire the transferable skills during their PhDs and perhaps were better at recognising and selling their skills to other non SET employers. Also that:

- opportunities for mentoring and shadowing were limited by the lack of senior female role models in chemistry
- universities and departments were not prepared to, or did not actively manage career breaks; for example they did not provide resources to maintain professional networking.

RSC's 2003 study identified good practice including:

- induction for all including a formal programme, with briefing on how promotion operates at departmental and institutional levels
- compulsory lecturing training to ensure that all appointees are treated the same, and have to meet standard probation criteria
- the provision of mentoring for all new staff.

Mentoring - the introduction of mentoring opens up discussions on the issues of women's career progression. On a relatively short timescale, mentoring is highly effective in helping to equip women, early in their careers, with the support, self-awareness and confidence needed for a successful career. Mentoring is also invaluable to senior women who hope to be promoted into levels where there are currently very few women. Mentoring is resource intensive. However, there is something uniquely powerful about the one-to-one mentoring relationship.

Networks - the support, encouragement and activities that networks offer makes small but significant differences to the working lives of women in SET and helps them to develop an understanding of how to progress a career in SET. Through the networks' programmes of activities they provide their members with the support and encouragement that men usually get from their departments, principal investigators, research group leaders or section heads, but that women may not otherwise receive.

APPOINTMENT AND PROMOTION PROCESSES

Establishing an understanding of the differences (in both reality and perception) of men's and women's approaches to, and preparation for, appointment and promotion is an important step to making the procedures, practices and criteria fair, open and well understood. The issues and the good practice identified by Athena's partner HEIs is described in Reports 9,10,12,13,18 and 19 and is also drawn together in Reports 7, 8, 15,16 and 22.

Results from ASSET show some disparity on promotion - 78% of male respondents (women 68%) achieved senior lecturer or reader posts through promotion rather than through competitive application. All-male panels had appointed 37% of the respondents and of those appointed in the last two years at senior lecturer level 47% of men and 32% of women had been appointed by all-male interview panels. Also 73% of male senior lecturers/readers reported full or fairly good knowledge of promotion procedures compared with 60% of women.

RSC's 1999 study suggested that some departments functioned as 'male clubs', where appointments and promotion depended more on individuals' fit within the current culture, than on transparent assessment criteria.

RSC's 2003 study suggests that promotion remains a significant mid-career barrier with:

- a lack of formal procedures
- the potential sidelining of women into atypical posts with unclear future progression routes
- its emphasis on research in the selection criteria for the most senior posts (whereas women typically have greater pastoral responsibilities, and often a higher teaching load, compounded by the longer time for marking associated with the bigger first and second year classes)
- women's relative lack of mobility, coupled with a perceived bias to external candidates.

The 2003 study looked at ways to create a more rounded selection process, in which candidates were not judged on first impressions or a single presentation and which would reduce the tendency for departments to appoint in their own image or on the basis of personal contacts. The good practice identified includes:

- targeting external women for inclusion in the short list
- encouraging internal women applicants to gain practice with interviews, and giving them feedback
- a discussion with the head of department and other staff
- requiring candidates to present their research to a non-chemist
- an interview panel including two women (possibly the external academic and lay members) and an external chair
- work allocation meetings before new staff take up post, to discuss overall workload, including the balance of teaching, research and administration and to give the appointee the opportunity to raise any personal circumstances that might affect their allocation of duties.

DEPARTMENTAL ARRANGEMENTS, STRUCTURES AND CULTURE

Women's career progression, the choices they make, how comfortable they feel at work and the extent to which they benefit from the contributions they make, relate to the way their departments are managed, the working practices they adopt, and the way they allocate resources and responsibilities and how they recognise and reward contributions.

Family-friendly policies are of no avail if they are not taken up either because of the culture of the laboratory or because no-one outside administration knows about them or how they work. Changing departmental and institutional processes as a precursor to cultural change was a theme of Athena's 2000 Development Programme.

The good practice and changes developed by partner HEIs is described in Reports 10, 12,13,18,19 and 20 and is drawn together in Reports 15, 16 and 22.

Findings from ASSET show differences across SET in the committee representation and positions of responsibility at departmental level: 20% of men and 27% of women carried student support and welfare responsibilities, whereas 36% of men and 26% of women were heads of research groups/sections. 41% of men compared with 33% of women were members of departmental research committees, while 56% of men and 49% of women were members of teaching committees. At senior lecturer/reader level 64% of men and 49% of women agreed that they had the opportunity to serve on important departmental committees.

ASSET showed marked variations in male and female perceptions of the value that colleagues and departments place on their contributions. Overall more than 50% of respondents agreed that their teaching, research and administrative contributions were valued, that senior colleagues were supportive and that they had the opportunity to serve on committees. 37% of respondents felt their successes were celebrated and 36% felt that their external professional activities were valued. At professorial level, 55% of women and 75% of men agreed that their senior colleagues were supportive, 55% of women and 77% of men felt socially integrated within their department; 58% of women and 74% of men agreed that their administrative contribution was valued and 37% of women and 56% of men agreed that their department celebrates successes in their working lives.

ASSET found differences between the genders in terms of what would have helped their transition back to work. Women's top priorities were childcare (79%), flexible working (78%) and keeping in contact with their department (63%). Men's priorities were contact with their department (59%), peer networks (39%) and flexible working (26%).

RSC's 1999 study identified as barriers the:

- men who see chemistry as hard-edged and not emotionally suited to women, and have traditional attitudes to the role of women, particularly those with children
- large numbers of post-docs needed for research, and the massive competition for lectureships
- criteria used for measuring success leading to an emphasis on certain ways of working, eg long hours and 'fitting in'

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- limited opportunities to develop interdisciplinary ideas - women are more likely to favour interdisciplinary working
 - long hours and little opportunity to socialise (except with other chemists) and the socialising being dominated by 'male activities and values'
 - competitive culture with the emphasis on results at the expense of process - women are more interested in learning from the process, than in the rush to publish
 - predominance of full-time posts determined by tradition not research and teaching needs
 - large departments and teams of full-timers which predominate in 'old' universities - women are more likely to work in smaller departments in new universities, alone, part-time, on short-term contracts
 - stronger concerns of women about health and safety compared with men.

RSC's 2003 report recognised that the best departments did not target measures specifically at women but created a culture of diversity where all could thrive and be rewarded for their contribution, regardless of gender and family circumstances. The report defines the characteristics of open and supportive departmental management:

- letting staff know if they can put themselves forward for increments and promotion
- legitimising decisions about balancing work and home
- a broadly based reward mechanism
- peer support, appraisal, development and mentoring
- transparent decision making with board of studies membership open to all and meetings that are not male-dominated, intimidating or hierarchical
- open discussions of teaching loads and equity in allocating administrative and support duties, on a rota to avoid women taking too many support roles
- open bidding and accounting so everyone knows how much funding others receive
- research organised by floor and not segregated in laboratories to facilitate socialising.

THE CHECKLIST

1. Personal professional support / development

A = established/widely applied B = occasional/informal/pilot C = under discussion D = review required E = no/not applicable

1.1	Career development	A	B	C	D	E	Notes
1.1.1	women / all staff expected / encouraged to participate in personal / professional development programmes / training						
1.1.2	Development opportunities available to staff include entrepreneurship / IPR / people and financial management / other transferable skills						
1.1.3	Career development / career advice / CV development of junior staff a responsibility allocated to specific individuals / post holders INDICATE IF THIS AND THE FOLLOWING APPLY TO POST-DOCS						
1.1.4	The responsibility for the career development of junior staff is included at appraisal / staff reviews / in promotion consideration etc						
1.1.5	(Junior) women are encouraged to present at / contribute to departmental research seminars / to research sponsors						
1.1.6	(Junior) women are encouraged to raise profile externally eg contribute to professional society activity, attend / present at conferences						
1.1.7	Exit interviews are held with leavers / issues are followed up (in department or centrally)						
1.2	Networks						
1.2.1	Peer support / buddy systems encouraged / junior staff act as role models / to mentor post-docs and post-docs for postgraduates etc						
1.2.2	women encouraged / supported to network at Faculty/ HEI level / regionally / nationally						
1.2.3	Network members report activities / fed back to departmental committees						
1.3	Mentoring and role models						
1.3.1	Mentoring is provided departmentally as career development / part of induction / probation PLEASE INDICATE WHICH APPLIES						
1.3.2	The department is covered by the university's mentoring provision						
1.3.3	staff are encouraged to act as / train as mentors (by the university and/or department) PLEASE INDICATE WHICH APPLIES						
1.3.4	Women staff encouraged to act as role models / mentors by the department / university / regionally / nationally in chemistry PLEASE INDICATE WHICH APPLIES						
1.3.5	Staff mentors / role models / others feedback career progression issues to department (preserving confidentiality / anonymity)						

2. Appointment and promotion process

A=established/widely applied B= occasional/informal/pilot C= under discussion D=review required E= no/not applicable

2.1	Identifying and supporting candidates	A	B	C	D	E	Notes
2.1.1	women & men in the department are encouraged to apply for appointment / promotion when they are ready and/or are identified when reaching readiness						
2.1.2	women in the department are supported through procedures with eg mentoring mock interview and feed-back						
2.1.3	Feedback is given on, e.g., career development needs for internal unsuccessful applicants						
2.1.4	Departmental procedures for appointments / promotions are openly communicated / guidance is provided for potential candidates						
2.2	Appointments						
2.2.1	The departmental staff profile is reviewed / attempts are made to identify appropriate women candidates internal / external						
2.2.2	Selection criteria and procedure are reviewed for bias and are clear to all						
2.2.3	Selection panels include women / external people PLEASE INDICATE WHICH						
2.2.4	% female applicants, shortlisted and appointed monitored against available 'pool' / feedback sought from women who withdraw PLEASE INDICATE WHICH						
2.3	Promotions	A	B	C	D	E	Notes
2.3.1	The department's criteria for nominations / support of candidates are consistent fair in application and clear to all						
2.3.2	Departmental procedures are clear / open / effectively communicated to all / reviewed / compared to others						
2.3.3	Outcomes reviewed against criteria (teaching / research / admin contributions) and successes celebrated						

3. Departmental arrangements structures and culture

A=established/widely applied B= occasional/informal/pilot C= under discussion D=review required E= no/not applicable

3.1	Workload, roles and responsibilities	A	B	C	D	E	Notes
3.1.1	Work allocation discussions are held with new staff to pick up work / life balance issues / covered in annual appraisals / reviews						
3.1.2	The workload balance eg of admin / research / teaching is reviewed / equitable and / women are not sidelined in atypical jobs / not able to develop their CVs / unable to take up development opportunities						
3.1.3	Roles and eg committee memberships rotated for staff to gain experience / exposure						
3.1.4	Individuals' contributions to department administration / teaching is recognised (eg for promotion) / valued / rewarded						
3.2	Departmental organisation / style						
3.2.1	There is openness in departmental management & communication & in, e.g., allocation of resources – space / funding /research support						
3.2.2	The department involves RAs and part timers in 'life' of department / keeps in touch with staff on sabbaticals / career breaks/ long sick leave / maternity leave						
3.2.3	There is recognition / practical demonstration of work-life balance, (e.g. flexible working) practices from top / middle of the department						
3.2.4	Induction programmes include – 'how we do things round here' at departmental, lab and individual role levels						
3.2.5	Contributions to department administration / teaching recognised / valued / rewarded						
3.2.6	Departmental staff profile - % part timers /men /women at different levels (including, e.g., academic visitors monitored) & results reported						
3.2.7	Research organisation – the membership of research groups / interdisciplinary groups is reviewed for bias						
	Departmental organisation / style						
3.2.8	Department meetings are timed to take account of caring responsibilities, e.g. school runs						
3.2.9	Image eg publicity / photographs / newsletter / job particulars reflect the contribution of women to the department						

Acknowledgements

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Thanks are also due to the individuals who spent time discussing their experiences in telephone interviews, and especially to those who allowed their career summaries to appear in the report.

Andy Boddington analysed the data which appears in the section on statistics.

In all some 150 people have contributed to this report. We hope they will be satisfied that their efforts were worthwhile and that they will at least in some small measure benefit, if only from the gentle amusement of trying to identify the sources of the good practice we describe, and the departments where if Utopia has not yet quite arrived it is around the corner.

Caroline Fox

Sean McWhinnie

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