Written evidence submitted by the British Pharmacological Society

1. Introduction and the gender pay gap in Pharmacology

1.1 The British Pharmacological Society (BPS) is a learned society that represents the discipline of Pharmacology in academic, industrial and clinical areas within the UK. The Society develops and promotes Pharmacology, the study of therapeutic agents, by organising meetings, workshops, awards and training schemes and publishing two journals. Additionally, the Society holds joint meetings and shares information with other societies with related interests.

1.2 The Women in Pharmacology (WiP) group within the British Pharmacological Society monitors and acts on gender related issues. The WiP group consists of a cross section of the membership, with representatives from academia, industry, health services, and early career positions. The WiP group is involved in society activities in which gender bias may occur, such as meetings, committees, awards, communications and membership. WiP initiatives include a mentoring scheme, leadership and presentation training for women, networking events and a ‘Women in Pharmacology’ award. The group maintains close contact with related organisations such as the campaign to promote women in science and technology (WISE) and Athena SWAN in the Higher Education sector.

1.3 The WiP group prepared an internal report on the previous House of Commons Science & Technology Committee report on Women in Scientific Careers, (6th Report of session 2013-14, January 15th 2014, included at the end of this paper), which was critical of its lack of analysis and recommendations relating to career development for women, particularly at senior levels.

2. Barriers to Promotion: Inducements and Penalties

2.1 Pharmacology is an area where gender bias results in a substantial financial and scientific deficit. This is reflected in the awards and membership statistics of the Society, where studentship applications are approximately 50% female, whereas in the highest 7 academic awards open to both genders, very few candidates (less than 20%) have been female over the past two years. The gender balance is even less (below 10%) if the teaching award is excluded from this total (see Appendix A).

2.2 While the reasons for the gender gap in career opportunities are complex, societal and discriminatory factors in a predominantly
male management culture in appointment committees, senior boards, and international scientific meetings are rarely effectively analysed or challenged.

2.3 BPS has been committed to promote and increase female participation within the Society’s leadership and governance structures, its membership and professional development activities. Female participation and increased opportunities for and support of professional development for women had been articulated as a core value in the Society’s equality and diversity statement and as an overarching objective, in 5 year strategic review, 2012-17. The WiP group was tasked by the BPS Board of Trustees (Council) to monitor and report on female participation across the Society’s diverse committees and activities. In March 2015, following the report on progress in achieving a minimum of 25% female representation Council had revised the target upwards to 30%. In order to incorporate best practice the Society had brought its process of collecting membership (including gender) data in line with the recommendations of the UK’s Higher Education Statistics Agency and Equality Challenge Unit. A new database was developed to more accurately collect and analyse the data to ensure this.

2.4 In addition, the WiP group of the Society aims to reduce barriers to promotion, recruitment and training by raising the issue of gender balance at the application stage for meetings and awards, and is considering extending this scrutiny to publications. Affirmative action programmes, such as the Women in Pharmacology prize, and training workshops for women, have improved gender balance and may also have helped female career development, as winners of the prize have gone on to receive further awards open to both men and women.

3. How adequate are the government’s proposals for tackling the pay gap for women over 40? Monitoring, Inducements and Penalties

3.1 The WiP group prepared a report on previous government proposals (House of Commons Science & Technology Committee report on Women in Scientific Careers, 6th Report January 15th 2014, see Appendix B), which was critical of lack of analysis and recommendations relating to career development for women at senior levels. The data for analysing the pay gap during career progression was very limited and many of the comments were anecdotal and some appeared inaccurate.
3.2 Reliable data are available for one of the most successful schemes, Athena SWAN monitoring of academic gender balance in appointments and awards. This is important, as awards and grants support the careers of mid and late career scientists. Successful measures included schemes with inducements and penalties for noncompliance in the Athena SWAN scheme, where institutional academic status and eligibility for grants was dependent on monitoring and the ability to improve gender bias. When these schemes were voluntary, a small improvement rate was detected, but when mandatory elements were introduced, there was a 30% improvement in gender balance.

3.3 A study presented to the British Pharmacological Society (2014), in an undergraduate population showed a statistically significant gap of 20% in the perception of ability when self assessed according to gender (see Appendix C). This indicates that female students require more support in promoting their own work and abilities. The Society’s commitment to monitor gender balance in scientific meetings and publications helps to identify less confident and more self critical scientists who have fewer opportunities to put forward their work.

3.4 Monitoring age-related differences is relatively straightforward. When the basic gender statistics are in place, these are easily presented as bar charts, dividing data into two or three age related categories. The effects of interventions and initiatives is analysed by annual monitoring on these data. Using these techniques to compare gender in the same workforce, there should be few problems in monitoring age specific differences and the effects of interventions in predominantly female workforces. Age dependence gender gap differences and the effect of initiatives would similarly be open to such analysis in non-professional roles.

4. Conclusions: Analysing Barriers to Promotion

4.1 Pharmacology attracts young female scientists and shows a gender balance that reflects the general population at the beginning of young pharmacologists’ careers. This gender balance is very poorly maintained in the representation of women over 40, so there is ample room for improvement.

4.2 Rigorous gender monitoring of membership, awards, and meetings provides a basis for understanding the gender pay gap. Gender monitoring allows the analysis of age and career stage related statistics and of initiatives which aim to improve the gender pay
gap. This monitoring has facilitated the identification of areas in need of improvement and policies to address these problems.

4.3 Targeted interventions, such as the ‘Women in Pharmacology’ award and leadership workshops have been successful and popular. Athena SWAN has brought about substantial improvements in gender balance in awards and performance in the academic sector.

4.4 Learned Societies such as BPS can play a vital role in promoting gender balance issues in wider scientific community through a diverse range of activities, e.g. rewarding excellence and providing funding, training and support. It is necessary to maintain awareness on gender issues by bringing up deficiencies in practice, improvements and initiatives. These activities are more effective when they are observed by all groups across learned societies. However, eliciting change using purely voluntary methods is not sufficient. The evidence shows that targets and institutionalised awareness at every point of recruitment, selection, appraisal and other processes is what is effective.
Appendix A: Gender breakdown for 2014 and 2015 award applications

The following table was extracted from the BPS award nominations data by Teesha Bhuruth, BPS Membership & Community Officer for the WiP Group:

<table>
<thead>
<tr>
<th>Type of Support</th>
<th>Award</th>
<th>Number of applications per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2014 Male</td>
</tr>
<tr>
<td>Student Support (Undergraduates)</td>
<td>AJ Clark Studentship</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Vacation Studentships</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Schachter Award</td>
<td>2</td>
</tr>
<tr>
<td>Younger members (40 years under as guide)</td>
<td>Bill Bowman Travelling Lectureship</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Novartis Prize</td>
<td>n/a</td>
</tr>
<tr>
<td>Women in Pharmacology</td>
<td>AstraZeneca Prize for WiP</td>
<td>n/a</td>
</tr>
<tr>
<td>Experienced level (Researched, Published, Presented)</td>
<td>Gaddum Memorial Award</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GSK Prize for Research in CP</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>JR Vane Medal</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Lilly Prize</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Sir James Black Award</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Wellcome Gold Medal</td>
<td>n/a</td>
</tr>
<tr>
<td>Experienced level - Teaching</td>
<td>Rang Prize</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>73</strong></td>
</tr>
</tbody>
</table>
Appendix B: British Pharmacological Society Report on UK parliament select committee report 2014

Comments on House of Commons Science & Technology Committee
Women in Scientific Careers, 6th Report of session 2013-14
January 15th 2014, Dr H Anne Leaver 3rd April 2014

This report describes the under-representation of women in science, technology, engineering and mathematics (STEM) in academic disciplines in the UK. The best part of the report is the beginning, where the magnitude of the problem is assessed in economic, business and demographic terms, together with a critical analysis of the quality of information currently available from various sources.

The following section, on the nature and causes of diversity problems in STEM, tends to be descriptive rather than analytical. Current approaches to determining the causes of gender diversity in STEM are described. Perceptions and biases are identified as a primary cause of discrimination, together with sociological issues relating to caring roles undertaken by women. Certain aspects of scientific promotion and development that adversely affect women are described.

The recommendations of the report are commendable and practical. Mandatory training in diversity for line managers, recruitment and promotions panels, improved career structure and increases in longer term positions at postdoctoral level an extension of current early education initiatives to higher education and professional development. The Athena SWAN charter initiative to improve gender diversity in science is commended. The report also expresses concern about recent government cuts in diversity initiatives in business, innovation and skills.

A weakness of the report is that it tends to follow societal attitudes in focussing on women and their behaviour as the problem, rather than the outcome of discriminatory practice and culture. Do most women perceive promotions as undesirable? (Gender perceptions, opening of section 23).
Could the current system of promotion be accurately described as competitive? (Conclusions and Recommendations section 33). Although the intellectual losses associated with the current situation are analysed in monetary and business terms, only limited aspects of this loss are discussed, for example, the higher impact factors and lower frequency of female first author publications. There also appears to be a reticence to discuss recent gender issues in regulatory bodies, e.g. the Human Fertilisation & Embryology Authority, Human Tissue Authority, and NHS Appointments Commission, where a tranche of senior professional women have been removed and replaced by male political appointees.

It is concluded that current initiatives to encourage girls to choose science are not sustained in support of career development. The report mentions disproportionate cuts in dedicated equality initiatives. However, there is relatively little analysis of the culture of male dominance in academia where, a priori, there is little justification for lack of understanding or study of attitudes which pervade intellectual and scientific development of a high proportion of the scientific community. Possibly an additional report, examining these aspects should be prepared, which could include recommendations that would focus on exclusion and equality throughout the scientific community but particularly at managerial levels.

Appendix C: Do undergraduate women in pharmacology underestimate their academic ability?

This paper was presented at the BPS event, Pharmacology 2014 on 18th December, 2014. It can be found at the following link: https://bps.conference-services.net/resources/344/3811/pdf/PHARM14_0112.pdf

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Women are underrepresented in science, technology, engineering and mathematics (STEM) related careers. The British Pharmacological Society (BPS), the primary learned society in the UK for pharmacology, a STEM subject, report that only a third of their members are female, with less than 25% representation across management committees and activities (1).

The underrepresentation of women in STEM subjects has been hypothesised to result from various social, biological, or psychological factors (2). One such psychological factor is known as the Impostor Syndrome (3). It is experienced as chronic self-doubt and feelings of fraudulence even when faced with evidence of success. One characteristic identified in sufferers of
the Impostor Syndrome is an underestimation of performance success, as measured using self-assessment questionnaires (4).

Our questions:

1) Do women in the Cardiff Medical Pharmacology BSc underestimate their academic performance?

2) If so, do they underestimate their performance more than men?

3) Do women and men achieve similar marks?

Methods:

We analysed self-assessment questionnaires that students are routinely asked to submit with each piece of coursework across the 3 years of study. Students were not followed up beyond the 3 year BSc course. For each piece of coursework, we calculated the difference between the self-assessed mark and the mark given by the relevant staff marker(s). We term this number the Self-Assessment Differential (SAD).

Results:

We found that compared to a mean SAD of zero (i.e. perfect accuracy in self-assessment), both genders significantly underestimate their academic ability in coursework assessments (-15.84% ± 1.109 N=158 women, -8.857% ± 1.207 N=105 men, one-tailed t-test, p<0.001). However, women underestimate their academic ability to a significantly greater extent than men (6.99% ± 1.68, unpaired, two-tailed t-test, p<0.001). The mean coursework marks for women and men were not significantly different (unpaired, two-tailed t-test, p=0.5753).

Conclusion:

These data show that both men and women in an undergraduate pharmacology programme underestimate the quality of their coursework, but women do so much more than men. An inability to accurately self-assess one’s ability is a component of the Impostor Syndrome and is believed to be a factor that contributes to the reduced number of women in STEM subjects. Therefore, interventions targeted at improving self-assessment accuracy may improve the retention of women in these fields, including pharmacology.

References
1) BPS website

3 December 2015