

The Gender Equity Report

Executive Summary

The Gender Equity Committee was established in June, 2000, by Provost Robert Barchi and Faculty Senate Chair Larry Gross at the recommendation of the University Council Steering Committee. The charge was to undertake a systematic review of the status of women faculty at the University of Pennsylvania. Four subcommittees were formed to complete the review: one on faculty census using fall 1999 data, one on professional status of women faculty, one on faculty salaries, and one on a survey of faculty regarding their quality of life.

The census data show that women averaged 23.8% of the faculty in 1999. While comparison with the prior ten years indicates an upward trend in the hiring of women, there are indications that this increase has slowed or ceased in some areas. The data show considerable variability in the proportion of women among the various schools, much of it reflecting differences in the availability of women in the doctoral pool. There were also marked unexplained differences within groups of departments that should be drawing from pools of similar size. Examination of Ph.D. pool data suggests that in many schools and departments the number of women at the rank of Assistant Professor or Associate Professor is fairly consistent with the numbers in the doctoral pool. The School of Medicine, which has more than half of all of Penn's women faculty, reached expected numbers in clinical departments but had lower than expected numbers of women Assistant and Associate Professors in basic science departments. In the Natural Sciences in SAS, the Wharton School and the Basic Science Departments in the Dental School, the number of women was less than 60% of that expected based upon the pool. The census data also show that the proportion of men in the faculty increases with rank while the proportion of women does not; thus, women are 35% of all Assistant Professors, 23% of all Associate Professors, and only 15% of Full Professors. This pattern appears to be the result of both loss of some senior faculty women to other universities and the hiring of relatively large number of men at senior faculty rank. A Harvard survey comparing the numbers of women at Penn with numbers at other universities shows Penn at or better than median rank among Medical School Full Professors and untenured Associate Professors as well as non-Medical Assistant Professors. However, Penn was below median rank in the remaining five categories, and ranked lowest for tenured Associate Professors in both the medical and non-medical areas.

Recommendation

We recommend that the University work with the deans to develop policies about hiring practices to ensure change, particularly in those departments whose hiring of women is not consistent with their numbers in the pool. These policies should also aim at counteracting the male bias in the hiring of senior faculty and at keeping more tenured women at Penn.

Half of all women faculty at Penn are in the School of Medicine and almost half of these are Assistant Professors-Clinician Educator. This large group of junior faculty women is experiencing particular difficulty reconciling their professional responsibilities with the demands of family and home life, resulting in an unusually high resignation rate.

Recommendation

We recommend that policies affecting the retention and promotion of Assistant Professors-Clinician Educator be evaluated for their disproportionate impact on faculty women.

With respect to the professional status of women faculty, the committee determined that at the more junior ranks women had more research space per grant dollar than men, but women Full Professors averaged somewhat less space per grant dollar than their male colleagues; in both SAS science departments and the School of Medicine, senior women faculty had about 85% of the space assigned to males. Women have been funded by the University Research Foundation in proportion to the number of grants they have submitted and, in some years, in a greater proportion than the number submitted. Women faculty hold administrative positions at the school level (dean and sub-dean) in proportion to their numbers, but they are under-represented among department chairs. They also tend to be under-represented as holders of endowed and term chairs. When measured against their proportion of the total faculty, the proportion of women winning the Lindback teaching award was roughly comparable to their proportion in the faculty.

Recommendation

The University and the deans should work together to develop policies that assure that women achieve leadership positions and scholarly rewards in schools and departments consistent with their interests and capabilities.

A statistical analysis of salary by gender among faculty of the same rank and cognate disciplines was carried out, controlling for time since degree, for whether the faculty member was first hired as a full professor (for comparisons of professor rank only) and, in some instances, for specific department. This analysis indicated that women had slightly lower salaries than men in most of the groupings; however, only a few of these differences were statistically significant.

Recommendation

The equity of faculty salaries in all schools should be reviewed with special attention to salaries of women faculty.

The survey of non-medical faculty (men and women) yielded a number of important similarities in terms of the work they do and their satisfaction with space. However, the women reported being less satisfied with their jobs and the majority reported feeling that men faculty were more advantaged at Penn. The survey of medical faculty also showed males and females being similar in the work they do; but, here too, most women faculty (and 25% of the men faculty) felt that male faculty were advantaged. Comparison of non-medical and medical school data suggested that faculty in the School of Medicine were more concerned about the impact of gender than faculty in the other schools. Finally, a comparison of the non-medical data with the 1999 National Survey of Post-Secondary Faculty showed that Penn faculty are more satisfied with their salaries and benefits and the quality of students. It also showed that Penn faculty, especially women faculty, put in much longer workweeks than do faculty at most other institutions. In other respects, Penn faculty opinion closely mirrors that of faculty nationally.

Recommendation

The University and the deans should work together to find ways to alter the environment in which many women and some men perceive men to be advantaged. It is also important for the University of Pennsylvania to make a major, visible commitment to efforts intended to create an environment friendly to women.

Note: Appendices and tables are available online at (www.upenn.edu/almanac/v48/n14/GenderEquity.html)

Gender Equity Committee

Part I: Faculty Census

Women in the Standing Faculty

Our information on composition of the Standing Faculty and Standing Faculty-Clinician Educator is derived from fall 1999 data, and a summary is presented in Table I (*available online*). More detailed information on faculty composition for each department in the University, listed by gender and by the percentage of women, for fall 1988, 1994 and 1999, is provided in Appendix I-A (*available online*).

In 1999, 50% of the women faculty (and 52% of the total faculty) was in the Medical School, while SAS contained approximately 20% of the women faculty (and 20% of the total faculty). With the exception of the Law School, all schools have made considerable gains in the number of women faculty in the past decade. The total faculty at Penn in 1988 was 17% women, while in 1999 it averaged 23.8% women. Excluding Nursing, which is 97.9% women, the range goes from a high of 50% in Social Work to a low of 6.4% in Engineering. Several schools are well above the University average: Social Work (50%), Graduate Education (45.2%), Fine Arts (32.1%), Arts and Sciences- Humanities (32%). However, three areas fall well below the University average: Wharton School (12.9%), Arts and Sciences-Natural Sciences (13.3%), and Engineering (6.4%).

There is considerable variation in the proportion of women not only among the various schools but also within a given school or division. Some of this variation may be due to differences in the proportion of women obtaining doctorates in specific disciplines, but it also is observed in disciplinary groupings that might be expected to have similar proportions of women. Figure 1 (*below*) illustrates the range for some of these groupings. Engineering and clinical medicine are fields with great variability in the percent of women entering individual doctoral and specialty programs and would be expected to show large differences in the proportion of women within these groupings. In SEAS one department, Computer and Information Sciences, has a high of 13.6% women, but four of the seven departments contain no women faculty. The clinical departments in the School of Medicine range from 43.5% women in Emergency Medicine to no women in Orthopaedic Surgery. Some clinical departments were well above the School's average of 23% women: Emergency Medicine (44%), Family Medicine (40%), Pediatrics (36%) and Rehabilitation Medicine (36%). However, four departments with women faculty fell well below the average: Radiation Oncology (5%), Surgery (9%), Neurosurgery (11%), and Otorhinolaryngology (14%). The largest department, Medicine, contained 21% women.

To gauge the equity of the current status of women on the faculty, an attempt has been made to compare percent of women Assistant and Associate Professors in the various schools with their respective pool size (Table

II available online). The pool size is determined from the percentage of doctorates awarded to women in a given discipline between 1985 and 1995. While some disciplines expect a period of post-doctoral training before entry into faculty positions and others do not, it is reasonable to assume that most Assistant Professors and a majority of Associate Professors in 1999 will have received their Ph.D. degrees between 1985 and 1995. Engineering, Annenberg and the clinical departments in the Dental School have well above the number expected from the pool data. However, the Natural Sciences division of SAS, the Wharton School and the basic sciences departments in the Dental School have less than 60% of expected numbers based upon the pool.

Distribution Among Ranks

As of 1999, women comprised 35% of the Assistant Professors in the Penn faculty, 23% of the Associate Professors, and 15% of the Full Professors, i.e. the proportion of women decreases with increasing rank. AAUP data [*Academe 86(2), 2000*] show that in private universities women are 37% of Assistant Professors, 30.5% of Associate Professors and 14.5% of Full Professors. Thus Penn is about even with the national data for Assistant and Full Professors, but below the national average for women Associate Professors. Figure 2 (*below*) displays representative data on the distribution of men and women, by rank, for our largest groups of faculty: SAS, Wharton and the clinical faculty of the Medical School. Within the clinical departments of the Medical School, women were 18% of senior faculty (Full and Associate Professors) on the clinician educator track, and they were 9% of the senior faculty on the tenure track.

It might be plausible to attribute the high proportion of male Full Professors to large numbers of men hired and promoted many years ago, since it is a phenomenon that appears to cut across all private universities. However, Penn women constitute a smaller proportion of Associate Professors than Assistant Professors throughout the University, except for SEAS where they were 7.1% of Assistant Professors and 12.5% of Associate Professors. We therefore considered several other explanations for a pattern of declining percentage of women with increasing rank: 1) men Assistant Professors are promoted to tenure in greater proportion than women; 2) a greater fraction of women leave voluntarily due to failure to retain tenured women faculty relative to men and/or a greater fraction of women Assistant Professors resign before attaining tenure; 3) new hires at tenured ranks are proportionally fewer among women than men. Data previously reported by the Provost's Office (see *Almanac* vol. 44 (6); Sept. 30, 1997) indicated that the first possible scenario, i.e. men are promoted to tenure at a greater rate than women, does not hold.

Based on information from SAS, it appears that scenario 2 explains at

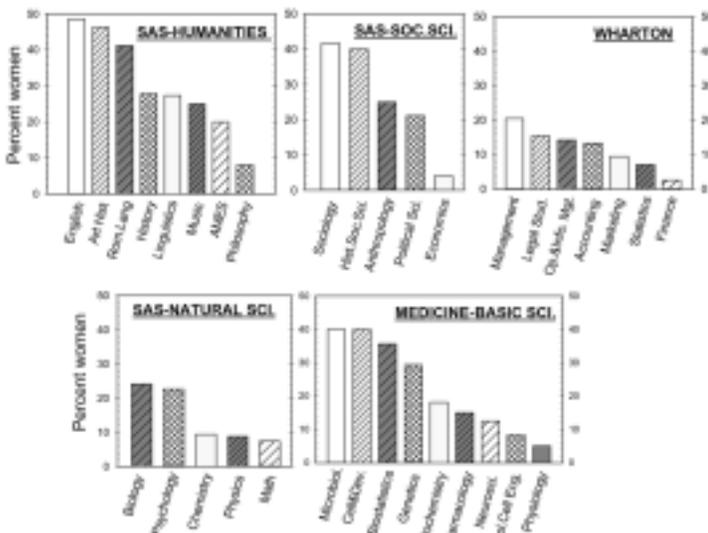


Figure 1. Analysis by department of percent women standing faculty for selected divisions at Penn. Departments containing fewer than 10 faculty have been omitted.

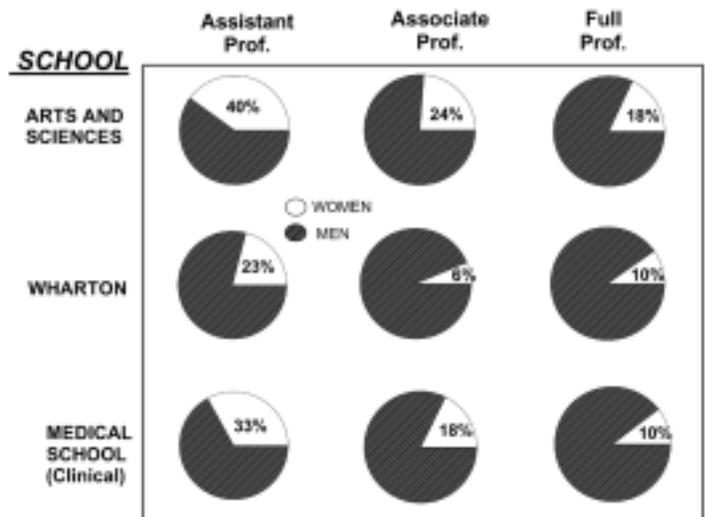


Figure 2. The percent of women at each rank in the School of Arts and Sciences, the Wharton School, and the clinical departments of the School of Medicine.

least some of the problem. Of the 24 men and 16 women who resigned from SAS in 1997-2000, 54% of the men and 69% of the women were tenured. Ten tenured women left from Humanities and Social Sciences departments, representing a loss of over 17% of the tenured women in these areas. In contrast, resignations of tenured men from these departments represented only 4% of the men with tenure. Thus, tenured women in the Humanities and Social Sciences of SAS left in disproportionate numbers; most of these went to other institutions. In the School of Medicine, both men and women Assistant Professors-Clinician Educator are leaving because they experience a high degree of discouragement (see Part IV of this report), but the resignation rate among female Assistant Professors-CE (16%) is significantly higher than that of male Assistant Professors-CE (9%). We also examined 59 confidential questionnaires returned to the Faculty Senate office by faculty who resigned during the period 1997-2000. While the response rate to this questionnaire was poor, the replies supported a conclusion that women resigning from Medical School faculty appointments were primarily Assistant Professors-CE while those resigning from non-medical areas were more likely to be tenured faculty. A summary of the findings is presented in Appendix I-B (*available online*).

Analyses of new hiring patterns support the third scenario as also contributing to the problem, i.e., appointments of men directly to tenured ranks far exceeds that of women. Table III (*available online*) presents data on the numbers of men and women Full Professors in each school, and the proportion who were hired at that rank. SAS shows roughly equal proportions of women and men hired as Full Professors. Four additional schools with a total of 53 Full Professors (Annenberg, Grad Education, Fine Arts, and Social Work) appear to have hired senior women at a rate higher than that for senior men (although the total number of faculty hires is small). In contrast, 6 schools, representing over 60% of all Full Professors at Penn, show marked differences in the route by which men and women achieved that rank.

Figure 3A (*below*) presents information on the number of men and women faculty newly hired with tenure for the period 1986-1996, and Figure 3B (*below*) is the same information for hires during the past three years. Data compiled annually by the National Research Council indicate that the proportion of women receiving doctorates in science and engineering fields has been increasing steadily over the past 30 years, and in the humanities it has been least 40% women since the late 1970s. It is

therefore notable that while the percentage of women who might be hired as senior faculty should be increasing, the number hired at Penn had decreased in the most recent three years for all schools represented. The most dramatic decreases occurred in the Natural Science departments of SAS and in Wharton, where no senior women were hired in the last four years compared to 12% in the preceding eleven years.

Hiring Patterns for Junior Faculty

We examined whether the proportion of women among newly hired Assistant Professors during the period 1986-1996 was consistent with their increased share of Ph.D.s awarded. In SEAS, the proportion of women hired as Assistant Professor during this period was twice that expected from the national pool of Ph.D.s in Engineering; unfortunately, most of these women had left the faculty by 1999. Appointments of Assistant Professors in clinical departments in the School of Medicine have also exceeded the estimated availability pool, although this group has experienced a simultaneous high resignation rate (*see above*). In the Humanities division of SAS, the percent of women among newly hired Assistant Professors for the period 1986-1996 was comparable to the proportion of women receiving doctorates in the Humanities during that period, and the combined number of Assistant + Associate Professors in 1999 (Table II) suggests that retention of these women has not been a major problem. However, the percentage of women among newly hired Assistant Professors was slightly lower than expected in the Social Science departments of SAS, and it was markedly lower than expected in the Natural Science departments of SAS and the basic science departments of the Medical School. More detailed information on hiring patterns and availability pools for SAS divisions, the School of Medicine, and Wharton may be found in Appendix I-C (*available online*).

Trends in the Proportion of Women Faculty

The steadily increasing number of women receiving Ph.D.s should be gradually but steadily reflected in significant increases in total faculty women. As noted previously, almost all schools have shown considerable increases in faculty women since 1988. Figure 4 (*below*) presents the percentage of women faculty in SAS (Humanities, Social Sciences, and Natural Sciences) and for the Medical School, Wharton and Engineering, for the period from 1988 to 1999. Much of the increase in faculty women occurred during the first half of this period, and the increase has slowed or stopped in more recent years in Wharton, Engineering, and the Social and Natural Sciences divisions of SAS.

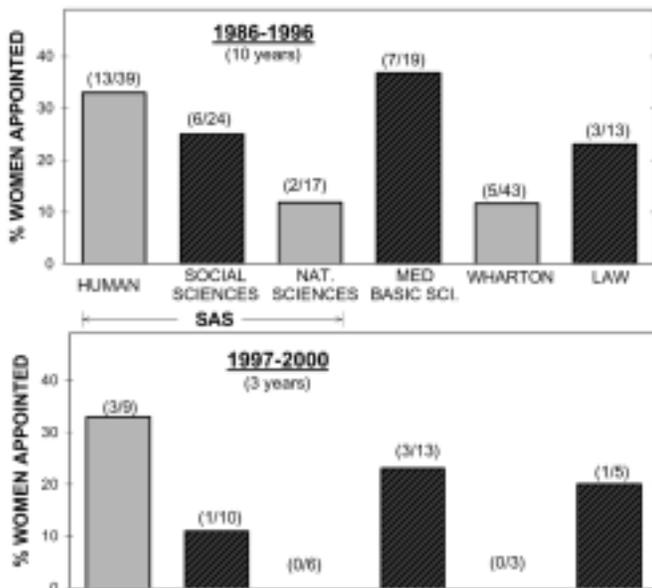


Figure 3. Percent women among appointments of new faculty to tenured faculty positions.

Actual numbers of women/total new hires are shown in parentheses.

3A. Upper figure: New tenured appointments from fall 1986 through fall 1996.

3B. Lower figure: New tenured appointments from fall 1997 through fall 2000.

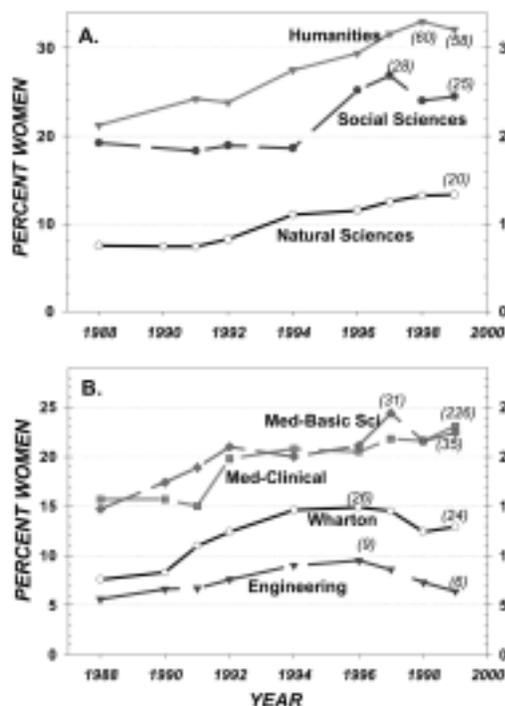


Figure 4. Changes in percent of women faculty during the past 12 years. Numbers in parentheses = absolute number of women.

A. Percent women in the School of Arts and Sciences.

B. Percent women in the School of Medicine, Wharton, and SEAS.

Gender Equity Committee

Comparative Data

Benchmark data from a group of 16 Ivy-plus schools provides a context within which Penn's gender issues might be viewed. Highlights of the Harvard Survey of '99-00 provide that context.

With respect to the proportion of women among non-medical school faculty, Penn ranks close to the median (9th out of 16 institutions) for Full Professors, last (14/14) for tenured Associate Professors, and in the middle (8/16) for untenured Assistant Professors. For comparisons of medical school faculty, the data set consisted of all full-time faculty including research and clinical faculty. With respect to the proportion of women faculty in medical schools, Penn ranked in the upper half (4/11) for Full Professors, last (8/8) for tenured Associate Professors, 3rd out of 10 for untenured Associate Professors, and in the middle (6/11) for Assistant Professors.

These data suggest that with respect to women Full Professors and junior faculty hires, Penn is neither better nor worse than its peers. Our low rankings for tenured Associate Professors suggest that Penn has major problems in retaining meritorious younger faculty women, either prior to or after the tenure process.

A separate report was recently prepared by a committee of the Medical School, comparing the proportion of faculty women in each department to the national averages compiled by the American Association of Medical Colleges in 2000. In most cases, Penn departments were near the national average. Two departments were markedly higher than the national average (Emergency Medicine and Microbiology), while five departments were at least 30% lower than the national averages (Physiology, Pharmacology, Orthopaedic Surgery, Otorhinolaryngology and Obstetrics and Gynecology).

Summary of Census Findings

The upward trend in the hiring and percentage of women faculty at Penn is encouraging. However, there are some areas where the trend has slowed, and others where it has even reversed, in spite of the increasing percentage of Ph.D.s being awarded to women. While retention of tenured women faculty seems to play a role in some disciplines, a major factor appears to be the hiring patterns within selected departments. It is apparent that some departments at Penn are responding to the growing numbers of women scholars with increased hiring rates, while others are not. If Penn is to progress in gender equity with respect to the percentage of women on the faculty, it is obvious from the data that it must be done at the level of the individual departments where recruiting and hiring decisions are made. Most of the departments at the lowest end of the range represent disciplines in which the proportion of women Ph.D.s is markedly higher than is reflected in hiring patterns. The faculty of these departments should be made aware of their position, and the potential impact on Penn's academic mission.

In addition to increasing the numbers of faculty women, it is clearly important to rectify the low number of senior faculty women. Many departments in the University have relatively few women Assistant Professors in the pipeline, and promotions to more senior ranks in the near future will therefore tend to be male. If the fraction of women at tenured ranks in these departments is to improve within a reasonable time frame, it will require an exceptional effort to appoint women as Associate or Full Professors. Our data suggest that, throughout the University, greater attention must be paid to gender equity when hiring directly to senior faculty positions.

The benchmark data indicate that our record in hiring and/or promoting women faculty is mixed at best. The fact that Penn ranks last in comparison with its peers in the numbers of tenured Associate Professors who are women is particularly disconcerting, and should be taken into consideration at all stages in hiring and promotion decisions. Because data from the Harvard study are aggregated and do not provide information for specific disciplines, it is not possible to determine if Penn's relatively low rankings reflect University-wide problems. Our departmental analyses suggest that they may result from an unusually low number of women in a sub-set of Penn departments relative to comparable departments in peer institutions. Alternatively, it is possible that Penn has developed extraordinarily large departments in those disciplines where women are poorly represented.

Data presented above also indicate that we are disproportionately losing faculty women in the humanities and social sciences once they achieve tenure. While there are many possible causes for this, the fact that these

women are leaving for other institutions at a rate markedly higher than their male counterparts suggests that Penn should place a greater emphasis on counteroffers designed to improve retention of tenured women faculty.

Part II: Professional Status of Penn Women Faculty

Allocation of Research Space

The committee collected data on research laboratory space assigned to science faculty for FY2000. Faculty without assigned research space were omitted from the analysis. Information on space allocations was obtained from SAS, the School of Medicine, and SEAS. In SAS, we examined space allocations only for Chemistry, Biology, and Psychology, because Math and Physics had no women faculty who required laboratory space. Data from SEAS were not sufficiently detailed to permit a valid analysis.

In the SAS departments, women faculty at the ranks of Assistant or Associate Professor tended to be allocated research space that was more than their male colleagues. This was true whether one looked at the net square feet (NSF)/faculty or at grant dollars/net square feet. However, a different picture emerged when we analyzed space allocated to faculty who were Full Professors. As had been suggested by the MIT report on Women Faculty in Science, there was a consistent pattern of senior women faculty in science departments having less research space. In each of the three SAS departments where women Full Professors had research space (Biology, Chemistry, and Psychology), the women had fewer square feet assigned to them, with women's space averaging 63% of that for male Full Professors. In the School of Medicine, space allocated to women Assistant and Associate Professors was also a mixed picture. At the Assistant Professor level, men had 90% of that for women, and there was little difference between men and women who were tenured Associate Professors. Among Full Professors who were tenured, the net square feet allocated to women was 94% of that for men.

Because these differences in space at the Full Professor level might reflect gender differences in research support, we obtained information on external grant funding. In the SAS departments, 85% of the male Full Professors and 90% of the female Full Professors had grants to support their research; however, the average size of women's grant income tended to be less than that of the men. For this reason, the differences between male and female Full Professors in each department decreased when the net square foot of research space/\$1,000 grant income was calculated. Nonetheless, women Full Professors in Biology, Chemistry and Psychology averaged 84% as much research space per grant dollar as their male counterparts. In the School of Medicine, tenured women Full Professors averaged more grant income than their male peers. The difference in research space allocation for men and women therefore increased when normalized for grant income; men Full Professors in the Medical School averaged 1,950 sq.ft./\$500,000 while women Full Professors averaged 1,660 sq.ft./\$500,000; thus women Full Professors had 84% as much research space per grant dollar as their male counterparts. The picture was different with respect to more junior faculty; in both the Medical School and most of the SAS departments, women Assistant and Associate Professors tended to have more space per grant dollar than men.

University Funded Research Grants

The funding available from internal sources to faculty for research grants varies from school to school. In so far as we have been able to collect information on these grants, we can find no evidence of gender inequity in the allocation of University-funded grants. The most important general source of funds is the University's Research Foundation. This is an important source of research support, and its procedures are well-established and effective. The competition is public, the rules are clear, and the selections are made by a faculty committee. Over the past three years, women have constituted between 23% and 34% of all applicants, and they have been awarded between 22% and 38% of all the grants.

We have also collected data on the awarding of the McCabe Fund grants by the Medical School. These funds to support biomedical and surgical research are intended for junior faculty with tenure track appointments who have received limited amounts of external funding. Approximately 25% of tenure-track Assistant Professors in the Medical School are women. Since 1996, women have been awarded approximately 25% of the grants each year, and they have been between 14% and 24% of the faculty nominated annually for the grants.

Part III: Salary Analyses

Administrative Positions

Superintendence of school administrations below the level of the Dean has been entrusted to Associate, Deputy, and Vice Deans. Since most schools other than the School of Medicine have only a handful of such positions, one case constitutes a significant proportion of the total number. In the largest schools, women have held mid-level administrative positions roughly in proportion to their number in the senior faculty. In the Medical School 12-13% of the Deans and sub-Deans are women and in SAS women now hold two of seven such positions. Both the Wharton School and the Law School have one female working in such a position, while women hold all of these positions in the Nursing School. However, over the past five years, the Schools of Social Work, Veterinary Medicine, Engineering, and Fine Arts have not had a female in any of these jobs.

In the academic year 1999-2000, women were 6 of 92 or 6.5% of the department chairs in the seven schools surveyed (*Table IV available online*). This proportion is roughly half the expected number based on the proportion of women among Full Professors within the seven schools (12.5%). Data on the distribution of department chairs by sex covering the period since 1995-6 show two dissimilar trends. In 1995, five of the schools at the University (SEAS, GSFA, MED, VET and DENT) had no women serving as chairs. Since that date, there have been 1-2 women chairs in the Medical School and one in the Graduate School of Fine Arts. An opposite trend can be seen in both SAS and Wharton, where the proportion of female chairs dropped since 1995. In SAS, where the proportion of female Full Professors has risen from 15% to 19% since 1995, the proportion of female department chairs has dropped from 22% to 12%.

We conclude that, in the largest schools, women have held mid-level administrative positions roughly in proportion to their number in the senior faculty. The position of department chair, which often rotates among tenured faculty, is one in which women are currently under-represented throughout most of the University.

Endowed Chairs and Term Professorships

While the overall difference is small, women do not occupy endowed chairs in proportion to their numbers in the faculty. The University of Pennsylvania has, at present, 288 endowed professorships awarded to faculty, 86% of which are held by men and 14% held by women. The total Penn faculty is currently 76% male and 24% female, but the proportions of women among Associate and Full Professors (the primary recipients of endowed chairs) decreases to 17.4%. At one extreme, the School of Veterinary Medicine (15% of whose tenured faculty is female) has assigned no endowed chairs to females; nor have the Dental School, the Graduate School of Fine Arts or the Engineering School. In several of these faculties, however, both the number of endowed chairs and the number of female faculty is quite small. In the two largest units of the University, SAS and the School of Medicine, women are under-represented among the holders of endowed chairs. In these two schools, both Full Professors and Associate Professors are recipients of endowed chairs. Women hold only 14% of the 73 endowed chairs in SAS, although they constitute 19.5% of the Associate and Full Professors. In the Medical School, women occupy 10% of its 88 endowed chairs but are 14.4% of the Associate and Full Professors. At the other end of the spectrum can be found the Nursing School and the Graduate School of Education, where 100% and 75% of the endowed professorships are held by women.

Term chairs are awarded in significant numbers only in SAS, and to a lesser extent in the Wharton School. They are frequently awarded to Assistant Professors. Figures from SAS show that women are currently over-represented (33%) among the holders of term chairs if compared to their share of the total standing faculty (24%), but not if compared to their presence among Assistant Professors (40%). In the Wharton School, one of 9 term chairs is held by a woman; females constitute only 13% of the total Wharton faculty, but 21% of the junior faculty.

Teaching Awards

Our committee used the Lindback awards as a proxy for the recognition of teaching excellence. When measured against their proportion of the total faculty, the proportion of women winning this award was roughly comparable to their proportion in the faculty.

We analyzed whether a faculty member's gender affected his or her salary in the 1999-2000 academic year. We examined whether there is any difference in salary by gender, after adjusting for potential gender differences in characteristics (i.e., experience, rank, degree, and department).¹ We analyzed academic base salary for all faculty other than those in the School of Medicine (SOM). For SOM faculty, we included the actual payments (academic base and clinical fees) to tenure-track and clinician-educator faculty for the fiscal year 2000. For all schools other than SOM, we analyzed actual compensation. The data collection task was particularly complicated, however, in SOM. SOM assembled data from the University payroll and from the Clinical Practices payroll. When available, salary from the Veterans Administration and other external salary were included. Faculty members who were known to have salary from the Veterans Administration or other external sources and for whom these data were unknown were excluded by SOM from the data that they provided to the Committee. SOM also excluded department chairs, for reasons that are not clear. The salary data from the SOM were provided in an "index form." All payments to individual faculty were entered as the proportion of the average salary of all other faculty in the data set. For all SOM faculty, the average is 1.00. This data presentation made it impossible for us to consider compilations involving basic sciences throughout the University.

We conducted analyses based on the actual compensation where available and using the salary index for SOM. The analyses were performed separately by rank and by school-cognate fields. There were separate analyses for Assistant Professors, Associate Professors, and Full Professors in each of the following groupings: School of Arts and Sciences (SAS) sciences, SAS humanities, SAS social sciences, Wharton, Veterinary Medicine, Dental Medicine, the Law School, SOM basic science departments, SOM clinical departments, and a grouping of faculty in Annenberg, Graduate School of Fine Arts, Graduate School of Education, and School of Social Work. In all analyses, we compared faculty with equal time since terminal degree. For Full Professors, we also controlled for whether the faculty member was hired into that rank from outside the University. In SOM, we also controlled for whether the highest degree was an MD and whether the professor was in the clinician-educator track. In SOM clinical departments and in Wharton, we controlled further for whether the professor was in a high-pay, low-pay, or medium-pay department. For SAS Social Science, we controlled for whether the professor was in economics. For a small sample of the clinical departments in SOM, we added controls for the amount of clinical work.

Of the 27 separate "field-rank" regression analyses, women received less salary than comparable men in 21 estimations and more than comparable men in 6 estimations. The magnitude of the differences when women

¹ There are several reasons why salary levels differ among faculty members. If one faculty member has a more highly compensated degree, or more experience, or has a specialty that other universities or the broader labor market compensates more highly, he or she is more likely to receive a higher salary. To quantify gender differences, it is necessary to control for any *systematic* differences between men and women faculty in these characteristics. There is one important aspect of faculty characteristics that determines whether they must be included in the analysis of salary differences by gender: the characteristics are systematic by gender *after* the inclusion of all of the other characteristics included in the study. Therefore, it is *only* necessary that the analyses compare equivalently qualified *groups* of men and women. Any characteristics that affect salary that are possessed by equivalent proportions, or in equal intensity, by both men and women *after* controlling for any characteristic differences already included in the model or analysis, cannot affect the size of the gender disparity and, therefore, cannot affect the "true" level of gender disparity in salary. The salary analyses are not designed to identify the particular salary to be paid to particular faculty. Although it is difficult to imagine a situation where a statistical model would be used to set salary, such a model would have to include *all* relevant qualifications for which *any* faculty differ. In that way, a model that is designed to set individual salaries is fundamentally different from a model that is designed to determine differences in salaries across groups of faculty defined by a characteristic, such as gender. In fact, adding characteristics that do not differ between the genders (even though they do differ among faculty within each gender) to the analyses may render them less powerful and more likely to lead to erroneous conclusions. Salary differences that cannot be explained by differences in credentials are suspect if they are also associated with gender.

We use regression analyses. We regressed annual salary on gender and other faculty characteristics. In general, the regression coefficient for gender provides an index of the impact of gender on salary after adjusting (or controlling) for the effect of the other faculty characteristics included in the regression equation. When a characteristic is described as being "controlled," the statistical analysis is effectively comparing outcomes for men and women faculty that are equal or equivalent with respect to the characteristic. For example, when time since degree and degree are "controlled," the model is comparing the average difference salaries for men and women faculty that have the same degree and have the same time since receiving their degree.

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earned less ranged from 0.1% to 14.8%; the magnitude when women earned more ranged from 0.1% to 27.8%. None of the differences where women earned more represented a pattern sufficiently strong to yield a statistically significant difference, and only a few of the differences where women earned less were statistically significant. For many of the regression analyses, the estimates of gender differences are imprecise because there were few women faculty to include.² If we exclude Associate Professor comparisons, which are made among a particularly small and heterogeneous grouping of faculty, we have 19 separate “field-rank” regression analyses. Within these 19 analyses or comparisons, women receive less salary than men in 14 of the estimations, with magnitudes remaining between 0.1% and 14.8%. Women receive more salary than men in 5 of the estimations, with magnitudes between 0.1% and 5.7%. Alternative analyses performed separately for each rank but aggregating all faculty (across divisions) within SAS produced similar results; that is, there were small percentage differences by gender that were not statistically significant. Both analyses find similar salary differences by gender and few differences that are statistically significant.

Part IV: Faculty Survey Data

In addition to the quantitative data collected by the committee, a survey of the perceptions of faculty on many aspects of quality of professional life was conducted. The results indicate that while men and women faculty are similar with regard to academic performance and productivity, women faculty have some concerns that are not shared by their male counterparts.

A. Non-Medical Survey

In the fall of 2000, a nine-page questionnaire was sent to 1,093 members of the standing faculty at Penn in all schools other than the Medical School. After the distribution of a reminder notice and a second wave of questionnaires, 483 responses were received by February, 2001. The response rate was 57.2% for women faculty (276 responses) and 39.4% for men faculty (207 responses). In the interest of brevity we refer to this group as “non-medical”; however it should be noted that it also includes faculty from the Schools of Nursing, Veterinary Medicine and Dental Medicine. Women are concentrated in the ranks of Assistant and Associate Professor and have been at Penn fewer years than their male colleagues. Consequently, after examining the data for gender differences, all of the measures were adjusted to take rank and years at Penn into account. More detailed information on the questionnaire and responses are available on the web as Appendices.

In a number of important respects, men and women were closely matched:

- Women are as likely to obtain grant support as men, although men are more likely to be principal investigators.
- Women publish as many articles and books as men once rank and years at Penn have been taken into account.
- Women teach as many students as men and advise more dissertations.
- Women and men are generally satisfied with the space they have allocated to them, although data on actual space allocations may raise some issues for certain subgroups of faculty.
- Women and men both work very long hours (nearly 60 hours per week on average).

There are many important gender disparities, in addition to the response rate, revealed by this survey:

- Women faculty are less satisfied with their jobs than are men.
- A majority of women respondents report feeling that men faculty are advantaged at Penn, and nearly half of women respondents report that women are disadvantaged at Penn.
- Over half of women faculty believe they are paid less than comparable men in their departments, although an analysis of salaries suggests that the modest gender gap is principally due to differences in rank and school.
- One fifth of women report having encountered unwanted sexual com-

² The other characteristics included in the analyses—time since degree, MD degree, clinician-educator, department, hired in as a full professor—were generally statistically significant and of the expected sign and magnitude. The adjusted R² for the equations ranged from .01 to .83. If we exclude the associate professor equations, which represent particularly problematic “fits,” the adjusted R² ranged from .10 to .55. These ranges are within those typical for similar analyses in the published literature.

ments, attention or advances by a superior or colleague.

- Nearly half of women faculty raise concerns about getting appropriate credit for their work (compared with almost a third of men who voice the same complaint).
- Women faculty raise a number of specific equity concerns, including access to students and the allocation of clerical support.
- Women are less likely to obtaining mentoring from male colleagues, from colleagues in their departments and from their department chair than are men.
- Women reported serving on committees more frequently than their male colleagues.
- Time pressure and work-family issues abound among Penn faculty, but are felt more strongly by women than men.
- Most women faculty report feeling unsafe in one or more locations around campus.

Selected items related to the above conclusions are presented in Appendix IV-A to IV-C (*available online*). Each section of the faculty questionnaire also included an open-ended question that solicited additional comments and suggestions from faculty. Women faculty were more likely to offer responses to these questions than men (typically about 1/4 of female respondents and about 1/10 of male respondents offered additional comments). About half of all respondents added comments to at least one of these questions. In addition, several respondents requested an interview, and a summary of these interviews is presented in Appendix IV-D (*available online*).

B. School of Medicine Survey

In January 2000, as part of the Faculty-2000 project, all School of Medicine faculty were asked to complete a questionnaire to examine academic job satisfaction and reasons for changing institutions or for leaving academia altogether. A total of 938 faculty (70%) in the school responded to this survey. We are grateful to Dr. Judy Shea, Department of Medicine, for sharing summaries of data which we then sorted by gender. To maintain consistency, this questionnaire also formed the basis for the survey sent to non-medical faculty described in section A.

Women faculty in the School of Medicine were more likely than men faculty to be Assistant Professors and to be in the Clinician Educator track. In the total sample, men had been faculty members at Penn for a longer period of time and held their current rank for a longer period of time than women. No differences in duration at Penn and at rank were observed within the Assistant Professor subgroups.

In several of the areas, responses from the medical faculty were similar to those obtained from non-medical faculty:

- Women are as likely to obtain grant support as men, although men are more likely to be principal investigators.
- Women publish as many articles and books as men once rank and faculty status have been taken into account.
- Women and men both work very long hours (60 hours per week on average). Men averaged 5hrs/week more than women (62 vs. 57); but this difference was statistically significant only for faculty at the level of Assistant Professor.
- A majority of women respondents report feeling that men faculty are advantaged and women faculty are disadvantaged at Penn.
- 40% of women faculty (and 26% of men faculty) believe they are paid less than their peers.
- Nearly half of women faculty raise concerns about getting appropriate credit for their work (compared with almost a third of men who voice the same complaint).

There were also several areas of gender differences that appeared to be unique to School of Medicine faculty women. Women were far more likely to report that their professional responsibilities and workload impacted on family and personal time:

- Women at all ranks reported spending twice as much time in childcare as men.
- Women were far more likely to have a spouse/partner who worked full-time than their male peers (90% vs 48%). Among male faculty, 30% had spouses who were full-time homemakers, while only 3% of women faculty had spouses/partners who were at home full-time.
- Women were also disproportionately impacted by meetings scheduled before 8 a.m. or after 5 p.m., by the absence of on-site childcare and by the absence of part-time positions.

	Total Medical Faculty		Assistant Professors	
	Men	Women	Men	Women
Difficulty with meetings before 8	41%	64%	48%	69%
Difficulty with meetings after 5	34%	59%	38%	63%
Absence of on-site childcare	15%	35%	23%	46%
Absence of emergency childcare	19%	38%	27%	45%
Absence of part-time positions	9%	34%	10%	38%

All differences between men and women responses were statistically significant, $p < 0.01$

- Women Assistant Professors in the School of Medicine perceived that they were less likely to be promoted, and more likely to leave their academic positions for private practice or jobs in industry.
- Aggregated data suggested that women were significantly more dissatisfied with their jobs than men; however, analysis by rank indicated that this was because both male and female Assistant Professors-Clinician Educator were more dissatisfied than other faculty, and the majority of women were in this category.

C. Comparison of Medical and Non-Medical Responses

Since many of the questions were identical in both the School of Medicine and non-medical questionnaire, it was possible to directly compare the responses of the two groups of faculty.

1. *Perceptions of the status of women and men faculty.* Faculty in the School of Medicine, both male and female, appeared more concerned about the impact of gender differences than faculty in other schools (“non-medical”). Responses to the question: “At Penn, do you perceive that any of the following groups are either disadvantaged or advantaged?” are summarized below.

Respondents:		Who is Advantaged?		Who is Disadvantaged?	
		Men	Women	Men	Women
Non-Medical	Men	18.3%	13.3%	5.0%	15.2%
	Women	60.3%*	2.8%*	0.0%	46.2%*
Medical School	Men	13.7%	7.0%	0.9%	25.9%
	Women	59.4%*	1.4%*	0.5%	64.4%*

* Indicates that gender gap is statistically significant, $p < 0.05$

It is noteworthy that while 26% of the men in the medical school thought women faculty were relatively disadvantaged, only 15% of men in other schools shared that perception.

2. *Perceptions concerning relative rank and salary compared to peers.* When asked to compare their salary with that of faculty within their department with equivalent training, responsibility and accomplishment, women in both the School of Medicine and the “non-medical” group were more likely than men to perceive that their rank and salary were inappropriately low.

Respondents:		Compared to My Peers			
		My Rank Is		My Salary Is	
		Higher	Lower	Higher	Lower
Non-Medical	Men	7.8%	9.4%	14.0%	30.4%
	Women	2.7%	21.0%	9.0%	55.4%*
Medical School	Men	8.9%	13.2%	13.0	26.0%
	Women	3.8%	17.1%*	2.7%*	39.9%*

* Indicates that gender gap is statistically significant, $p < 0.05$

D. Data from Other Institutions

Eight questions included in this survey were designed to match questions asked in a 1999 National Survey of Faculty conducted by the National Center for Educational Statistics. A comparison of the responses of Penn non-medical faculty to the national results is presented below.

Comparison of Penn Faculty Survey (excluding Medical School) With the 1999 National Survey of Post-Secondary Faculty

	Penn Faculty Questionnaire		1999 National Survey of Post-Secondary Faculty	
	Men	Women	Men	Women
Satisfied with job overall (%)	86.4%*	78.6	86.1	83.3
Satisfied with salary (%)	70.8%*	60.3	58.4*	53.3
Satisfied with benefits (%)	86.7%	89.0	67.9*	61.3
Satisfied with quality of undergrad. students (%)	85.2%*	91.2	71.6*	74.0
Satisfied with quality of graduate students (%)	82.2%*	92.5	83.6*	84.3
Think female faculty are treated unfairly (%)	10.8%*	30.2	10.0*	29.5
Think minority faculty are treated unfairly (%)	11.9%*	24.1	11.1*	20.3
Average hours worked per week	59.5	58.9	48.2*	43.3

* Indicates that gender gap is statistically significant, $p < 0.05$

Faculty at Penn exceed national faculty benchmark data in a number of important respects. Penn faculty are more satisfied with some aspects of their jobs, e.g. their salaries and benefits and the quality of both undergraduate and graduate students. Penn faculty, especially women faculty, put in work much longer work weeks than do faculty at most other institutions. In other respects, Penn faculty opinion closely mirrors that of faculty nationally. Women are less satisfied with their jobs overall and with their salaries. Women are less likely to agree with the statement that ‘women faculty are treated fairly’ and ‘minority faculty are treated fairly.’ On these two items, Penn faculty—both male and female—closely match the national averages.

Conclusions

The first official analysis of the status of faculty women at Penn was the Cohn Committee report [*Almanac* April 13, 20, and 27, 1971] that was commissioned by the University Council Faculty Affairs Committee in May 1970. Since that time, periodic updates have been prepared by the Office of Institution Research and Planning Analysis and provided by the Provost to each department. These reports have focused on the distribution of faculty women by department and rank as well as ten year rolling histories of faculty hiring patterns for each department in the University.

The picture that emerged from the Cohn Committee study was similar to that seen at other universities in the early days of affirmative action: women were only 7% of the standing faculty at Penn and were concentrated at the rank of Assistant Professor. Most strikingly, there were no women Full Professors in the College and many departments had no women faculty. The present study confirms that there has been marked progress in several important respects: the proportion of women faculty University-wide has risen to 24%, women now comprise 18% of the Full Professors in the College, and there are relatively few departments without women faculty. Nonetheless, it is clear that major problems still exist.

- Women are still concentrated at the rank of Assistant Professor in most disciplines. Major contributing factors are that faculty hired as Full professors are predominantly male, and resignations among senior faculty in SAS are disproportionately female.
- In most of the departments in the School of Medicine, Wharton, and the Natural Sciences in SAS, the proportion of women Assistant and Associate Professors is considerably below that predicted.
- Benchmark data indicate that the number of women Associate Professors in both the medical and non-medical area is low, and in some departments there are no women Assistant Professors who might be considered for promotion to Associate Professor.
- The number of department chairs who are women is substantially lower than women’s representation among senior faculty.
- Although not statistically significant within individual groupings, our analyses of salaries by gender, rank, and cognate discipline groupings found that women’s salaries are slightly lower than men for the majority of groupings.
- There are small but persistent differentials with respect to research space for Full Professors in the sciences and medicine.

The responses to the faculty survey provide additional important evidence about faculty perceptions of these differences.

- Although women faculty appear to be as productive as men faculty with respect to publication, teaching and research support, they are significantly less satisfied with their jobs and many issues related to working conditions.
- Both male and female faculty perceive that women faculty at Penn are disadvantaged when compared to men.
- Dissatisfaction with working conditions is a particular problem among the large number of women Assistant Professors with clinical responsibilities, whose work loads and family responsibilities are difficult to reconcile.

In 1997, the Senate Committee on the Faculty reviewed affirmative action in faculty hiring [*Almanac*, May 13, 1997]. They concluded that while some progress had been made and many schools and departments had “hired women faculty at rates that match or exceed the proportion of women in the relevant pool....Penn still falls far short in having achieved a truly representative or diverse faculty.” This committee re-affirmed the urgency of continued and expanded efforts to hire more women and minority faculty throughout Penn, and made several recommendations:

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The administration must make this a top priority and should take vigorous steps to ensure that attention to the hiring of women and minority faculty becomes, not simply a matter of bureaucratic procedures, but an integral element in the way schools and departments go about hiring. The provost should issue through the deans explicit statements to everyone involved about the central importance of hiring more women and members of minorities. Questions of diversity should be addressed at every stage of a search, starting at the point at which a position is requested and authorized. Specifically, diversity should be considered in the initial identification of the specialty and subfield in which a search will be conducted. In many disciplines, particular subfields have significantly fewer women and minority group members, and there is a danger that, by defining a position in terms of a traditional strength or of the interests of the person being replaced, a school or department may miss a valuable opportunity for increased diversity. We recognize that departments and schools are under heavy pressure to achieve excellence by maintaining and extending their established strengths, and we hope that this conflict can itself be discussed and addressed at all levels of the University. Finally, it should be required that chairs' letters proposing individuals for appointments include discussion of how the candidate's presence would help to broaden the diversity, as well as to enhance the intellectual strength, of the department.

Since our committee has not attempted to analyze hiring and promotion processes, we cannot judge whether the requested procedures are being followed. However, our results indicate that the desired outcomes have not been achieved. It is therefore time to consider additional measures.

Our evidence suggests that the problems reside primarily in individual departments rather than at the University-wide level. Those actions that occur centrally, e.g. Provost and Trustee approval of appointments and promotions, designation of Deans, Research Foundation awards show no signs of gender inequity. In contrast, those actions which are the provenance of individual departments or faculty groups, e.g. selection of new faculty hires, nomination of new department chairs, establishment of a congenial work environment, have resulted in many problems. This conclusion is supported by the census data for individual departments; groups of departments that should be hiring from a pool of applicants with similar percentages of women show wide variation in the proportion of faculty women. Clearly, some departments have been more successful in hiring and providing an appropriate environment for women faculty than other departments. With respect to senior faculty hires, however, the under-representation of women appears to be surprisingly widespread. Because departments select the faculty hired at senior levels, the underlying causes for the under-representation must lie within the individual departments that carry out the selection and initiate the hiring process.

Therefore, institutional change can only arise from new policies to influence decision making within departments. The policies must deal with both departmental hiring practices and creating change in those environments where women faculty may feel unwelcome or undervalued. Specific policies must be designed with input from the Deans, who must play a major role in implementing them. They should address the following issues:

- *How can departments with longstanding and large deficiencies in hiring of female faculty be directed to immediately alter their hiring practices?* This might require budgetary constraints on problem departments and rigorous performance evaluations of department chairs and Deans. Re-instituting the practice of annually publishing data on faculty composition by department may influence those departments that are unaware

of their discriminatory practices. Publishing reports targeting those departments which seem incapable of hiring women in proportion to their availability might be more effective.

- *How can all departments increase the proportion of women among senior faculty hires?* It is possible that improved awareness plus greater scrutiny of proposed senior appointments will motivate departments to avoid gender stereotypes and "old-boy" networks, but it is also likely that more stringent controls will be required in some departments and schools. Departments with disproportionately few women Assistant Professors should probably be targeted for particular attention.

- *How to keep more tenured females at Penn?* Deans and department chairs should recognize that high caliber female faculty in many fields are very likely to receive outside offers. It is therefore important that department chairs and Deans work to head off dissatisfactions and be prepared to raise salaries substantially in response to outside offers.

- *How can we include all schools in a review of the equity of faculty salaries, with special attention to the salaries of women faculty?*

- *How can we deal with the particular problems of junior women faculty in clinical departments who have workloads incompatible with family life?* Policies in clinical departments and clinical practices must be adjusted to ensure that it is possible for women as well as men to retain full time faculty positions.

- *How can we alter environments perceived by most women and many men faculty as unfriendly to women?* The existence of a "chilly climate" for faculty women is a problem facing most universities. While it is evident in the responses to our faculty survey, it is not unique to academia, its existence cannot be proven, and the causes are thought to be an accumulation of assumptions (often subconscious) about the capabilities and contributions of professional women. Given these characteristics, it is unlikely that publicity or sensitivity training can produce significant change. Therefore, the best remedy may be to increase the proportion of faculty women, reaching levels where women make a major contribution to establishing the climate and where senior women faculty can provide supportive environments.

Data Sources

Penn faculty census:

University of Pennsylvania Office of Institutional Research and Analysis

Availability pools:

University of Pennsylvania Office of Institutional Research and Analysis
Affirmative Action Reports for Current Standing Faculty, Fall 1992 and Fall 1997;
National Science Foundation/Science Resource Studies of Earned Doctorates.

Benchmark data:

Demographic Survey of Faculty and Administrators at Select Institutions
1999-2000, Harvard University, May 2001.

Research space and funding:

SAS department information from each department, Fall 2000;
School of Medicine data from the Office of Planning and Reporting,
School of Medicine, Fall 2000.

Administrative positions, Research Foundation Awards, Lindback Awards, and Term Chairs:

Office of the Provost.

Endowed Chairs:

Development Office

Salary data:

University of Pennsylvania Office of Institutional Research and Analysis.

Resignation information:

Office of the Provost and Office of the University Faculty Senate.

Gender Equity Committee

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