Report of the UC San Diego Vice Chancellor Health Sciences Task Force on Gender Equity

January 2015

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1. Executive Summary: key findings and recommendations

After detailed analysis, the VCHS Task Force on Gender Equity concludes that under-representation of women and underrepresented minorities (URM) and salary inequities currently persist at the Vice Chancellor Health Sciences. The following findings are identified as the most significant and at the same time amenable to intervention.

Main findings

1. After adjustment for relevant cofactors, women and URM faculty are paid significantly less than male faculty. The magnitude of the difference is approximately 12%. Although there has been improvement since the SOM Gender Equity Study of 2004, that reported a 23% salary differential for women compared to men, there remains considerable room for improvement.

2. After adjustment for relevant cofactors, underrepresented minorities (URM) faculty are paid significantly less than are male faculty. The magnitude of the adjusted difference is approximately 10%.

3. Our final model explains more than half of the salary paid to Health Sciences Faculty; however a substantial component remains unexplained. To some extent, this might represent missing or incomplete data elements.

4. While there is a disparity in compensation present in base salary, the magnitude is greater when considering total compensation.

5. There exists a plateau in salary advancement among women faculty occurring at 15 to 30 years after earning their degree.

6. Unadjusted for confounders, starting salaries appear lower both for women and URM faculty.

7. There are 25 faculty members whose log (compensation) falls at least 2 SD below the model prediction. Neither women nor URM faculty seem to be disproportionately represented among the lowest paid outliers.

8. Only two of the 25 lowest extreme outliers have evidence of any clinical income.

9. A disproportionately high fraction of the lower extreme outliers are in the adjunct series.

10. Women faculty are significantly ($p < 0.001$) more likely to work less than full time compared to male faculty. URM faculty also are more likely to work less than full time ($p = 0.07$) compared to the non URM faculty. The higher p-value for URM faculty may reflect the low number of URM faculty.

11. There appears to be a trend for part time faculty to be paid less, on a prorated basis, than full time faculty after adjustment for gender. This observation holds for non-URM faculty regardless of gender, as well.

Recommendations

1. Pertinent explanatory information regarding outliers should be made available to Department Chairs for review with the low paid faculty member and development of a suitable corrective action plan, if indicated.

2. Findings from each review should be provided to the Dean's office in order to guide and further refine the statistical examination of potential factors associated with unequal compensation.

3. As a component of annual salary negotiations, Department Chairs should review AAMC percentiles by rank and specialty and specifically make note of any faculty member below the 30^{th} percentile, and any changes in salary of > 10% and resultant impact on salary equity.

4. Utilizing the aggregated data obtained from recommend #2, above, as well as other pertinent information as available, the Dean's office may study whether there is a differential impact of wage compression due to mid career alterations in responsibilities among women and URM faculty.

5. The Dean's office may investigate whether gender or URM based differential responses in retention cases exist.

6. UC San Diego Health Sciences may broaden the definition of creative output to more fairly value collaborative contributions.

7. Promote easier targeted access to CREST, NCLAM and other faculty career development opportunities especially for women and URM faculty.

8. Institute a focus on individuals returning from family leave in order to expedite return to maximal productivity.

9. Strengthen the development and deployment of senior faculty as mentors for junior faculty. Expand mentoring programs to help junior women faculty use mid-career and senior faculty to navigate the work/life balance issues along with finding resources to help them stay on track with respect to research and clinical productivity.

10. A focus on enabling part-time faculty to more effectively engage, with fair compensation, in productive research, clinical and teaching activities should be made a priority for the Health Sciences.

11. The Health Sciences should generate academic progress charts of individual faculty (particularly part-time faculty) graphically representing academic milestones and achievements plotted against both base and total compensation.

12. Education regarding the academic review processes should be made readily available to all faculty (particularly part-time faculty.) Templates and exemplars tailored to part time faculty should be readily available.

13. Review current USCD VCHS faculty development and internal research grants and how they are currently allotted in terms of women and URM faculty.

14. Develop a mechanism to target development programs to women and URM faculty returning from leave or are advancing from part to full time, to ease transition back into the competitive work environment.

15. An annual audit of equity differences and their correction, if any, should be provided regularly to the Dean's office.

16. The current statistical model assessing inequality can be made richer and more precise with input from the aggregate findings of individual faculty review.

17. Data on faculty salary, rank advancement and H.R.-related events are currently in disparate, often difficult to analyze, data repositories and there are abundant missing data elements. An effort should be made to integrate the various data systems for easier-and more reliable-routine analysis and to insure completeness and correctness of data elements for known and potentially important predictive factors.

18. It is important that potential inequities be recognized early. Therefore, it would be useful to undertake careful study of starting salaries, and the equity of starting salaries. This process should be routine for all new hires. Precise explanation of apparent instances of starting salary inequities should be recorded and regularly reviewed in aggregate to seek patterns that might contribute to ongoing inequity in compensation for women and minority faculty.

19. Stratified analyses according to the series should be done in order to determine if our findings pertain to faculty in all of the series'. Departments should be made aware of the findings.

2. Introduction and background

In 2002, the Senior Vice-Chancellor of UC San Diego charged a group of faculty on the general campus to conduct a survey of salary equity related to gender among the ladder-rank faculty. This group identified important challenges to the campus as a whole in hiring and retaining women faculty. In addition to under representation of women on the faculty and academic senate, they found salary inequities in the Health Sciences. Based on these findings, the group recommended improvements in recruitment and retention of female faculty along with correction of the salary inequities.

Twelve years later, there are still inequities in female representation and compensation among faculty at the UC San Diego Health Sciences. We found that the inequity extends to underrepresented minorities as well. To secure the future quality of faculty and maintain the high quality of UC San Diego, Health Sciences requires continued emphasis on insuring equity and inclusion focused on under represented minorities and women. Maintaining this focus calls for periodic analysis of the state of salary equity, with appropriate plans for correction of inequities and monitoring of progress.

Monitoring and correction of inequities in faculty compensation have implications beyond satisfying an obvious moral obligation. Gender diversity is associated with improved organizational innovation, critical during times of either expansion, improvement or cost cutting (Yang, 2014). Likewise, racial diversity brings alternative perspectives that stimulate creativity and innovation (McLoed, 1996). In public equity firms, racial diversity in management was associated with greater market share and stock returns, probably through increased capacity in gaining temporal advantages (Andrevski, 2011). UC San Diego Health Sciences is now entering a phase of increased competitive challenges with respect to clinical reimbursement and research support. To weather and thrive in such a disruptive paradigm will require the diversity of thought and action that accompanies full gender and ethnic representation and equity.

The University of California Office of the President recognizes the importance of faculty salary equity. An objective study of compensation is one of the most appropriate methods to measure the value of a diverse faculty; knowledge of the findings is an important determinant of recruitment and retention. The study was done last year for the general campus and SIO. The present study adds information from the Health Sciences to UC San Diego’s profile.

In an effort to objectively evaluate faculty pay equity at UC San Diego Health Sciences, on August 4, 2014, Dr. David Brenner, Vice Chancellor for Health Sciences convened a task force. Dr. Steven Plaxe was chair, with Ron Espiritu in support. Members of the Working Group included: John Fontanesi, Tom Liu, Grace Kuo, Andrina Marshall, Tom

Moore, Angela Scioscia, Christian Tomaszewski, Deborah Wingard, and Ronghui (Lily) Xu. Data was provided by Lin Majors. Expert statistical analysis was provided by members of the UC San Diego CTRI and included Jiayi Hou and Lishi Zhan, with supervision from Ronghui (Lily) Xu. The work group included faculty from a broad cross-section of the UC San Diego Health Sciences faculty, including diverse series and job descriptions. The task force met regularly between August 2014 and January 2015 to develop and finalize this report.

The tasks of the group were to:

- Determine period of salary equity review
- Determine what faculty positions will be part of the study
- Develop and document methodology (so that study can be replicated in the future)
- Develop plans to address patterns of discriminatory salary differences
- Review and provide explanations for individual outlier cases in full context

Our report consists of an analysis of the current state followed by recommendations for correction. In our analysis, we had to make decisions on inclusion and exclusion criteria that would not compromise the quality of the report. For example, it made sense to exclude all faculty members that worked less than 50% full time in the Health Sciences. More challenging was employees who terminated at midyear, possibly representing negative affirmation for current compensation strategies. Ultimately the committee came to a unanimous decision on the individuals, compensation sources, time frame (2009 - 2014), and cofactors to be included in the final model. We then used the model to look for salary discrepancies among women and underrepresented minorities.

In the end, based on our findings, we made recommendations as to how to correct problems that emerged from our review of the current state within the Health Sciences.
We intend for the recommendations to lead to changes that result in sustainable meaningful progress, as measured by improved salary equity.

3. Methodology

The data observed contained salary information for 1688 faculty members in the Health Sciences at University of California, San Diego from years 2009 to 2014. As each faculty may have multiple records across the five years, a total of 6641 salary records have been observed at observation-level. The variables of primary interest are the following:

- FiscalYear
- EMPLOYEE_ID (Categorical with1688 levels)
- Degree (Categorical) with 9 levels:
  - DO
  - DO/PhD
  - DPM
  - MD
  - MD/PhD
  - NonDoc
  - OtherDoc
  - PharmD
  - PhD
- Rank (categorical) with 3 levels:
  - Asst Professor
  - Assoc Professor
  - Professor
- Series (categorical) with 5 levels:
  - FTE
  - ADJ (Including “Adj” and “ADJ”)
  - CLIN (Including “Clin” and “CLIN”)
  - CLINx (Including “ClinX” and “CLINx”)
  - IR
- TotalPay (Continuous)
- HomeDept (Categorical) with 21 levels:
  - ANESTHESIOLOGY
  - BIOENGINEERING
  - CELL & MOL MED PROG
  - CHEMISTRY & BIOCHEMISTRY
  - CTR FOR RES. BIOL.STRUCT/SOM
  - DEP. OF REPRODUCTIVE MEDICINE
  - DIVISION OF BIOLOGICAL SCI.

  - FAMILY & PREVENTIVE MEDICINE
  - MEDICINE
  - MEDSCH/EMERG MED SVC
  - NEUROSCIENCES
  - OPHTHALMOLOGY
  - ORTHOPAEDIC SURGERY
  - PATHOLOGY
  - PEDIATRICS
  - PHARMACOLOGY
  - PSYCHIATRY
  - RADIATION MED & APPLIED SCI
  - RADIOLOGY
  - SCH OF PHARMACY AND PHARM. SCI
  - SURGERY
- OriginalHireDate ("MM/DD/YY")
- FirstFacultyAppt ("MM/DD/YY")
- Gender (Categorical) with 2 levels:
  - F
  - M
- ethnicityGrouping (Categorical) with 2 levels:
  - Not URM (Including MAJ and MIN)
  - URM
- Calc Appt %: faculty members with less than 50% appointment are

A. Data Management

After we removed all the records with appointment percent less than 50%, a total of 6261 observations were left in the data analysis corresponding to 1622 faculty members. Some other modifications made to the original dataset follow:

- There were 3 faculty members without degree data who were removed when we fit the model.
- There were 18 faculty members whose URM status is Unknown, which were removed when we fit the model.
- We merged the columns in the original dataset named "MD.DO.Degree.Date", "PhD.PharmD.Degree.Date" and "Other.Degree.Date", into a single column named date of degree. There were 126 faculty members having multiple degree dates. For each of

these faculty members, the date of obtaining the first degree was chosen as their dates of degree. Finally we had 148 faculty members whose dates of degree were not successfully collected.

- The years of experience at UCSD for each observation is defined as the years since their "OrignalHireDate" to the end of "FiscalYear" of each record.
- The total salary is adjusted by prorating "Total Calc Salary" using "Calc Appt %" (Total salary = "Total Calc Salary"/ "Calc Appt %")

B. Statistical Modeling

To assess the impact of each covariate on the total salary, we fit a linear random intercept model with the following form:

$$\log(Y_{ij}) = \beta_0 + B^T X_{ij} + U_i^T Z_i + \varepsilon_{ij}$$

where $\log(Y_{ij})$ is the log of total salary for faculty i at year j, β_0 is a shared intercept term, B^T represents the effect size of all the covariates, X_{ij} is the design matrix for the fixed effects. U_j^T represents a random intercept term associated with each faculty (following a univariate normal distribution with mean 0 and diagonal variance matrix σ_u^2), Z_j is the design matrix for the random effects, and ε_{ij} is a normal distributed error term with mean 0 and variance σ^2. The statistical significance of fixed terms is determined with a normal approximation. A likelihood ratio test is used to detect the significance level for each variable entered in our model. We also report two measures of coefficient of determination: Partial R^2 (R_p^2), computed as in Xu (2003)[1], and Marginal R^2 (R_m^2), computed as in Nakagawa and Schielzeth (2013)[2]. R_p^2 can be interpreted as the ability of the model, given all the covariates to predict a second measurement. R_m^2 can be interpreted as the ability of the model, given all the covariates, to predict the outcome measurement.

We use log transformation on the total salary to reduce skewness and narrow the range of the response. The correlation between rank and years since degree is

[1] Xu, R. (2003), Measuring explained variation in linear mixed effects models. Statist. Med., 22: 3527-3541. doi: 10.1002/sim.157

[2] Nakagawa, S., Schielzeth, H. (2013). A general and simple method for obtaining R2 from generalized linear mixed-effects models. Methods in Ecology and Evolution, 4: 133-143. doi: 10.1111/j.2041-210x.2012.00261.x

calculated as 0.844, 0.847, 0.834, 0.829 and 0.838 for 2010-2014, respectively, by using a new methodology for detecting the relationship between ordinal and continuous measurements proposed by Peng et al. (2011)[3] . As a result, years since degree is not included in our model due to the high correlation with rank and a large amount of missing data. The trend of total salary over the years of experience at UCSD shows non-linearity which in fact satisfies the reality that the acceleration of salary is expected to be slower when years of experience increases. Therefore, a quadratic term of years of degree at UCSD is added into model as well to capture the non-linear trend. In addition, the fiscal year is also included in the model to account for the average change in salary across individuals in each year. Eventually we fit three random intercept models to assess the effect of gender and URM. The first model is only with gender as the primary predictor of interest. The second one is only with URM as the primary predictor of interest. The third one is the model with gender, URM and the interaction of them as the primary predictors of interest. The equations can be expressed as follow:

Model 1 : $\log(\text{total salary}_{ij}) = \text{Department}_{ij} + \text{Series}_{ij} + \text{Degree}_{ij} + \text{Rank}_{ij} + \text{Gender}_{ij} + \text{Years of experience at UCSD}_{ij} + \text{Years of experience at UCSD}_{ij}^2 + \text{Fiscal year}_{ij} + \boldsymbol{U_i} + \boldsymbol{\varepsilon_{ij}}$

Model 2 : $\log(\text{total salary}_{ij}) = \text{Department}_{ij} + \text{Series}_{ij} + \text{Degree}_{ij} + \text{Rank}_{ij} + \text{URM}_{ij} + \text{Years of experience at UCSD}_{ij} + \text{Years of experience at UCSD}_{ij}^2 + \text{Fiscal year}_{ij} + \boldsymbol{U_i} + \boldsymbol{\varepsilon_{ij}}$

Model 3 : $\log(\text{total salary}_{ij}) = \text{Department}_{ij} + \text{Series}_{ij} + \text{Degree}_{ij} + \text{Rank}_{ij} + \text{Gender}_{ij} + \text{URM}_{ij} + \text{Gender}_{ij}*\text{URM}_{ij} + \text{Years of experience at UCSD}_{ij} + \text{Years of experience at UCSD}_{ij}^2 + \text{Fiscal year}_{ij} + \boldsymbol{U_i} + \boldsymbol{\varepsilon_{ij}}$

Where I means faculty i, j means year j, $\boldsymbol{U_i}$ is a random intercept term associated with each faculty, and $\boldsymbol{\varepsilon_{ij}}$ is an error term. Years of experience at UCSD is centered at zero in order to reduce the multicollinearity between main effect and quadratic term.

[3] Peng, L., Li, R., Guo, Y. and Manatunga, A.K. (2011). A framework for assessing broad sense agreement between ordinal and continuous measurements. Journal of the American Statistical Association 106:496, 1592-1601.

Since model 3 includes the effects of both gender and URM status, we have primarily focused on the results of this model to identify the findings of most interest and identification of outliers.

4. Results

Figures 1 through 6 are shown below to describe the unadjusted (raw) data regarding the relationship of base and total salary to gender and URM status.

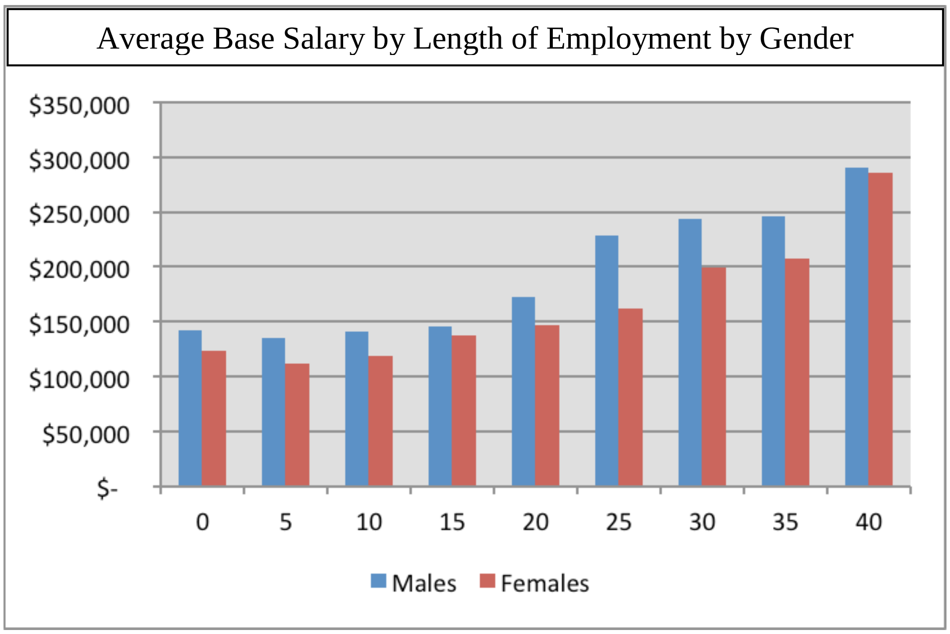


Figure 1. Average base salary by gender vs. length of employment at UCSD

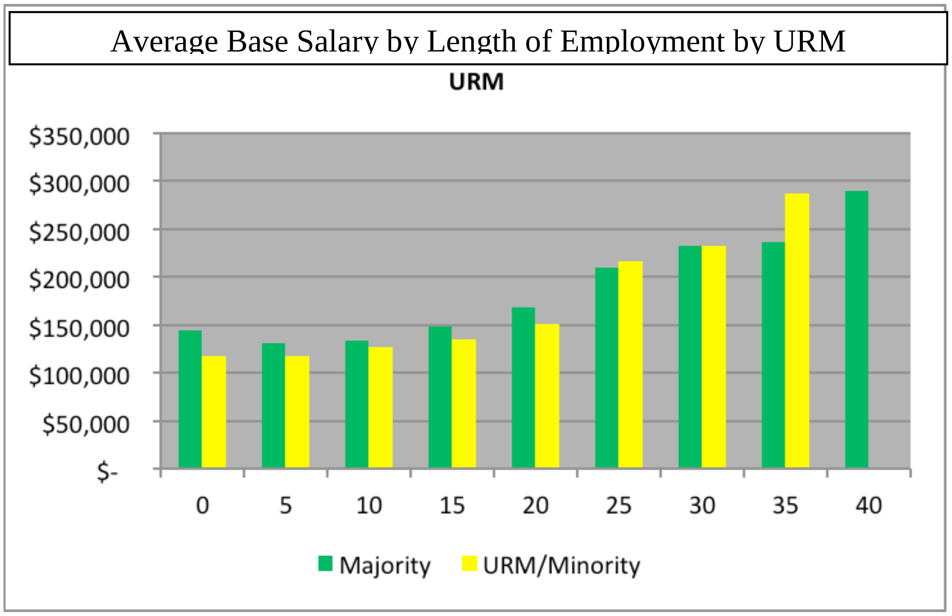


Figure 2. Average base salary by URM status vs. length of employment at UCSD

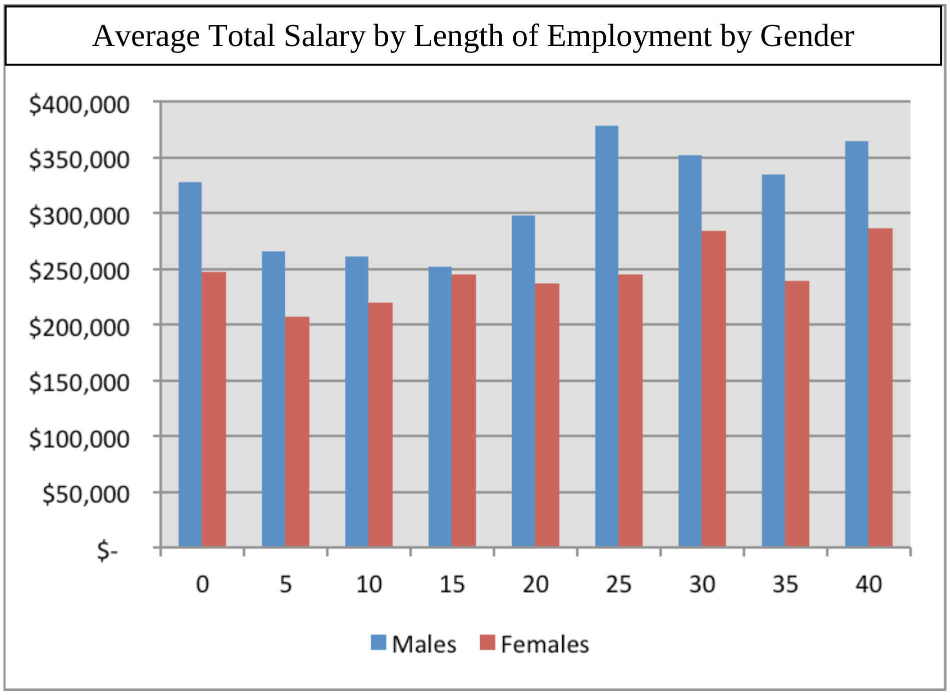


Figure 3. Average total salary by gender vs. length of employment at UCSD

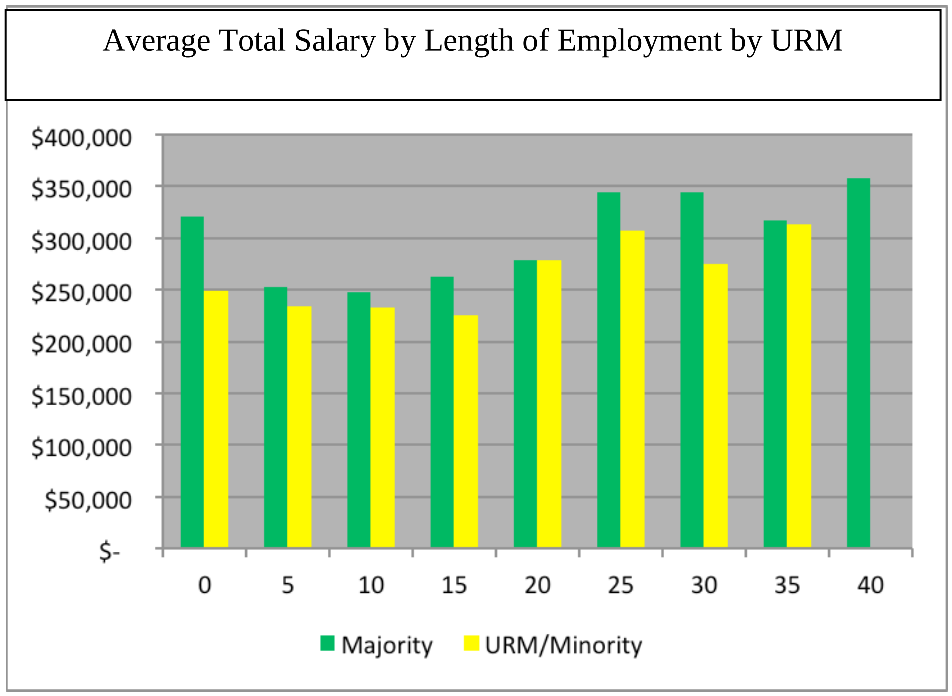


Figure 4. Average total salary by URM status vs. length of employment at UCSD

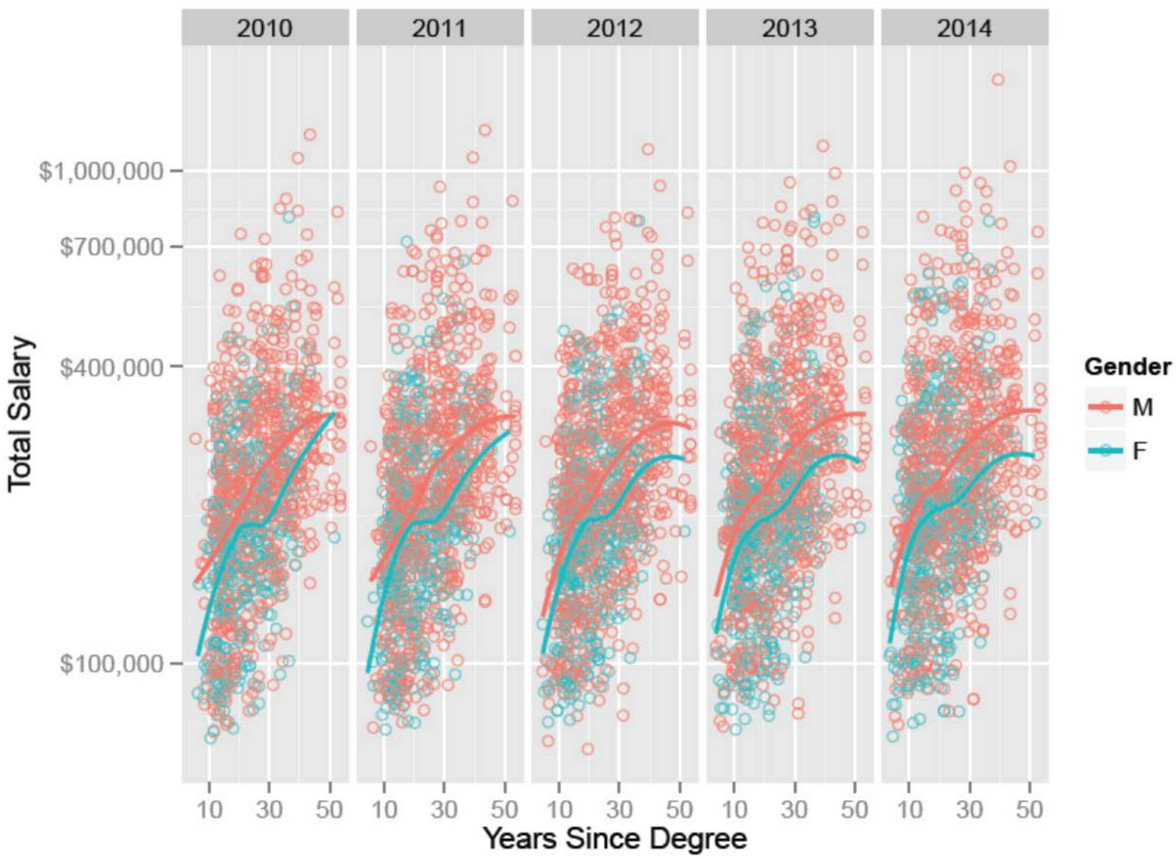


Figure 5. Scatter plot for total salary trend over years since degree grouped by gender.

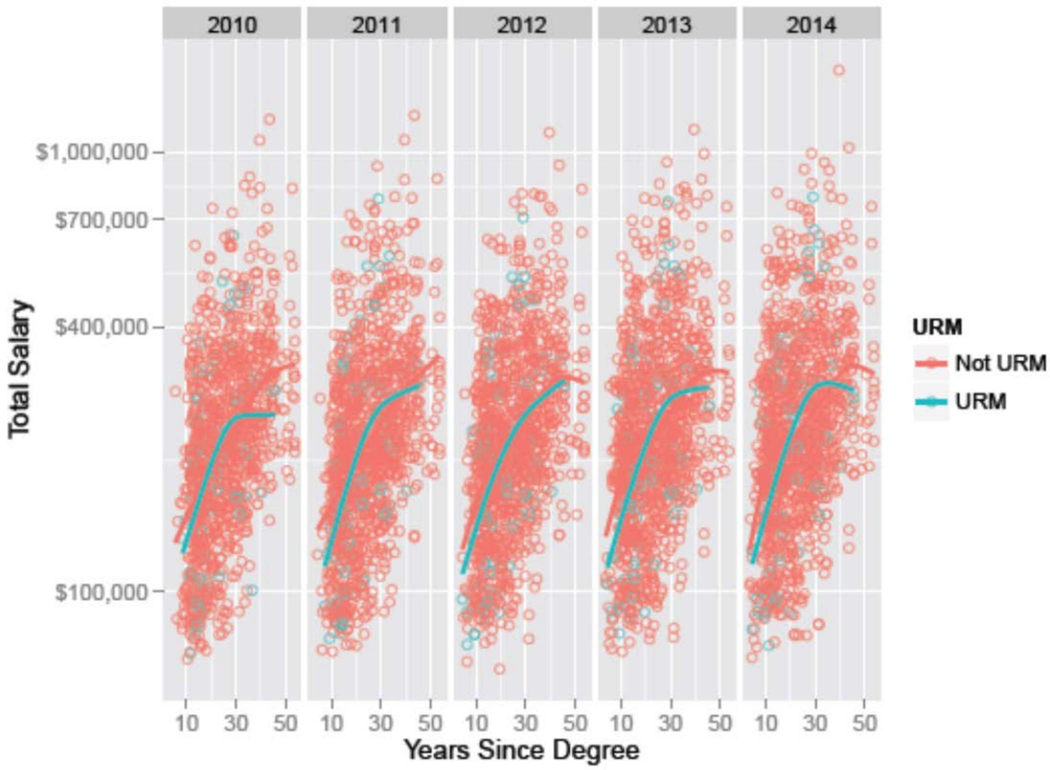


Figure 6. Scatter plot for total salary trend over years since degree grouped by URM

Additional descriptive tables and plots are presented in the appendix.

Table 1 is a contingency table for each of degree, rank, series, years since degree, home department, years of experience at UCSD and URM by gender as well as overall in fiscal year 2013- 2014. Frequency (percentage) is reported for degree, rank, home department and URM. Mean (standard deviation) is reported for years since degree and years of experience at UCSD. The p-values in the forth column are generated from a two-sample t-test for continuous variables and a permutation Chi-squared test for categorical variables. For each variable, the number of missing is also reported in the last column. (Contingency tables for years 2009 - 2013 are presented for comparison and numbered as tables 11-14.)

Table 2, 3 and 4 report the median (prorated) salary by gender, URM and appointment percentage from 2009 to 2014, respectively.

Summary Tables (5 through 7)

The effect of gender and URM is summarized from the random intercept model on total salary. Table 5 shows the summary results from Model 3 that gender, URM and the interaction between gender and URM each is found to have a significant effect on total salary.

Using male and Not URM as reference group, the average total salary (in raw scale)

- for female and not URM is 12.4% lower (95% CI: 9.3%, 15.4%),
- for male and URM is 9.3% lower (95% CI: 1.9%, 16.2%),
- for female and URM is 10.3% lower (95% CI: -3.9%, 22.5%).

Using male and Not URM as reference group, the average total salary (in log scale)

- for female and not URM is 0.132 lower (95% CI: 0.0977, 0.167),
- for male and URM is 0.0979 lower (95% CI: 0.0191, 0.177),
- for female and URM is 0.108 lower (95% CI: -0.039, 0.255).

Table 6 presents the number of faculty members (percentage) who work for full-time (>90%), semi full-time (75-89%) and part-time (50-74%) broken down by the appointment percentage and median prorated salaries grouped by gender and URM in fiscal year 2013-2014. We see that for non-URM faculty, for both men and women, on a prorated basis, part-time faculty are paid less compared to full time faculty.

Table 7 presents the prorated median salary in fiscal year 2013-14 for each of the cohorts in table 6.

Table 8 presents the number of faculty members (percentage) that falls in each quartile category grouped by URM, gender and the combination of URM and gender.

Detection of Outliers

Table 9 presents the number of faculty with marginal residuals from Model 3 that are below -2SD's below the predicted value, the number of faculty with residuals above +2 SD's above the predicted value and the number of faculty with residuals between that boundary in each category grouped by degree, rank, gender, URM, the combination of gender and URM and series, respectively. Adjunct faculty seem to be disproportionately highly represented among faculty paid < 2 SD below the mean. Neither women nor URM faculty appear to be disproportionately represented among the lowest paid outliers. It was determined that only 2 of the 25 individuals in this list received funding from clinical sources.

Table 10 reports the number (percentage) of faculty members that appear in Table 25 and the number (percentage) of faculty members in original dataset in fiscal year 2013 - 2014 for each level grouped by degree, rank, gender, URM, the combination between gender and URM and series. Neither women nor URM faculty are disproportionately represented among the lowest paid; however, adjunct faculty seem to be more frequently in this group. Conversely, clinical faculty appear to be less frequently among the low end outliers.

For fiscal years 2009 - 2013, we report some summary statistics in tables 11 to 14 for each level of degree, rank, series, years since degree, home department, years of experience at UCSD and URM by gender as well as the overall. Frequency (percentage) is reported for degree, rank, home department and URM. Mean (standard deviation) is reported for years since degree and years of experience at UCSD. The p-values in the forth column are generated from a two-sample t-test for continuous variables and a permutation Chi-squared test for categorical variables. For each variable, the number of missing data is also reported in the last column.

Table 15 – 18 report the rank of total salary by degree, home department, series and academic rank. The rank is based on the median of total salary for each year.

Table 19 shows:

Using male and Not URM as reference groups respectively, the average total salary (in log scale)

- for female is 0.123 lower (95% CI: 0.0896, 0.157),

- for URM is 0.0477 lower (95% CI: -0.0123, 0.108).

Using male and Not URM as reference groups respectively, the average total salary (in raw scale)

- for female is 11.6% lower (95% CI: 8.6%, 14.5%),
- for URM is 4.7% lower (95% CI: -1.2%, 10.2%),

Full Results of the Models

Table 20 and Table 21 present the full results of Model 1 and Model 2 with gender and URM as the primary predictors of interest, respectively. Table 22 presents the results of the random intercept model with both gender and URM and the interaction between gender and URM as well.

Tables 23 and 24 present 80 outliers in total sorted by the absolute value of the marginal residuals. Marginal residual is the difference between the observed data and the estimated marginal mean, which includes contribution from only fixed effects. An outlier is defined as a faculty having the marginal residual of fiscal year 2013-2014 generated from Model 3 more than 2 standard deviations from the predicted value. Gap column is the difference between the two standard deviations from the recommended salary and the real total salary. Table 25 lists 100 faculty members with the lowest marginal residuals in Model 3. Because they contain individually identifiable data, tables 23 through 25 have been provided to the office of the Vice Chancellor Health Sciences only and are not included in the appendix of the report.

Figure 7 shows the trend of total salary over years of experience at UCSD for each of the five fiscal years. Figure 8 shows the trend of total salary over years of experience at UCSD grouped by gender for each of the five fiscal years. Figure 9 shows the trend of total salary over years of experience at UCSD grouped by URM status for each of the five fiscal years. Figure 10 shows the trend of total over years of experience at UCSD grouped by rank for each of the five fiscal years. Figure 11 shows the trend of total salary over years of experience at UCSD grouped by the interaction between rank and gender for each of the five fiscal years. The LOESS smoother of the total salary for each year is applied to all of the scatter plots.

Figure 12 and Figure 13 show spaghetti plots of the total salary trend over five fiscal years grouped by gender and URM, respectively.

Discussion

Unadjusted (raw) data

Inspection of the graphs of unadjusted data suggests a disparity in pay for women faculty in the Health Sciences when looking at base salary regardless of length of employment (Fig 1). The disparity is less apparent for URM faculty (Fig 2).

The inequality gap increases for women when total compensation including X, X1 , Y, Y1 and Z salary components are included (Fig 3). There is some effect as well for those who are part of an under-represented minority (Fig 4).

Although reporting on gender equity in faculty representation was not a charge to our committee, the process of collecting information to address salary equity permits us to make some observations about Health Sciences progress in representativeness as well. Reference to table 1 and to the 2004 Task Force on Gender Equity, demonstrates the following: During the period covered by the 2004 Task Force (1997-2002), the proportion of women faculty rose from 23% to 27%. During the five year period covered by our report, the proportion of women faculty rose from 35% in 2009-10 to 39% in 2013-14. The 2004 report found that 16% of full professors at the UCSD School of Medicine were women, in 2013-14, at UC San Diego Health Sciences, the proportion of women full professors had risen to 33%. The frequency of women with FTEs has remained stable, 12% both in the 2004 report and in 2013-14; however, it should be noted that the proportion of males with FTEs fell from 38% to 25% over the same period.

Multivariate Regression Analysis

In order to drill down and account for cofactors, a multiple linear regression model was developed. To predict (log) current pay, the model included several important cofactors such as department, academic series, degree, gender, ethnicity (dichotomized as under-represented minority and other), years of service at UCSD, and academic rank.

The most comprehensive model (#3) shows a significant negative effect both for gender and URM status, even after accounting for relevant cofactors.

The model, demonstrates that after taking into account all of the cofactors women faculty make 13.2% less than male faculty. Although the regression model used for the 2004 report was not identical to ours, there appear to be sufficient similarities to allow a general comparison. In 2004, it was reported that women's faculty salaries lagged salaries by 23%. Therefore, within broad limits, the Health Sciences seems to have made progress toward balance; however, it is clear that additional work needs to be done to attain full equity. The reasons for these findings are not clear; however, there are a number of possible explanations. Although all salaries have been normalized to effectively represent full time employment, there still may be a residual negative effect from a past history working part time. In the Health Sciences, part time status is more common among women. As shown in table 6, in 2013-2014, 19% of women faculty worked less than full time; 8% of male faculty are less than full time. Reasons for this disparity are not well defined, but may relate to gender differences in choice of reduced work hours in order to enable care either of children or aging parents. Lower salaries may also be a reflection of lower demands when negotiating for starting salaries, or at times of retention. In both groups, this could indicate a reluctance to seek outside offers as part of compensation negotiations compared to male faculty in similar circumstances.

Among research faculty, lower salaries may reflect a growing impact of collaborative science, not always fairly rewarded with current compensation paradigms. Whether women faculty collaborate more frequently cannot be determined from the data provided, but could be the focus of more in depth analyses. In addition, women in research tracks, may be experiencing a disproportionate impact of the challenges of "making up for lost time" in pursuit of discovery and publication. Figure 5 illustrates that women's starting salaries appear to be lower than are male's starting salaries and this the initial "deficit" seems not to be made up during the course of a career. Further, Figure 5 shows women not only start lower but fail to catch up. The data suggests that there is a distinct plateau in salary advancement at approximately 15 to 30 years since earning the degree. The cause of this plateau is unclear, but may be a result of career interruption secondary to raising a family or caring for older parents. Regardless of cause, this further puts women behind in salary advancement, and makes parity more difficult to achieve. This may be an important causative factor for the observed salary inequity.

URM faculty, in the model, were found to have, salaries 9.8% lower than non URM faculty. The cause of this also is unclear. Figure 6 shows progression of salary since degree. Similar to what was seen with women faculty, starting salaries for URM faculty are lower. But unlike women, there does not appear to be an anchoring effect and URMs approached their non-URM colleagues in salary; however, it seems to require a decade or two of employment to attain parity. Additionally, the mid-career plateau seen with women, was not observed for URM faculty.

Although only affecting a very small number of faculty dual attribution, specifically a woman who also is a member of an URM group, dual attribution seemed to have a less than additive effect. Individuals who were female and URM were compensated 10.8% lower than predicted vs. their male non-URM colleagues. Regardless, it is clear from our analysis of the data that bot women and URM faculty in the Health Sciences are significantly undercompensated.

Identification of outliers

The outliers with low negative marginal residuals in the analysis for FY 2014 were identified as faculty possibly needing an equity pay adjustment. Twenty five faculty members fell onto this list. Of the 25, four (16%) were identified as underrepresented minorities (URM) and seven (28%) were female. For the former that is a higher proportion than the 7% URMs reflected in the total 1345 individual salaries analyzed. These outliers represent a cohort that deserves further scrutiny. The disparity in their salaries may be a reflection of a relatively high frequency of appointment in the adjunct series. More than half of these extreme low outliers are in the adjunct series. It is notable that adjunct appointees may demonstrate a wider variation in professional roles and responsibilities, compared to the other series. This variability could be a contributor to the over representation of adjunct faculty among the lowest extreme outliers. Further, only two of these lowest 25 outliers had a record of any amount of clinical income, suggesting that both academic series and non-clinical activity may be important explanatory factors for being extremely undercompensated. In the future, precision of the predictive modeling might be increased with more robust information regarding the particulars of individual's University roles and responsibilities as well as proportion of time spent in clinical activities (direct patient care.) for example, the professional degree indicated in the available data did not always seem to reflect the actual degrees held by the individual, which could lead to an incorrect identification of an outlier. It should also be noted that adjustment of the compensation for outliers in one year is likely to lead to the identifications of new sets of outliers in subsequent years. The total dollar value of payments below 2 SD below the model prediction is $640,001.

We also identified 55 high end outliers whose compensation exceeded 2 SD above the model prediction. The total dollar value of payments greater than 2 SD above the model prediction to these individuals is $6,379,683.

Limitations

The model has several limitations. We were unable to adjust for every possible confounder due to incomplete of data. For example, it may have been important to account for the proportion of individual compensation derived from research vs. clinical work, the former usually resulting in less compensation; this information was not uniformly available. The feeling in the committee was that compensation of individuals on the research track would be more adversely affected than those in clinical tracks, if they took family leave, because of greater difficulty in returning to success in a competitive research environment. Interruptions due to personal leave could not be factored into the model. Because of the permanent compensation lag that may be introduced by interruptions in full time employment, even if many years prior, the impact of ever being a part time employee might be significant.. Although we are able to report the proportion of part time faculty in a given year, time commitment throughout an entire career was not available, and a history of part time status, therefore, was not modeled. It should be noted that simply pro-rating current salary to full time, as was done in our analysis, does not address this problem. It may be that since there seems to be an overall higher representation of part time employment among women, a history of part-time status if included in the model, might significantly impact compensation. It may be that part time individuals are at a disadvantage in bargaining for equitable compensation. Finally, length of employment was not included in the analysis due to excessive missing data and the fact that individuals join our organization at different levels of rank and degree. Although this metric is highly correlated with years after degree, the lack of specific seniority data could also affect findings.

Our analysis describes an aggregate experience among Health Sciences faculty, which is essential for exploring institutional factors potentially contributing to pay inequality. Statistical analysis alone cannot address individual interactions – either in retarding an individual's advancement and salary or in favoritism. Random sampling and review of individual faculty compensation and career advancement will be needed to supplement the statistical analyses

Approach to addressing the outliers

The outliers with low negative marginal residuals in the analysis for FY 2014 were identified as faculty possibly needing an equity pay adjustment. 25 faculty members fell onto this list. Of the 25, 4 were identified as underrepresented minorities (URM) and 7 were female.

Health Sciences normal budget process, which is done annually between February and May, includes a salary negotiation period. During this salary setting process, departments identify all funding sources available for the faculty member's salaries. In the process, all Department Chairs are charged with reviewing equity, looking at three components: 1) AAMC percentile equity across ranks by specialty, 2) any faculty member below the 30^{th} percentile, and 3) salary changes greater than 10% and impact on equity. The Dean's office will provide the data of those identified as having a potential equity problem, asking Chairs to explain if there is a reason for the equity difference and/or how to correct for it, to insure the identified issues with faculty salaries are addressed. All negotiated salaries are approved by the Vice Chancellor for Health Sciences.

Health Sciences will provide a post audit report on the identified individuals to the committee.

5. Recommendations

Compensation is complex, includes life-style choices, work-environment, job satisfaction and salary and is bounded by organizational philosophy and economic context. UCSD Health Sciences has a social contract to efficiently conduct research, delivery quality medical care, and effectively train the next generation of medical professionals. It is understood that the committee's analysis and recommendations regarding compensation inequality for women and URM faculty exists within the larger set of challenges in faculty recruitment, retention and development. The following recommendations are intended to identify ways to make greater use of the talent and commitment of all faculty and begin to address inequity among Health Sciences faculty.

(1) *Identifying Affected Individuals*
As a start, we have provided the lowest 25 individuals, but that list is certainly not comprehensive in capturing all underpaid, and possibly under-appreciated, talent at UCSD Health Sciences. Department chairs and deans should be provided a list of individuals whose base or total compensation is 1 ½ standard deviations (bottom 10%) below what is predicted by our model.

- For each such individual, their department chair should be provided a chart of academic milestones and achievements plotted against both base and total compensation.
- Each chair should review the information (preferably) with the faculty member, the potential reasons for the below expectation salary and generate either a corrective action plan or explanation to be provided to the Dean's office.
- The Dean's office can then aggregate the identified factors to guide and further refine the statistical examination of potential factors associated with pay inequality.

(2) *Annual Salary Negotiations*
During the salary setting process there is an annual negotiation phase. During this salary setting process, departments identify all funding sources available for the faculty member's salaries. In the process, all Department Chairs are charged with reviewing equity, looking at three components:

- AAMC percentile equity across ranks by specialty,
- Any faculty member below the 30th percentile, and
- Salary changes greater than 10% and impact on equity.

The Dean's Office will provide the data of those identified as having a potential equity problem, asking Chairs to explain if there is a reason for the equity difference and/or how to correct for it.

(3) *Wage Compression*
Female faculty are more likely to require and exercise various family leave options. Though a generic problem, female faculty may be differentially affected by the disparity between salaries of faculty at mid-career levels compared with more recently appointed members. This phenomenon is most evident with total salary. Though not possible to evaluate adequately during this committee's tenure, we suspect an interaction between mid-career wages and various family accommodations such as maternity leave, Active Service-Modified Duties (ASMD), and tenure clock extensions differentially affecting female faculty.

- Beginning with the aggregated data generated by recommendation #1, the Dean's office should investigate possible differential impact of wage compression affecting female faculty.

(4) *Loyalty Tax*
A related generic problem that may be also be differentially affecting female faculty is the tendency to increase compensation for faculty who ask for retention offers based on offers from other institutions. There is superficial evidence female faculty are less likely to make such demands.

- Beginning with the aggregated data generated by recommendation 1, the Dean's office might investigate possible differential impact of requests for retention packages between female and male faculty

(5) *Valuing Part-time Faculty*
UCSD Health Sciences was principally founded as a research entity with a philosophy of individual achievement often expressed in the colloquialism "eat what you kill". While this philosophy may have been crucial early on in establishing UCSD Health Sciences as a premier research entity, it may not be as effective in an era of "team science" and multi-specialty collaboration. It may be that a culture focused on individual, rather than team, success inhibits part-time faculty from maximally contributing. We observed a trend of part time faculty being paid less on a prorated basis compared to full time faculty. Female faculty are more likely to hold part-time appointments than their male colleagues.

UC faculty advancement policy for part-time faculty research, teaching, clinical, community service and research productivity assume a somewhat linear cumulative production model that can be pro-rated from full time faculty levels. While it is possible to pro-rate teaching, clinical activities and community service, research does not easily fit within this paradigm. Arguably, research is not a linear process in which X% effort produces Y levels of results much less that ½ X% effort will then produce ½ Y levels of results. Lower research productivity will slow academic progress and differentially affect X, X1, Y, Y1 and Z salary components.

- It is not suggested UCSD lower expectations for the quality of research conducted-only that an expanded notion of creative output be considered including collaborative contributions.
- There are already a number of research facilitation opportunities such as CREST and NCLAM. Exploring adding and expanding options for easier access to such services (e.g. permitting faculty to take an individual class or using distance learning technology) is encouraged.
- The institution should target individuals as they return from family leave. These may represent opportunities to harness talent as in facilitating return to the clinical and/or research arena as is appropriate.
- Each department as well as the Dean's office identify experienced faculty to act as research mentors to part time faculty.
- Part-time faculty-as well as primarily clinical faculty often perceived activities such as obtaining IRB approval, statistical analysis, subject recruitment and journal writing as simply overwhelming. UCSD's CTRI program provides such services on a "scholarship" basis. It is strongly encouraged the Dean's office support and promote such services and opportunities.
- Much as with recommendation 1, the Dean's office should generate academic progress charts of individual part-time faculty, graphically representing academic milestones and achievements plotted against both base and total compensation.
- The intricacies of the Faculty Reward System and review processes are neither transparent nor intuitive. Part-time faculty are less likely than full-time faculty to have full knowledge of the review process, much less how to optimally construct their review materials for SOMCAP or CAP review. The Dean's office should expand educational outreach efforts as well as provide suggested templates and exemplars appropriate for part-time faculty.

(6) *Family Leave Return*
The distinct plateau in women's salary advancement early to mid-career is very concerning. This may represent women who took time off, either full or went to part-time, to raise children or care for older parents. There is an opportunity as these individuals return to the work force to help then get back on track in terms of research and clinical contribution.

- Review current USCD Health Sciences faculty development and internal research grants and how they are currently allotted in terms of women, along with URMs.
- Develop a mechanism to target these programs to women returning from leave or are advancing from part to full time, to ease transition back into the competitive work environment.

- Expand mentoring program to help junior women faculty use mid-career and senior faculty to navigate the work/life balance issues along with finding resources to help them stay on track with respect to research and clinical productivity.

(7) *Ongoing monitoring*
Analysis of equity should be integrated with retention, recruitment and faculty development analysis on an ongoing basis.

- An annual audit of equity differences and their correction, if any, should be provided regularly to the Dean's office.
- The current statistical model assessing inequality can be made richer and more precise with input from the findings of individual faculty review.
- Data on faculty salary, rank advancement and H.R.-related events are currently in different, often difficult to automate, data repositories and there are abundant missing data elements. An effort should be made to integrate the disparate data systems for easier-and more reliable-routine analysis and to insure completeness of data elements for known and potentially important predictive factors. Specific examples of incomplete and absent data of interest include starting salary, years since first appointment, proportion of income derived from specified clinical, research, teaching and administrative and service sources, more robust and informative job descriptions and a career long history of periods of less than full time employment with the percent time commitment for each period.

6. *Task Force Members*

The Task Force comprised the following members, and all are in agreement with the contents of this report.

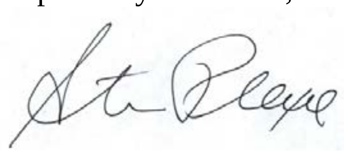
Steven Plaxe, Reproductive Medicine (Chair)

John Fontanesi, Medicine
Grace Kuo, Skaggs School of Pharmacy and Pharmaceutical Sciences
Tom Liu, Radiology
Adriana Marshall, Skaggs School of Pharmacy and Pharmaceutical Sciences
Tom Moore, Clinical Affairs
Angela Scioscia Reproductive Medicine
Linda Sorkin, Anesthesiology
Christian Tomaszewski, Emergency Medicine
Deborah Wingard, Faculty Affairs
Ronghui (Lily) Xu, Family Medicine & Public Health

Ron Espiritu, Dean's Office (consultant)

In addition to the listed members, the Task Force consulted with several individuals in reaching their conclusions and preparing this document. These included Jiayi Hou, Lishi Zhang, (both from CTRI) Lin Majors (VC Health Sciences) and Bill Hodgkiss (Office for Academic Affairs). However, the conclusions expressed are solely those of the Task Force members.

Respectfully submitted,



Steven Plaxe, M.D.

REFERENCES

Andrevski, Goce, et al. "Racial Diversity and Firm Performance The Mediating Role of Competitive Intensity." Journal of Management 40.3 (2014): 820-844.

McLeod, P. L., Lobel, S. A., & Cox, T. H., Jr. 1996. Ethnic diversity and creativity in small groups. Small Group Research, 27: 246-264.

Yang, Yang, and Alison M. Konrad. "Gender Diversity, Business Strategy, and Organizational Performance." In *Academy of Management Proceedings*, vol. 2014, no. 1, p. 14319. Academy of Management, 2014.