

Final Report of the 2016 Faculty Pay Equity Study

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Executive Summary

Washington University School of Medicine is committed to fair and appropriate compensation for each faculty member's contributions to the School of Medicine and its overall mission, without regard to gender, race, creed, age, sexual orientation, religion or disability. The goal is to provide an optimal working environment for all. Faculty compensation should be aligned with experience, market forces by specialty or scientific field and productivity, reflecting appropriate compensation for time commitments across all areas of the academic mission and consistent with the expectations of the various faculty tracks.

As one tool to evaluate those commitments, the School of Medicine has conducted periodic studies of faculty pay over the years, and has attempted to address areas highlighted by those studies as meriting further attention. The School of Medicine (WUSM) has conducted five previous pay equity studies; the most recent prior major study was reported in 2010.

Multivariate logistic regression analysis is the most commonly used tool for studying pay equity among large groups. The major strength of this model lies in its ability to assess the predictive values of many variables known to predict pay, such as medical or scientific field, highest degree, rank, and metrics of productivity such as RVU's, clinical revenues, grant dollars, publications etc. The consulting firm for this current study Willis Towers Watson (WTW) uses a slightly different approach than prior outside consultants, who were also employed by the previous iteration of this same consulting firm. WTW does not believe in using gender or ethnicity/race as independent (predictor) variables and believes this is the now accepted industry standard for these types of studies. In the analysis they performed they entered only variables thought to be legitimate predictors of compensation and compared outcomes by gender or race/ethnicity.

The focus of the current study was to apply multivariate regression to a faculty data set for the entire School of Medicine faculty at rank of Assistant Professor and above, who were working greater than or equal to 0.5 FTE in FY 2016 (n = 1630), to examine the magnitude and statistical significance of differences in average male and female faculty compensation and between faculty in racial and ethnic groups underrepresented in medicine (URiM) and the white majority group. The methodology and model specifications are in accord with many other such studies, and this study built substantially on previous in-depth analyses of WUSM faculty pay, most recently reported in July 2010. As in past studies of faculty pay equity, a steering committee comprised of department heads, senior administrative staff, senior faculty, representatives of

the Gender Equity Committee, the Executive Committee of the Faculty Council, the Academic Women's Network and the Faculty Diversity Committee endorsed the study methodology.

We believe it is important that everyone reading this report have a basic understanding of the common terms used herein. To that end, the following terms are defined. '**Base Pay**' means 'X' (base) plus 'Y' (supplemental) components of compensation. '**Total Compensation**' also called '**Total Cash**' includes 'Base Pay' as well as 'Z' (incentive/bonus) component and any other compensation paid to faculty. '**Unadjusted**' and '**actual**' data indicate pay and compensation means, differences and/or other salary data for which all the variables that should legitimately determine compensation (i.e. subspecialty, rank, productivity and experience metrics) have not yet been considered. The term "**adjusted**" to modify salary data and differences indicates that all such appropriate compensation variables in the multivariate regression model have been utilized to account for differences in market forces, productivity and experience that should be taken into account in any valid pay equity study. The term '**unpredicted variation**' reflects the nonstandard variations between gender and/or ethnicity that are not explained by the legitimate compensation criteria reflected in the multivariate regression analysis.

Together the variables selected explained 83% ($R^2 = 0.83$) of the variation in base salary and 84% ($R^2 = 0.84$) of the variation in total compensation. The variables which were most significant in predicting pay were highest degree, RVU's for clinicians, mandatory cost sharing, department, rank, AAMC subspecialty, leadership role, division, experience and tenure, faculty track, non-clinician performance metrics, and AAMC market data.

The current study, using fiscal year 2016 base salary and total compensation amounts and other data, indicates a finding consistent with WUSM's past studies that female WUSM faculty members as a group make less than the group of male WUSM faculty members. Together the variables selected explained 83% of the variation in base salary and 84% of the variation in total compensation. The consulting firm concluded that the variations found were within the predicted 95% confidence intervals of the logistic regression analysis. The unexplained gaps in compensation (Table 1) are small (1.48% for base pay and 2.87% for total pay) and improved since the last study which demonstrated a -4.0% gap for women as compared to men. However, given the history of underpayment of women, these differences remain important. As an additional component of the study, we have analyzed faculty compensation increases over the last three years. These increases have been substantial and greater in women than men with a 6.6% increase in compensation of women compared to 3.4% in men in FY18.

The comparison between the white majority group and those underrepresented in medicine, showed mixed results with some URiM groups actually on average being compensated at higher levels than the majority group while others appeared to be paid at slightly lower levels but the differential was not as great as the comparison between males and females.

Table 1. Pay gap by Gender & Ethnicity

Unpredicted Variation	Base Pay	Total Cash Compensation
Male/Female	1.48%	2.87%
White/Asian	1.03%	0.95%
White/URiM	0.67%	1.66%

The results of the current study again merit the serious attention of those charged with establishing faculty compensation.

Among the Steering Committee’s recommendations is that the Dean’s Office be charged with reviewing the detailed results and underlying data utilized in this current study, departmental compensation plans, and other relevant information. There should be meetings as necessary with Department Chairs, Program Directors, and those with the authority and responsibility for establishing faculty compensation to review individual faculty salaries and make any appropriate adjustments.

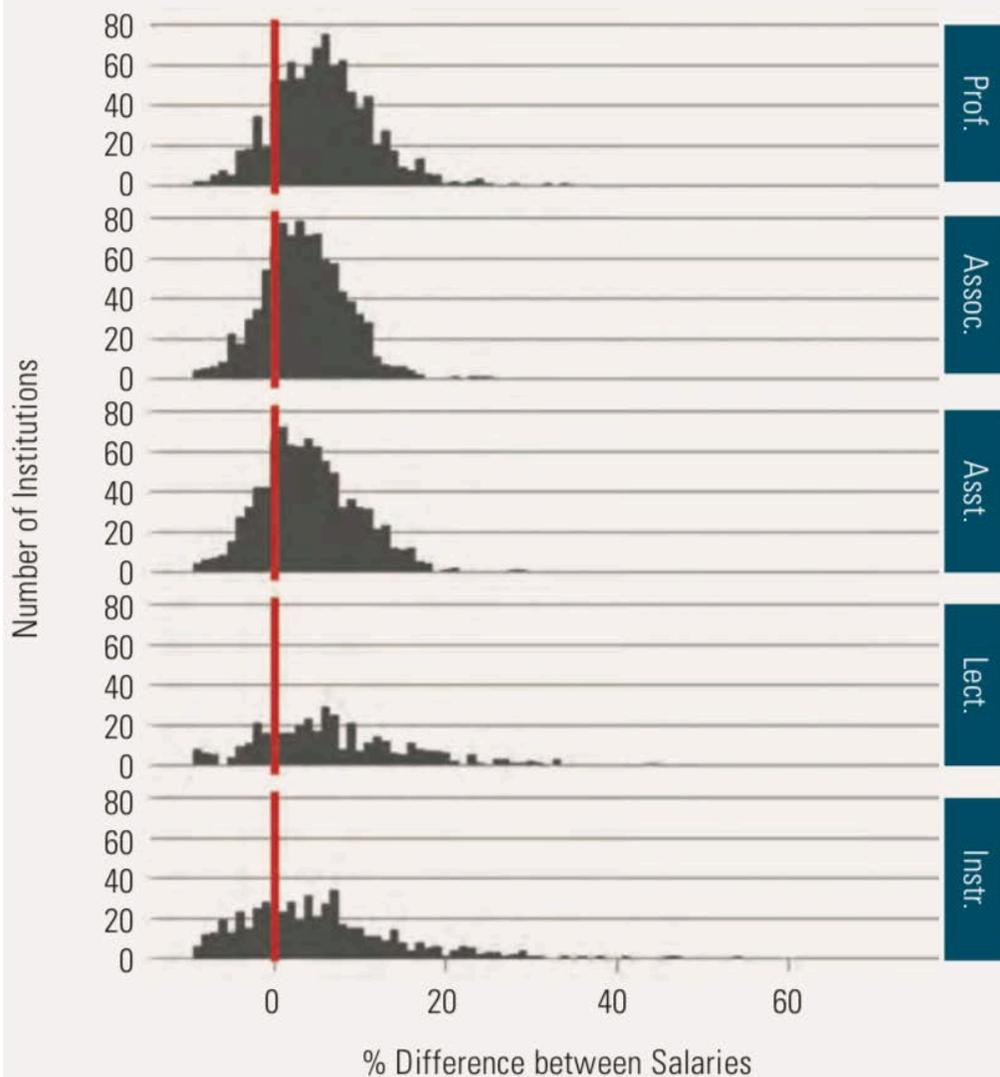
The Committee desires that this report be used to maintain the attention to pay equity high in our collective conscience and to continue an annual review process that maintains accountability for meeting our institutional expectations while preserving the appropriate discretion necessary to govern a wide array of faculty talents, skills, needs and accomplishments.

Background and Methods

Despite passage of the Equal Pay Act in 1964, women and minorities continue to lag behind Caucasian men in compensation. This is true not just in academia but in most professions and occupations. The gender pay gap has remained fairly stable over the past 15 years. In 2017 women earned 82% of what men earned according to a Pew Research Center’s analysis of median hourly wages for both full-time and part-time US workers. Much of the general US workforce gender pay gap can be explained by measurable factors such as educational attainment, occupational segregation and work experience. Other factors continue to play a large role including much higher proportions of women than men taking time away from their careers for family care-giving responsibilities. Roughly four-in-ten mothers said that at some point in their work life they had taken a significant amount of time off (39%) or reduced their work hours (42%) to care for a child or other family member. Roughly a quarter (27%) said they had quit work altogether to take care of these familial responsibilities. Fewer men said the same. Other factors more difficult to measure including gender discrimination in compensation also continue to play a role in the wage gap. (Pew Research Center, April 9, 2018)

The same issues and concerns have existed, and continue to exist, within American higher education generally, and within many academic medical centers. The American Association of University Professors (AAUP) data for 2018 reveal that 93% of institutions participating in the annual report on faculty compensation pay men more than women at the same rank. See Figure 6 below from the American Association of University Professors' [Annual Report on the Economic Status of the Profession: 2017-18](#).

FIGURE 6
Distribution of Gender Inequity by Rank, 2017–18



Note: Institutions to the right of the red line pay men more than women at the specified rank.

Many faculty pay equity studies have been carried out at colleges and universities across the country. Although such studies involve varying degrees of sophistication, they almost

universally find that on average female faculty earn less than male faculty, both in gross average terms and even after account is taken of other legitimate predictors of pay such as educational attainment, prior experience, and academic discipline.

At the School of Medicine, the current report represents the sixth study of pay equity. The previous studies were reported in 1990, 1995, 2002, 2004 and 2010. All demonstrated less compensation for female faculty than for male faculty although various conclusions were reached as to the statistical significance of those differences. The study reported in 2004 demonstrated no differences that were statistically significant ($p = 0.05$) level. The only previous studies to consider race and ethnicity were the 2003-04 and 2008-09 studies in which no significant differences by race or ethnicity were apparent in part due to small number of URiM faculty for comparisons.

Key Project Steps & Methodology

WUSM Central Administration began discussions around the current faculty pay equity study late in 2014. A pilot study of faculty compensation for market comparison and equity was undertaken with data from the adult cardiology division in 2015. Solicitation of potential consulting firms took place late in 2016. After negotiations and review by the Office of General Counsel, Willis Towers Watson was selected as the consultant. The contract was finalized in the spring of 2017. The Central Finance Office led by Mary Corcoran built a robust data base for FY2014-16. The current study was focused on salary data from 2016. Rick Stanton and Diana Gray provided oversight for the study. A steering committee composed of key School administrators, department and program chiefs and general faculty representatives from key faculty organizations including the Executive Committee of the Faculty Council, the Academic Women's Network, the Faculty Diversity Committee, and the Gender Equity Committee met for the first time in October 2017. The steering committee provided meaningful feedback and endorsed the proposal for the study. The Central Finance Office worked closely with the consultants to provide them the needed data files. After the first preliminary draft of study results was obtained in January 2018, there was much back and forth discussion with requests for refinement of the study methods between the project managers at WUSM and the consultants. Data flaws and idiosyncrasies were identified, corrected or reconciled. The 2008 and 2016 study methodologies were compared and analyzed. Results were found to be reassuringly similar. In June 2018 additional analytical data were provided by WTW. Final results were obtained in the fall of 2018. Results of the study were presented to the Steering Committee and to the EF subcommittee - Administration and Finance - in December 2018 prior to presentation to the Executive Faculty in January 2019.

Methods:

The proposed study was to be in two parts. First, as near a replication of the methodology of the study of 2008 salary data as was possible would be performed with 2016 salary data. The purpose of this was to evaluate under nearly the identical study conditions whether there had been progress in narrowing the pay gaps or not. The second part of the study was intended to optimize the approach to the WUSM faculty pay equity study by utilizing available market data by specialty or scientific field as gathered by the AAMC.

Using multivariate, logistic regression analysis, WTW conducted the study of the faculty data and developed the preliminary statistical models that were used in the study. They calculated predicted pay and the 0.95 confidence interval (CI) for each faculty member in the study for both base salary and total cash compensation. The 95% CI represents the range in which in repeated samples 95% of the actual observations would be expected to be within the predicted range. After preliminary results were discussed with Associate Dean Gray, Associate Dean/Vice Chancellor Stanton, and Assistant/Dean Vice Chancellor Corcoran, further refinements were made and final statistical models developed.

Selection of Variables

A well-specified regression model that is intended to be used to evaluate equity in compensation should include the faculty attributes that are commonly used in establishing salaries and that are available in a central WUSM data base. Generally, these variables for faculty salary equity studies include those based on educational attainment, experience, discipline or specialty, academic rank, merit and productivity. Hence, the independent (predictor) variables for the current study were selected from among the data available through WUSM central databases. These databases have been significantly enhanced in recent years compared to past faculty pay equity studies. Table 2 below includes the experience, market and productivity variables that were utilized in this study. The experience variables included factors such as highest degree, rank, years in rank, tenure, PI status, a leadership title, years on faculty, and % effort in the primary missions of the School of Medicine. Productivity metrics included such variables as RVU's (relative value units), clinical revenues, both submitted and awarded grant proposals, direct expenses from grants, wet lab space, patents, invention disclosures, publications and metrics of publication impact.

Table 2 - Variables

<u>Experience and Market Force Variables</u>	<u>Productivity Variables</u>
AAMC Specified Field (n=151) AAMC Market Comparison Department Division Age Highest Degree Rank Administrative Leadership Role Years Since Highest Degree Years at WU Years in Rank Years Pre-faculty @ WU Tenure FTE (Full Time Equivalent) Faculty Track PI (Principal Investigator)	Clinical revenue collections^ RVU's (Relative Value Unit)*^ Submitted grant proposals Awarded grant proposals^ New grant awards Direct expenses Mandatory/voluntary cost share Research MTDC (Modified Total Direct Costs) Wet lab space Other occupied space Total occupied space Patents Agreements Invention disclosures Number of publications & citations First, sole & last authors H index** M & V (Measurement & Verification) values*** Other performance metrics

* RVU's - relative value units, a CMS (Centers for Medicare and Medicaid Services) measure for Medicare payments based on resources used in providing physician services

**The h-index is an author-level metric that attempts to measure both the productivity and citation impact of the publications of a scientist or scholar. The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications. [Wikipedia](https://en.wikipedia.org/wiki/H-index)

***The International Performance Measurement and Verification Protocol (MVP) provides an overview of current best practice techniques available for verifying results of energy efficiency, water efficiency, and renewable energy projects. It may also be used by facility operators to assess and improve facility performance. [International Performance and Measurement & Verification Protocol. Concepts and Options for Determining Energy and Water Savings Volume 1, Revised March 2002](#)

RVU's, clinical revenues and grant awards were averaged over 3 years (2104-2106)

Regression analysis was conducted by the consulting group using the natural log of pay as the dependent variable because pay tends to increase in percentage increments that compound over time. When the log of pay is used in a regression on employee factors, the estimated coefficients give the approximate percentage change in pay from a one-unit change in the explanatory factor.

Results

The composition of the faculty included in the study by gender and race/ethnicity can be found in Table 3 below. Of the 1630 faculty members in the study data set, 35% were women. This can be compared to approximately 37% of the faculty as a whole (including instructors and others excluded from this study). More women faculty members were in this study compared to the last study in 2008 (28%).

Table 3 – Faculty Data set

at rank of \geq Assistant Professor		
Total	Male	Female
1,630	1,060	570
	65%	35%

Differences in Mean Base Salary and Total Cash for Men and Women

Final results of this study indicate that female WUSM faculty members as a group make less than the group of male WUSM faculty members. The selected variables explained 83% of the variation in base salary and 84% of the variation in total compensation. The consulting firm concluded that the variations found were within the predicted 95% confidence intervals of the logistic regression analysis. The unexplained gaps in compensation (Table 1) are small (1.48% for base pay and 2.87% for total pay) and have improved since the last study which demonstrated a -4.0% gap for women as compared to men. We believe, given the history of underpayment of women, these differences remain important. Also highlighted as an additional component of this study are substantial increases in faculty compensation over the last 3 years, greater in women than men with a 6.6% increase in compensation of women

compared to 3.4% in men in FY18. The appendix to this report contains more detailed information from WTW in regards to study results.

In the study the comparison between the white majority group and those underrepresented in medicine, showed mixed results with some URiM groups actually on average being compensated at higher levels than the majority group while others appeared to be paid at slightly lower levels but the differential was not as great as the comparison between males and females.

Predictive variables

The variables that were found to be statistically significant in explaining the differences in pay included those representing experience: highest degree, rank, tenure, years pre-faculty at WU, administrative roles, and part-time employment; those representing market forces: AAMC clinical or scientific field, department/division, and non-clinician faculty track; and the following “performance” metrics: publications as represented by last author, M value and V value, collections, RVU, mandatory cost share, invention disclosure, total occupied space, and awards-new money.

The variables that appear to be most influential in predicting the differences in compensation between women and men are the following: rank and tenure, department/division/AAMC clinical or scientific field, leadership role, and performance metrics. Table 4 below provides the magnitude of the influence of these factors.

Table 4 - Variables Most Influential in Base Salary and Total Compensation Differentials for Men & Women

Variable	% of difference in base salary	% of difference in total compensation
Rank & Tenure	42	37
Department/Division/AAMC medical or scientific field	24	23
Leadership role	13	9
Productivity metrics	23	28

Outside of the analyses performed by WTW in this study, we have analyzed compensation data from 2013 to 2018 to determine pay increases from year to year for women and men. These data are displayed in Table 5 below. In summary, women on average have received greater pay

increases than their male colleagues on average during this time frame. This in part explains the decrease in the average unexplained gender pay gap since the last formal WUSM pay equity study reported in 2010.

Table 5 - Faculty Total Paid Compensation per Month: All forms Average Compensation per headcount faculty
Calculated monthly: 12 month rolling averages

**Data from HRMS*

	Jun-13	Jun-14	Jun-15	Jun-16	Jun-17	Jun-18
Male	238,587	243,210	241,011	248,852	260,623	269,473
Female	166,992	173,055	175,554	182,335	191,848	204,427
Male/Female	42.9%	40.5%	37.3%	36.5%	35.8%	31.8%

Yr/Yr Increases

Male	1.9%	-0.9%	3.3%	4.7%	3.4%
Female	3.6%	1.4%	3.9%	5.2%	6.6%

Percentage increases from June 2013 thru September 2019

	All Faculty	Women	Men
Headcount	25.5%	45.1%	16.5%
Compensation	14.1%	22.1%	13.2%
Ave annual Comp	3.0%	4.3%	2.8%

Conclusions and Recommendations

The findings of the current study, using fiscal year 2016 compensation amounts and other data, are consistent with most of WUSM’s past studies— compensation for female WUSM faculty members is less than that for male WUSM faculty members, but the current multiple regression analysis indicates that the difference is modest overall and has decreased since the last study was reported in 2010. Multivariate logistic regression analysis indicates that the differences between women and men are for the most part explained by the variables selected. Comparing faculty in groups underrepresented in medicine to the white majority, there were minor differences in pay found after controlling for all variables included in the regression analysis.

There are many potential confounders for a study such as this. The study does not attempt to explain the rationale behind differences in compensation but serves only to find differences by gender or race/ethnicity. All legitimate predictors of compensation can never be included in any model. This study included significantly more productivity metrics, such as those involving

publications, patents and grant proposals submitted, than were able to be included in past WUSM pay equity studies. Other legitimate variables predicting pay are more qualitative such as reputation and citizenship contributions and therefore cannot be included in a quantitative model. However, it is assumed that the variables that could not be used in the study were equally distributed between the gender and racial/ethnic groups.

As in past studies, the Pay Equity Steering Committee’s recommendation that the Dean’s Office and Executive Faculty continue reviewing the detailed results and underlying data utilized in this current study, address compensation equity issues to

- Correct or justify outliers
- Continue to develop and execute plans to eliminate variations in pay by gender or race/ethnicity that are “unexplained” by the regression model.

In addition, an update using the same methodology is underway with FY 2018 pay data, likely to be completed this spring. The study will be repeated in each future year with the expectation that the “unexplained” variations in pay by gender or race/ethnicity will be eliminated.

Appendix

Supplemental Data from Willis Towers Watson analysis

Outcome of Regression Analysis – Total Cash

- Our model shows that the variables together explains 84 percent of the variation in Total Cash
- Overall, 4.8% of the studied population is paid outside the predicted range for total cash

Actual Base Is:	Male	Percent Male	Female	Percent Female	Total	Percent Total
Above Predicted Range	32	3.0%	12	2.1%	44	2.7%
Below Predicted Range	24	2.3%	10	1.8%	34	2.1%
Within Predicted Range	1,004	94.7%	548	96.1%	1,552	95.2%

- The charts on the following pages provide detailed results for this analysis

Outcome of Regression Analysis – Gender – Total Cash

- The below table highlights the findings of the analysis for Total Cash*:

Gender	EEs	Actual Mean	Predicted			Actual Mean is:
			Mean	Range for 95% Confidence Interval		
Male	1,060	\$ 228,914	\$ 224,673	\$ 217,141	\$ 232,466	Within predicted range
Female	570	\$ 179,692	\$ 181,480	\$ 174,521	\$ 188,697	Within predicted range

On average, we found that both women and men are paid within the range we would expect given the factors in the model. Neither group is systematically paid more or less than expected given the factors identified in the model.

Working Group Commentary:

Male actual mean is 1.89% above the predicted mean

Female actual mean is .99 below the predicted mean

Unpredicted gender variation = 2.87%

-All estimations were done using the natural log of pay and have been converted back to \$ values for purposes of discussion here

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Outcome of Regression Analysis – Faculty Rank – Total Cash

- The below table highlights the findings of the analysis for Total Cash*:

Rank	Gender	EEs	Actual Mean	Predicted			Actual Mean is:
				Mean	Range for 95% Confidence Level		
Assistant Professor	Male	393	\$ 181,944	\$ 178,130	\$ 169,150	\$ 187,587	Within predicted range
	Female	313	\$ 166,332	\$ 167,492	\$ 159,218	\$ 176,196	Within predicted range
Associate Professor	Male	241	\$ 209,445	\$ 203,001	\$ 190,455	\$ 216,373	Within predicted range
	Female	152	\$ 174,165	\$ 177,861	\$ 165,530	\$ 191,110	Within predicted range
Professor	Male	342	\$ 274,692	\$ 273,079	\$ 259,001	\$ 287,922	Within predicted range
	Female	88	\$ 222,907	\$ 218,561	\$ 200,016	\$ 238,826	Within predicted range
Chief	Male	67	\$ 364,077	\$ 355,740	\$ 321,347	\$ 393,813	Within predicted range
	Female	15	\$ 302,389	\$ 339,875	\$ 283,380	\$ 407,634	Within predicted range

-All estimations were done using the natural log of pay and have been converted back to \$ values for purposes of discussion here

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Outcome of Regression Analysis – Workgroup Analysis Total Cash

Rank	Gender	Faculty	Actual Mean	Predicted Mean	Actual vs. Predicted	Male/Female <> Actual Mean	Unpredicted Gender <> Male/Female
Assistant Professor	Male	393	\$ 181,944	\$ 178,130	2.1%	9.4%	2.8%
	Female	313	\$ 166,332	\$ 167,492	-0.7%		
Associate Professor	Male	241	\$ 209,445	\$ 203,001	3.2%	20.3%	5.3%
	Female	152	\$ 174,165	\$ 177,861	-2.1%		
Professor	Male	342	\$ 274,692	\$ 273,079	0.6%	23.2%	-1.4%
	Female	88	\$ 222,907	\$ 218,561	2.0%		
Chief	Male	67	\$ 364,077	\$ 355,740	2.3%	20.4%	13.4%
	Female	15	\$ 302,389	\$ 339,875	-11.0%		

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Outcome of Regression Analysis – Ethnicity – Total Cash

Ethnicity	EEs	Actual Mean	Predicted			Actual Mean Is:
			Mean	Range for 95% Confidence Level		
Under-represented Minorities	89	\$ 205,391	\$ 204,832	\$ 183,642	\$ 228,466	Within predicted range
Asian	290	\$ 183,172	\$ 183,976	\$ 173,464	\$ 195,125	Within predicted range
White	1,251	\$ 217,547	\$ 214,914	\$ 208,464	\$ 221,564	Within predicted range

-All estimations were done using the natural log of pay and have been converted back to \$ values for purposes of discussion here

Outcome of Regression Analysis – Ethnicity Workgroup Analysis Total Cash

Ethnicity	EEs	Actual Mean	Predicted Mean	Actual vs. Predicted	Ethnicity/White <> Actual Mean	Unpredicted Ethnicity <> White/URM-Asian
Under-represented Minorities	89	\$ 205,391	\$ 204,832	0.3%	-5.6%	-1.0%
Asian	290	\$ 183,172	\$ 183,976	-0.4%	-15.8%	-1.7%
White	1,251	\$ 217,547	\$ 214,914	1.2%		

Comparing Methodologies 2008 vs. 2016 (using 2016 data in both)

Method			Actual	Predicted	<>
2016	Annual Base	M	201,310	200,266	0.521%
		F	165,429	167,025	-0.956%
	Gender Difference				1.477%
	Total Cash	M	228,914	224,673	1.888%
		F	179,692	181,480	-0.985%
	Gender Difference				2.873%
2008	Annual Base	M	201,310	200,025	0.642%
		F	165,429	167,393	-1.173%
	Gender Difference				1.816%
	Total Cash	M	228,914	226,704	0.975%
		F	179,692	182,974	-1.794%
	Gender Difference				2.769%

While there are small differences in the variation from the predictive model between the two methodologies, as highlighted, the 2016 methodology will be far easier to repeat.