



THE UNIVERSITY
of **NORTH CAROLINA**
at **CHAPEL HILL**

FACULTY SALARY EQUITY REPORT:
Academic Affairs Schools and Health Affairs
Schools Without Medicine

Presented to:

Executive Vice Chancellor and Provost Robert Blouin
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Assessment

The University of North Carolina at Chapel Hill

FACULTY SALARY EQUITY REPORT

Introduction

This report describes the results from an analysis of faculty salaries requested by the Chancellor and Executive Vice Chancellor to determine if systematic patterns of disparity by gender and race/ethnicity might exist at the University of North Carolina at Chapel Hill. The analysis followed three other comprehensive salary equity studies released in 2002 (using 2001 data), 2012 (using 2009 data), and 2017 (using 2016 data). The present study largely replicated the methodology used in these prior studies with only slight differences as noted in this report.

Faculty with appointments in the following units were included in the analysis:

- Academic Affairs: The College of Arts and Sciences; the Kenan-Flagler Business School; and the schools of Education, Government, Information and Library Science, Journalism and Media, Law, Social Work, and Vice Chancellor for Research.
- Health Affairs: The Adams School of Dentistry, the School of Nursing, the Eshelman School of Pharmacy, and the Gillings School of Global Public Health. School of Medicine faculty and staff are currently preparing a separate analysis that takes into account the unique compensation plans and payment procedures that influence faculty salaries in those units.

Methodology

Multiple regression analysis is the primary method used to examine the effects of gender and race/ethnicity on faculty salaries across a population. It involves the development of a model that predicts current salary (i.e., the dependent variable) as a function of a number of specific predictor variables (i.e., independent variables). The goal of the analysis is to determine if gender and/or race/ethnicity appear to impact salaries after holding constant career-related factors that should be related to salaries. The procedures used for this analysis were based on recommendations by the Association of American University Professors (AAUP) and described in their published guidelines: *The Higher Education Salary Evaluation Kit* (Scott, 1977), *Achieving Pay Equity on Campus* (Gray, 1990), and *Paychecks: A Guide to Conducting Salary-Equity Studies for Higher Education Faculty* (Haignere, 2002).

The salary equity analyses for Academic Affairs and Health Affairs without Medicine units were carried out in two stages:

1. A population-based regression analysis that examined the effects of gender and race/ethnicity on salaries across Academic Affairs and Health Affairs after controlling for variables representing faculty career attributes such as education level, years of professional experience, tenure status, academic rank, and discipline. The results using salary in dollars and the natural logarithm of salary as the dependent variables were compared.
2. Preliminary school- and department-level analyses to identify salaries that were significantly below the value predicted by the regression model after controlling for the factors listed above.

Data Sources

Institutional Research, Planning, and Assessment (IRPA) extracted the faculty data used in this study from the Human Resources database in ConnectCarolina. Because of changes in data definitions over time, caution should be used in comparing current findings with those from prior studies.

Population

A total of 1,815 faculty members were included in this study ($n = 1,276$ in the Academic Affairs group; $n = 539$ in the group of Health Affairs faculty outside the School of Medicine). Selection criteria included a primary appointment as a permanent, full-time (100% FTE) faculty member who was active (i.e., not on leave with or without pay) on October 31, 2016. Faculty holding primary appointments as senior academic and administrative officers, such as the Chancellor, Executive Vice Chancellor and Provost, Vice Chancellors, Vice Provosts, and Deans were excluded from all analyses.

Regression Model Variables

The dependent variable used in each regression model was annual base salary in dollars.

- Academic Affairs: 9-month base salary without stipends. Salaries for 12-month faculty (e.g., the School of Government) in these units were converted to 9-month salary equivalents by multiplying by 0.818 (9/11), as recommended by the AAUP.
- Health Affairs without Medicine: 12-month base salary without stipends as the dependent variable. Nine-month salaries, primarily in the School of Nursing, were converted to a 12-month equivalent by dividing by 0.818.

Similar sets of independent variables were used in the regression models for Academic Affairs and Health Affairs without Medicine units, as shown in Table 3. These variables can be grouped into general domains capturing faculty members' demographic background and various career-related factors:

- Demographics: Gender, race/ethnicity¹
- Education: Highest earned degree -- below doctoral level, doctoral research degree, professional degree, and multiple professional and terminal degrees
- Professional Experience: Years between receipt of the terminal degree and hire date at UNC-Chapel Hill, years between hire date at UNC-Chapel Hill and year appointed to current rank, and years in current rank. These variables were entered into the regression model in both actual years and in quadratic (squared) terms.¹
- Professional Status: Tenure status (tenured, tenure track, fixed term), academic rank, and rank modifiers
- Discipline: Indicators for each department.

Interpretation of Regression Coefficients

In the regression analysis results that follow, the unstandardized regression coefficients associated with gender and race/ethnicity are key indicators of the extent to which these variables influence salaries. These values can be directly interpreted as the dollar amount of difference between the average salaries of female and male faculty members and between white faculty and faculty from other race/ethnicity groups, after controlling for all the other independent variables in the model. For example, a regression coefficient of -2000 associated with the variable representing females indicates that women faculty with similar professional attributes have, on average, annual salaries that are \$2,000 lower than males with

¹ Federal regulations require employees to indicate whether they are Hispanic/Latino (yes/no) and any one or more of the following race categories: White, Black/ African American, American Indian/Alaskan Native, Asian, and Native Hawaiian/Other Pacific Islander. For this study, efforts were made to create groupings that were as similar as possible to those used in the prior studies: White, African American, Asian, and a fourth category that combined Hispanic, American Indian, Native Hawaiian/Pacific Islander, two or more races, and unknown. However, it is impossible to know how faculty in the past might have described themselves if presented with the current multiple reporting categories.

comparable professional attributes.

Opinions differ regarding the use of statistical significance levels to evaluate observed group differences in salaries. Some authors argue that when all faculty members are included in the analysis, the dataset constitutes a population, making inferences based on significance levels unnecessary. Others (Gray, 1993) suggest that statistical significance might be used to consider the possibility that the differences observed in a dataset based on a one-time snapshot of the faculty were due to random fluctuations in salaries that occur daily through new hires, departures, promotions, retention offers, etc. This report adopts Haignere's (2002) recommendation that statistical significance should be used as only one indicator of the importance of group differences in salaries, and that the focus of the evaluation should be on the general pattern of the findings. In addition, since probability levels are influenced by sample size, lack of statistical significance in small groups should not be considered as evidence that there is no bias (Snyder et al, 1994).

Limitations of the Analysis

The relatively smaller numbers of females in some disciplines, and the low number of non-white faculty university-wide make it difficult to identify group differences in salaries with reliability. Changes in even a few salaries or the inclusion/exclusion of individual faculty members in these small groups can produce relatively large changes in means and coefficients. While care was taken to check unusual cases for accuracy, undetected errors in the source system at the time the data were captured could make a difference in the findings.

Notably missing from this study are measures of faculty productivity and the quality of their work. Given the importance of merit and the academic market for a given faculty member's skills in setting salaries, this omission suggests that individual salary equity determinations should be made only after an additional review at the department level by those who are able to assess and take into account this critical qualitative performance information.

¹ This quadratic term was added to statistically adjust time and service length variables that are not linearly related to salary. For example, average salaries for assistant and associate professors may increase with each year in rank but then flatten or decline after the year in which most faculty are promoted.

Results

Descriptive Analyses

Appendix A provides descriptive statistics for the independent variables measuring faculty professional attributes and discipline and allows comparisons by gender and race/ethnicity for the faculty within the Academic Affairs and Health Affairs without Medicine units.

In general, these figures show that compared to male faculty, female faculty are more likely to:

- Have a fixed term appointment
- Hold an academic rank of Assistant Professor or Instructor
- Not hold a distinguished title.
- Have spent fewer years in their current rank
- Specialize in a lower-paying discipline area.

With respect to race/ethnicity, in comparison with white faculty, faculty members in other racial/ethnic groups are more likely to:

- Be on tenure track, but not yet tenured.
- Hold an academic rank below full professor
- Have spent fewer years in their current rank.

Regression Analyses

A description of how the independent variables were coded for the regression analyses is contained in Appendix B. The full results for the separate regression analyses for Academic Affairs and Health Affairs without Medicine population models are available upon request.

For both analyses, the independent variables reflecting education level, professional experience, professional status, and discipline/department were entered into the model first. Taken together, this set of predictors explained a large and significant ($p < .000$) portion of the variance in faculty salaries for both models. The addition of variables reflecting gender (Female) and the racial/ethnic groups (Black/African-American, Asian, Hispanic/Native American/ Other) did not increase the percentage of variance already accounted for by the overall model. In addition, two-way interaction terms for specific gender and race/ethnicity combinations were tested to identify groups within which the relationship to salary might differ by subpopulation (for example, Black/African American males vs. females). However, the coefficients for these interactions were not significant and those variables were eliminated from the models.

Academic Affairs Regression Analysis

The results of the Academic Affairs regression analyses are summarized below in Table 1. Nearly 84% of the total variation in salaries were accounted for by education level, professional experience, academic status, and discipline. Adding variables for gender and race/ethnicity made virtually no contribution to the prediction of salary in this population.

The gender coefficient indicated that female faculty members on average received salaries that were \$2,271 lower than the average for the male reference group, after controlling for all other variables in the model. Regression coefficients reflecting the three race/ethnicity group contrasts suggested that compared to white faculty, Black/African-American and Asian faculty members received higher salaries (\$3,989 and \$2,367 respectively), but the average salaries of the faculty in the Hispanic, Native American, and Other were \$1,739 lower, all other factors taken into account. None of these coefficient values were statistically significant at $p < .05$.

Table 1. Academic Affairs: Multiple Regression Analysis Results for Population

	N	%	Adjusted R ²	Coefficient	Sig. ¹
Total Population	1265	100.0%	83.6%		
Female	524	41.4%		-\$2,271	
Black/African-American	74	5.8%		\$3,989	
Asian	111	8.8%		\$2,367	
Hispanic / Native American / Others	104	8.2%		-\$1,739	

Note. The reference group consists of faculty members who are male, white, untenured assistant professors, with a PhD, no distinguished title, and an appointment in the History Department.

¹ An asterisk in this column indicates that after controlling for all other variables in the model membership in that group had a significant effect on salary. See notes about relevance of significance tests in the context of faculty salaries.

Consistent with AAUP recommendations, a second regression model was developed using only white males and then applied to females and non-white faculty. Table 2 below displays the mean difference between the actual salary and the salary predicted for an individual using the equation for white males. The average salary across all faculty outside the white male group was \$1,201 less than predicted for white males with the same characteristics and discipline area.

Among all females the deficit was \$1,760 and for white females, slightly larger at \$2,229. For African American females and males, Asian males, and Hispanic/Native American/Other females, the mean difference was positive, indicating that with all other factors treated equally, their actual salaries were higher than predicted for them using the white male equation.

Table 2. Academic Affairs: Comparison of Actual Salary to Salary Predicted Using White Male Model

Group	N	%	Mean Difference Between Actual Salary and White Male Predicted Salary	Sig. ¹
Total Population	1265	100.0%		
White Males	586	46.3%	\$0	
All Other Faculty	679	53.7%	-\$1,201	
Subpopulations:				
Females				
All Females	524	41.4%	-\$1,760	*
White	390	30.8%	-\$2,229	*
Black/African-American	42	3.3%	\$825	
Asian	42	3.3%	-\$400	
Hispanic / Native American / Others	50	4.0%	\$305	
Males				
All Non-White Males	155	12.3%	\$686	
Black/African-American	32	2.5%	\$3,501	
Asian	69	5.5%	\$2,286	
Hispanic / Native American / Others	54	4.3%	-\$3,027	

¹ An asterisk in this column indicates that after controlling for all other variables in the model membership in that group had a significant effect on salary (p<.05). See notes about relevance of significance tests in the context of faculty salaries.

Health Affairs without Medicine Regression Analysis

The results of the regression model for faculty salaries in Dentistry, Nursing, Pharmacy, and Public Health are summarized in Table 3. Similar to the results for Academic Affairs, the faculty education, professional experience, academic status, and discipline variables in the regression model explained a large portion of the variance in salaries (76%), and entering gender and race/ethnicity into the model made no contribution over and above those effects.

However, analysis of the individual coefficients indicated that being female and being a member of a non-white race/ethnicity group were negatively related to salaries. None of these relationships were statistically significant at p<.05 most likely due to the relatively small numbers overall and within these

groups; however, the dollar differences, particularly for females compared to males (-\$4,604) and for Asian faculty compared to white faculty (-\$5,303) are larger than what was observed in Academic Affairs.

Table 3. Health Affairs without Medicine: Multiple Regression Analysis Results for Population

	N	%	Adjusted R ²	Coefficient	Sig. ¹
Total Population	544	100.0%	76.0%		
Female	300	55.1%		-\$4,604	
Black/African-American	35	6.4%		-\$1,337	
Asian	59	10.8%		-\$5,303	
Hispanic / Native American / Others	44	8.1%		-\$1,862	

Note. The reference group consists of faculty members who are male, white, untenured assistant professors, with a PhD, no distinguished title, no Clinical or Research modifier, and had an appointment in the Department of Epidemiology.

¹ An asterisk in this column indicates that after controlling for all other variables in the model membership in that group had a significant effect on salary. See notes about relevance of significance tests in the context of faculty salaries.

Table 4 below displays the mean difference between the actual salary and the salary predicted for an individual using the equation for white males. Except for white females, whose actual salaries were on average \$312 higher than predicted by the white male model, all other contrasts were negative. Given the small numbers in both the white male population used to generate the equation and the even smaller numbers in the non-white male and female groups, these results may not be as reliable as those reported for the Academic Affairs group.

Table 4. Health Affairs without Medicine: Comparison of Actual Salary to Salary Predicted Using White Male Model

Group	N	%	Mean Difference Between Actual Salary and White Male Predicted Salary	Sig. ¹
Total Population	544	100.0%		
White Males	183	33.6%	\$0	
All Other Faculty	361	66.4%	-\$2,129	
Subpopulations:				
Females				
All Females	300	55.1%	-\$982	
White Females	223	41.0%	\$312	
Non-White Females	77	14.2%	-\$4,731	
Males				
All Non-White Males	61	11.2%	-\$7,768	

¹ An asterisk in this column indicates that after controlling for all other variables in the model membership in that group had a significant effect on salary ($p < .05$). See notes about relevance of significance tests in the context of faculty salaries.

Preliminary School-Level Regression Analyses

Consistent with prior salary equity studies, school-level regression analyses were conducted for the purpose of generating salary residuals (the difference between actual and predicted salaries) for each faculty member that can be reviewed by the deans of each school. Given the small number of faculty in most of the professional schools, some units were combined with others that had some similarities in terms of faculty work or subject matter. Preliminary results are provided below in Table 5. While the coefficients from these analyses are provided below, very few are significant and most should not be considered reliable given the relatively small number of cases even after combining units.

In the next step in the salary equity study process, a file containing the record for each faculty member included in this analysis is being prepared by the Office of Institutional Research and Assessment for delivery to the deans. In addition to the variables used in the regression analyses, both the actual and

predicted salaries as well as the standardized residuals will be included. As in the prior studies, faculty whose salary residuals are 1.5 standard deviations below the mean will be flagged. Deans will be asked to examine these cases and provide more information concerning performance or other factors that might explain why these salaries are much lower relative to their peers with similar characteristics.

Table 5. Results from Preliminary Regression Analysis of Academic Affairs School-Level Faculty Salaries

Subject to Change						
School(s)	N	R ²	Coefficients			
			Female	African American	Asian	Hispanic/NA/Other
Academic Affairs						
Arts & Sciences	874	0.833	-\$1,499	\$4,041	-\$709	\$749
Business	118	0.851	-\$3,131	\$30,743	-\$1,943	\$4,518
Education and Social Work	111	0.877	-\$939	-\$505	-\$5,495	\$424
Government and Law	91	0.870	-\$2,058	\$8,688	-\$1,978	-\$5,303
Info & Library Science and Media and Journalism	71	0.798	\$4,224	-\$2,382	\$2,110	-\$1,277
Health Affairs						
Dentistry, Nursing, and Pharmacy	301	0.792	-\$1,555	\$3,863	-\$7,532	-\$1,235
Public Health	243	0.773	-\$3,438	-\$3,909	-\$525	-\$308

References

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Appendix A

Descriptive Statistics for Academic Affairs and Health Affairs without Medicine

Academic Affairs: Descriptive Statistics

Includes the College of Arts and Sciences and the Schools of Business, Education, Government,
Information & Library Science, Media & Journalism, Law, and Social Work

(N=1,265)

	By Gender				By Race/Ethnicity							
	Male		Female		White		AfricanAmer		Asian		Hispanic, Native American, Other	
Number of Faculty	741		524		976		74		111		104	
Percentage of Total	58.6%		41.4%		77.2%		5.8%		8.8%		8.2%	
	N	%	N	%	N	%	N	%	N	%	N	%
Tenure Status												
Tenured	481	64.9%	232	44.3%	579	59.3%	38	51.4%	61	55.0%	35	33.7%
Tenure Track	125	16.9%	117	22.3%	152	15.6%	22	29.7%	33	29.7%	35	33.7%
Fixed Term	135	18.2%	175	33.4%	245	25.1%	14	18.9%	17	15.3%	34	32.7%
Rank												
Professor	342	46.2%	137	26.1%	416	42.6%	15	20.3%	35	31.5%	13	12.5%
Associate	186	25.1%	144	27.5%	243	24.9%	27	36.5%	30	27.0%	30	28.8%
Assistant	138	18.6%	138	26.3%	188	19.3%	24	32.4%	30	27.0%	34	32.7%
Instructor/Lecturer	75	10.1%	105	20.0%	129	13.2%	8	10.8%	16	14.4%	27	26.0%
Highest Earned Degree												
Below doctorate	75	10.1%	81	15.5%	119	12.2%	11	14.9%	11	9.9%	15	14.4%
PhD or other doctorate	617	83.3%	403	76.9%	782	80.1%	58	78.4%	96	86.5%	84	80.8%
First professional	49	6.6%	40	7.6%	75	7.7%	5	6.8%	4	3.6%	5	4.8%
Distinguished Title												
Permanent	157	21.2%	36	6.9%	172	17.6%	4	5.4%	13	11.7%	4	3.8%
Term-Based	20	2.7%	16	3.1%	33	3.4%	0	0.0%	1	0.9%	2	1.9%
	Male	Female	White	AfricanAmer	Asian	Hispanic, Native American, Other						
Mean years between highest degree and hire at UNC	6.44	5.24	6.34	6.54	3.86	4.00						
Mean years between hire at UNC and year appointed to current rank	5.64	5.56	6.09	3.68	4.42	3.87						
Mean years in current rank at UNC	8.50	5.29	7.80	5.59	5.47	4.18						
9-Month Equivalent Salary												
Mean	\$123,392	\$94,815	\$114,218	\$97,717	\$123,274	\$83,892						
Median	\$107,176	\$84,750	\$98,437	\$88,531	\$108,762	\$80,152						

Health Affairs Without Medicine: Descriptive Statistics

Includes the Schools of Dentistry, Nursing, Pharmacy, and Public Health

(N=544)

	By Gender				By Race/Ethnicity							
	Male		Female		White		AfricanAmer		Asian		Hispanic, Native American, Other	
Number of Faculty	244		300		406		35		59		44	
Percentage of Total	44.9%		55.1%		74.6%		6.4%		10.8%		8.1%	
	N	%	N	%	N	%	N	%	N	%	N	%
Tenure Status												
Tenured	115	47.1%	90	30.0%	164	40.4%	8	24.0%	24	40.7%	9	20.5%
Tenure Track	26	10.7%	35	11.7%	35	8.6%	7	20.0%	8	13.6%	11	25.0%
Fixed Term	103	42.2%	175	58.3%	207	51.0%	20	57.1%	27	45.8%	24	54.5%
Rank												
Professor	100	41.0%	66	22.0%	138	34.0%	4	11.4%	16	27.1%	8	18.2%
Associate	79	32.4%	81	27.0%	119	29.3%	11	31.4%	17	28.8%	13	29.5%
Assistant	62	25.4%	144	48.0%	139	34.2%	19	54.3%	26	44.1%	22	50.0%
Instructor/Lecturer	3	1.2%	9	3.0%	10	2.5%	1	2.9%	0	0.0%	1	2.3%
Highest Earned Degree												
Below doctorate	9	3.7%	46	15.3%	46	11.3%	5	14.3%	2	3.4%	2	4.5%
PhD or other doctorate	153	62.7%	183	61.0%	252	62.1%	22	62.9%	40	67.8%	22	50.0%
First professional	35	14.3%	41	13.7%	59	14.5%	5	14.3%	7	11.9%	5	11.4%
Multiple Terminal Degrees	22	9.0%	14	4.7%	22	5.4%	1	2.9%	7	11.9%	6	13.6%
Prof + Postdoct Degree	25	10.2%	16	5.3%	27	6.7%	2	5.7%	3	5.1%	9	20.5%
Distinguished Title												
Permanent	34	13.9%	10	3.3%	32	7.9%	0	0.0%	10	16.9%	2	4.5%
Term-Based	1	0.4%	5	1.7%	5	1.2%	1	2.9%	0	0.0%	0	0.0%
	Male	Female	White	AfricanAmer	Asian	Hispanic, Native American, Other						
Mean years between highest degree and hire at UNC	9.65	6.35	8.08	7.14	7.51	6.57						
Mean years between hire at UNC and year appointed to current rank	5.41	4.89	5.42	3.86	4.76	3.84						
Mean years in current rank at UNC	7.61	5.31	6.81	4.60	5.63	4.36						
12-Month Equivalent Salary												
Mean	\$162,429	\$125,834	\$144,071	\$140,461	\$132,798	\$135,346						
Median	\$148,908	\$114,526	\$130,287	\$115,000	\$119,770	\$124,161						

Appendix B

Independent Variables Used in the Regression Models

All Models	Contrast Group	Description
Demographics		
Female	Male	
Race/Ethnicity	White	African American, Asian, Hispanic/Native American/2 or more races/Unknown
Education		
Highest Degree	Doctorate	Below Doctorate, Professional Degree (e.g., MD, JD, DDS, PharmD, etc.), Research Doctorate (e.g., PhD, DPH, EdD, DFA, DSW, DNP, AuD, DPT, etc.), Combination of terminal or post-graduate degrees
Professional Experience		
Prior Experience: Number of Years, Number of Years Squared*	(Continuous)	Years between highest degree and hire date at UNC-Chapel Hill
Years at UNC-Chapel Hill: Number of Years, Number of Years Squared*	(Continuous)	Years between hire date at UNC-Chapel Hill and date appointed to current rank.
Years in Rank: Number of Years, Number of Years Squared*	(Continuous)	Years since appointment to current rank at UNC-Chapel Hill
Professional Status		
Appointment Type: Fixed Term, Tenured	Tenure Track	Fixed-Term = Not on tenure track; Tenured = Holds tenure
Rank: Below Assistant, Associate, Full Professor	Assistant	Below Assistant = Instructor and Lecturer
Title Modifier	No Title Modifier	Clinical, Research
Distinguished Full, Distinguished Term	No Distinguished Title	Full = Permanent Title Term = For a fixed period of years
Discipline/Unit Indicators		
Academic Affairs Model	History	College of Arts & Sciences: Humanities & Fine Arts – 14 depts, Social Sciences – 9 depts, Natural Sciences – 10 depts, KFBS: 7 depts; 6 other schools
Health Affairs without Medicine Model	Epidemiology	Dentistry: 9 depts, Nursing: 1 school, Pharmacy: 6 depts, Public Health: 8 depts.

Note. For Academic Affairs, the reference group consists of faculty members who are male, White, untenured assistant professors, with a PhD, no distinguished title, and from the History department. For the Health Affairs without Medicine, the reference group consists of white male untenured assistant professors, with a PhD, no distinguished title, without Research or Clinical title modifier, and from the Epidemiology department.