

## Business, Industry, & Government 2005 Salary Survey

In the spring of 1999 and 2003, the SPAIG Committee of the ASA conducted salary surveys of statisticians employed in Business, Industry, & Government (B/I/G). The survey objectives were to:

- Provide current salary information on statisticians employed in B/I/G
- Provide students with better information on starting salaries by academic degree achieved
- Provide students and employed statisticians with information on future salary potential
- Provide employers with salary reference points for statisticians
- Characterize statisticians by type of employer and geographic region

In June 2005 the survey was conducted again, with a change in sampling strategy to attempt to increase the response rate. Instead of sampling organizations that employ B/I/G statisticians (as identified through the ASA membership data base) and sending the survey questionnaire to a single contact person at each organization to gather information on each statistician within that organization, the survey was sent directly to a random sample of B/I/G statisticians who are ASA members.

The ASA membership data base included 4,718 statisticians who work in the B/I/G sector: 3,649 in Business/Industry and 1,060 Government. Two groupings were created based on years of ASA membership and used in the sampling strategy to ensure adequate representation of new ASA members, who would be more likely to reflect the starting salaries of newly employed statisticians.

**Table 1. ASA B/I/G Members**

Years of ASA Membership	Business/Industry		Government		Total
	N	%	N	%	
< 2	288	7.9	66	6.2	354
2+	3,361	92.1	1,003	93.8	4,364
All	3,649		1,069		4,718

Based on the characteristics of ASA B/I/G statisticians presented in Table 1, the following sampling strategy was chosen. The percentages reflect the ratio of the sample size to the number of members in Table 1.

**Table 2. Sampling Strategy for 2005 Salary Survey**

Years of ASA Membership	Business/Industry		Government		Total
	N	%	N	%	
< 2	173	60	40	61	213
2+	1,342	40	400	40	1,742
All	1,515		440		1,955

For the < 2 years of ASA membership category, simple random sampling was used. For the 2+ years of ASA membership category, systematic random sampling was used, with 22 of 55 systematic samples of size 61 selected for Business/Industry (after randomly deleting six of 3,361 members) and 16 of 40 systematic samples of size 25 selected for Government (after randomly deleting 3 of 1,003 members).

Each member in the random sample was contacted via mail and asked to either fill out a paper questionnaire or, preferably, to use a secure web-based application. The operational definition of “statistician” used in each of these surveys was:

- University or college degree (BS, MS, PhD) in Statistics, Biostatistics, or Mathematical Statistics, *or*
- Equivalent of one-year graduate coursework of academic statistics courses (including those in Federal Government who meet the educational requirements for a Mathematical Statistician)
- *and* is using statistical reasoning or performing statistical analyses (including supervision of statisticians) as part of their job.

One thousand three hundred fifty-two (1,352) persons responded to the survey, yielding a 69% response rate. One hundred seventy (170) respondents were not employed as statisticians. Thirty-four (34) of the respondents did not provide their salary or their year of first full-time employment as a statistician, which reduced the usable data to 1,148 responses. The number of respondents by sampling strata are shown Table 3.

**Table 3. Respondent Numbers & Percentages**

Years of ASA Membership	Business/Industry		Government	
	N	%	N	%
< 2	83 / 173	48	20 / 40	50
2+	783 / 1,342	58	259 / 400	65
All	866 / 1,515	57	279 / 440	63

The type of organizations employing the statisticians who responded is summarized in Table 4 (information was not provided by 4 respondents):

**Table 4. Types of B/I/G Organizations Employing Statisticians**

Type of Organization	Statisticians	
	#	%
Government	268	23.4
• Federal	248	21.7
• State or County	20	1.7
Pharmaceutical/Medical Device/Diagnostics	369	32.3
Consulting	92	8.0
Medical Clinic/Hospital/PPO	52	4.6
Survey/Market Research	42	3.7
Investments & Lending, Banking	37	3.2
Technical , Survey, CRO	36	3.2
Computer Software	29	2.5
Insurance	24	2.1
Health & Safety Research	23	2.0
Computer Products or Service	20	1.8
Chemicals	18	1.6
Aerospace	17	1.5
Food Products	16	1.4
Other	101	8.9
Total	1,144	100

The geographic location of the statisticians responding is summarized in Table 5 (information was not provided by 4 respondents):

**Table 5. Geographic Locations of B/I/G Statisticians**

Geographic Region	Statisticians		States
	#	%	
South Atlantic	367	32.1	DE, DC, GA, FL, MD, NC, SC, VA, WV
Middle Atlantic	230	20.1	NJ, NY, PA
East North Central	140	12.2	IL, IN, MI, OH, WI
Pacific	138	12.1	AK, CA, HI, OR, WA
New England	81	7.1	CT, MA, ME, NH, RI, VT
West North Central	77	6.7	IA, KS, MN, MO, ND, NE, SD
Other	111	9.7	States not listed above
Total	1,144	100	

The highest academic degree of the statisticians responding is summarized in Table 6 (information was not provided by 1 respondent):

**Table 6. Academic Degrees of B/I/G Statisticians**

Highest Degree	Statisticians	
	#	%
PhD	608	53.0
Masters	504	43.9
Bachelors	35	3.1
Total	1,147	100

The total years employed as a full-time statistician, from beginning of career, for the statisticians responding is summarized in Table 7. This computation is based on the first date a statistician was ever employed full-time as a statistician, regardless of whether that employment was with the current employer or a different employer. This date of first employment was compared to 8 June 2005, which was the midpoint of when survey responses were received. When month of first employment was unspecified, June was used.

**Table 7. Total Years Employed**

Years	Statisticians	
	#	%
0 – 1.9	50	4.4
2 – 3.9	63	5.5
4 – 7.9	176	15.3
8 – 11.9	142	12.4
12 – 19.9	255	22.2
20 – 27.9	251	21.9
28 +	211	18.4
Total	1,148	100

The managerial status of the statisticians responding is summarized in Table 8 (information was not provided by 2 respondents):

**Table 8. Managerial Responsibility**

Managerial Responsibility	Statisticians	
	#	%
No	690	60.2
Yes	456	39.8
Total	1,146	100

The gender of the statisticians responding is summarized in Table 9. The ratio of males to females in the data provided is approximately 5:2.

**Table 9. Gender**

Gender	Statisticians	
	#	%
Female	332	28.9
Male	816	71.1
Total	1,422	100

The highest academic degree by gender of the statisticians responding is summarized in Table 10 (information was not provided by 1 respondent). Males had a higher percentage of PhD degrees than females.

**Table 10. Highest Academic Degree by Gender**

Gender	Highest Academic Degree			Total
	Bachelors	Masters	PhD	
Male	28 (3.4%)	312 (38.2%)	476 (58.3%)	816
Female	7 (2.1%)	192 (58.0%)	132 (39.9%)	331

The length of time since first employed full-time as a statistician by gender for employed statisticians who responded is summarized in Table 11. Males had a greater length of employment than females (median length of employment was 18.1 years for males and 13.1 years for females).

**Table 11. Years Since First Employed by Gender**

Years	Gender			
	Female		Male	
	#	%	#	%
0 – 1.9	21	6.3	29	3.6
2 – 3.9	24	7.2	39	4.8
4 – 7.9	68	20.5	108	13.2
8 – 11.9	46	13.9	96	11.8
12 – 19.9	86	25.9	169	20.7
20 – 27.9	55	16.6	196	24.0
28 +	32	9.6	179	21.9
Total	332	100	816	100

The managerial responsibility by gender of the statisticians responding is summarized in Table 12 (information was not provided by 2 respondents).

**Table 12. Managerial Responsibility by Gender**

Gender	Managerial Responsibility		Total
	No	Yes	
Male	471 (57.9%)	343 (42.1%)	814
Female	219 (66.0%)	113 (34.0%)	332

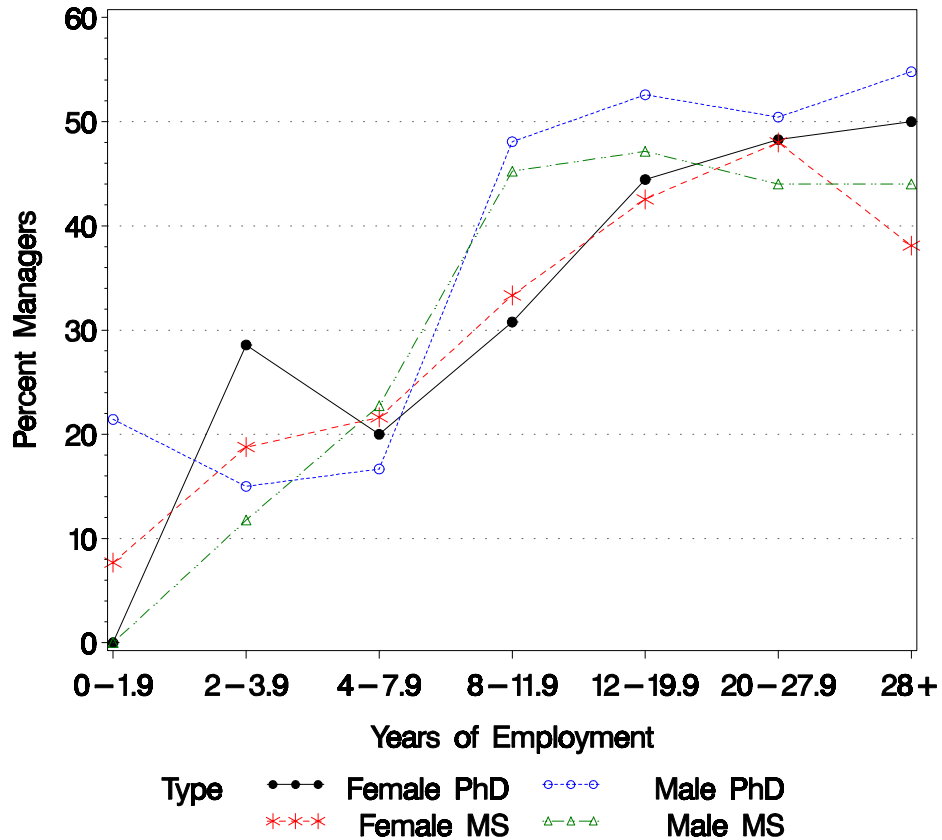
The managerial responsibility by highest academic degree of the statisticians responding is summarized in Table 13 (information was not provided by 3 respondents).

**Table 13. Managerial Responsibility by Highest Academic Degree**

Highest Academic Degree	Managerial Responsibility		Total
	No	Yes	
Bachelors	23 (65.7%)	12 (34.3%)	35
Masters	321 (63.8%)	182 (36.2%)	503
PhD	346 (57.0%)	261 (43.0%)	607

Because managerial responsibility and years of employment are both correlated with age, the relationships among gender, highest academic degree, and managerial responsibility are depicted in Figure 1. There is a clearly positive correlation of years of employment with percentage of managers, with a leveling off after 12 years of employment. The management percentages between genders is similar except in the 8-11.9 years of employment grouping.

Figure 1: Percentage of Managers by Gender, Highest Academic Degree, & Years of Employment



### Salary Statistics

Salary statistics were categorized by organization type (Fed. Gov., Pharma, Consulting, Other), managerial status, highest academic degree attained (BS, MS, PhD), and total years of experience.

Salary data shown in the following tables are based on reported current base salaries (survey fielded in June and July 2005) excluding bonuses, stock awards, stock options, and other forms of incentives. To preserve confidentiality and set a minimum standard on reliability:

- The median is presented only if N is 7 or greater
- The 1st and 3rd quartiles (Q1 and Q3) are presented only if N is 10 or greater.

Appropriate weightings were used to account for the different sampling rates of the sampling strata (see Table 2).

Table 14 provides information on annual salaries by years of experience based on managerial status.

**Table 14. Annual Salaries (\$000) of Statisticians**

<b>Years of Experience</b>	<b>Highest Degree</b>	<b>N</b>	<b>Q1</b>	<b>Median</b>	<b>Q3</b>
<b>With No Managerial Responsibility</b>					
0 – 1.9	BS	3			
	MS	25	55.0	<b>60.0</b>	70.0
	PhD	18	72.0	<b>83.0</b>	85.0
2 – 3.9	BS	3			
	MS	28	64.0	<b>70.0</b>	80.0
	PhD	22	85.0	<b>88.0</b>	98.0
4 – 7.9	BS	4			
	MS	62	67.0	<b>75.0</b>	85.0
	PhD	71	85.0	<b>94.0</b>	104.0
8 – 11.9	BS	2			
	MS	45	70.0	<b>83.0</b>	94.0
	PhD	36	88.0	<b>98.5</b>	121.0
12 – 19.9	BS	1			
	MS	64	85.0	<b>95.0</b>	105.0
	PhD	66	98.0	<b>110.0</b>	125.0
20 – 27.9	BS	3			
	MS	55	90.0	<b>101.0</b>	121.0
	PhD	73	94.0	<b>115.0</b>	134.0
28+	BS	7		<b>99.0</b>	
	MS	42	80.0	<b>97.0</b>	112.0
	PhD	60	100.0	<b>115.5</b>	147.0
<b>With Managerial Responsibility</b>					
0 – 1.9	MS	1			
	PhD	3			
2 – 3.9	MS	5			
	PhD	5			
4 – 7.9	MS	17	81.0	<b>95.0</b>	110.0
	PhD	13	100.0	<b>104.0</b>	120.0
8 – 11.9	MS	30	90.0	<b>100.0</b>	110.0
	PhD	29	102.0	<b>125.0</b>	150.0
12 – 19.9	BS	2			
	MS	53	100.0	<b>117.0</b>	137.0
	PhD	67	112.0	<b>135.0</b>	170.0
20 – 27.9	BS	2			
	MS	45	100.0	<b>117.0</b>	140.0
	PhD	73	115.0	<b>150.0</b>	179.0
28+	BS	8		<b>122.0</b>	
	MS	31	100.0	<b>128.0</b>	139.5
	PhD	71	119.0	<b>150.0</b>	185.0

The median salaries are plotted in Figure 2.



Table 15 provides information on annual salaries for Federal Government statisticians by years of experience based on managerial status.

**Table 15. Annual Salaries (\$000) of Federal Government Statisticians**

Years of Experience	Highest Degree	N	Q1	Median	Q3
<b>With No Managerial Responsibility</b>					
0 – 1.9	MS	1			
	PhD	1			
2 – 3.9	BS	2			
	MS	3			
	PhD	4			
4 – 7.9	MS	8		<b>78.0</b>	
	PhD	18	82.0	<b>85.0</b>	94.0
8 – 11.9	MS	5			
	PhD	11	79.0	<b>85.0</b>	98.0
12 – 19.9	MS	12	75.0	<b>89.5</b>	98.5
	PhD	16	97.0	<b>100.5</b>	120.0
20 – 27.9	BS	1			
	MS	13	92.0	<b>97.0</b>	106.0
	PhD	23	88.0	<b>115.0</b>	130.0
28+	BS	4			
	MS	16	95.5	<b>107.5</b>	114.5
	PhD	24	106.0	<b>116.0</b>	131.0
<b>With Managerial Responsibility</b>					
0 – 1.9	MS	1			
2 – 3.9	PhD	1			
4 – 7.9	MS	2			
8 – 11.9	MS	3			
	PhD	1			
12 – 19.9	MS	4			
	PhD	15	101.0	<b>125.0</b>	140.0
20 – 27.9	BS	2			
	MS	10	100.0	<b>112.5</b>	117.0
	PhD	14	114.0	<b>132.0</b>	139.0
28+	BS	2			
	MS	15	108.0	<b>131.0</b>	135.0
	PhD	15	125.0	<b>132.0</b>	153.0

Table 16 provides information on annual salaries for Pharma statisticians by years of experience based on managerial status.

**Table 16. Annual Salaries (\$000) of Pharmaceutical/Medical Devices/Diagnostic Statisticians**

Years of Experience	Highest Degree	N	Q1	Median	Q3
<b>With No Managerial Responsibility</b>					
0 – 1.9	BS	1			
	MS	8		<b>73.0</b>	
	PhD	7		<b>83.0</b>	
2 – 3.9	BS	1			
	MS	10	70.0	<b>79.0</b>	90.0
	PhD	12	86.0	<b>88.0</b>	96.0
4 – 7.9	BS	1			
	MS	22	74.0	<b>75.5</b>	87.0
	PhD	31	92.0	<b>100.0</b>	110.0
8 – 11.9	MS	16	79.0	<b>97.0</b>	114.0
	PhD	15	97.0	<b>120.0</b>	127.0
12 – 19.9	BS	1			
	MS	23	92.0	<b>104.0</b>	118.0
	PhD	19	106.0	<b>120.0</b>	135.0
20 – 27.9	MS	17	101.0	<b>112.0</b>	136.0
	PhD	19	110.0	<b>120.0</b>	140.0
28+	MS	6			
	PhD	8		<b>110.0</b>	
<b>With Managerial Responsibility</b>					
0 – 1.9	PhD	2			
2 – 3.9	PhD	2			
4 – 7.9	MS	5			
	PhD	6			
8 – 11.9	MS	14	103.0	<b>106.0</b>	120.0
	PhD	16	119.0	<b>127.5</b>	143.5
12 – 19.9	MS	24	100.0	<b>115.0</b>	140.0
	PhD	23	140.5	<b>166.0</b>	196.0
20 – 27.9	MS	11	120.0	<b>140.0</b>	145.0
	PhD	22	150.0	<b>168.0</b>	205.0
28+	BS	1			
	MS	3			
	PhD	21	120.0	<b>178.0</b>	200.0

Table 17 provides information on annual salaries for Other statisticians by years of experience based on managerial status.

**Table 17. Annual Salaries (\$000) of Other Statisticians**

Years of Experience	Highest Degree	N	Q1	Median	Q3
<b>With No Managerial Responsibility</b>					
0 – 1.9	BS	2			
	MS	16	55.0	<b>57.0</b>	70.0
	PhD	10	55.0	<b>80.0</b>	85.0
2 – 3.9	MS	15	60.0	<b>65.0</b>	70.0
	PhD	6			
4 – 7.9	BS	3			
	MS	32	62.0	<b>70.0</b>	85.0
	PhD	22	80.0	<b>92.0</b>	110.0
8 – 11.9	BS	2			
	MS	24	68.0	<b>74.0</b>	89.0
	PhD	10	89.0	<b>98.0</b>	108.0
12 – 19.9	MS	29	83.0	<b>92.0</b>	103.0
	PhD	31	90.0	<b>110.0</b>	125.0
20 – 27.9	BS	2			
	MS	25	83.0	<b>97.0</b>	120.0
	PhD	31	83.0	<b>100.0</b>	128.0
28+	BS	3			
	MS	20	60.0	<b>89.0</b>	105.0
	PhD	28	93.5	<b>117.0</b>	164.0
<b>With Managerial Responsibility</b>					
0 – 1.9	PhD	1			
2 – 3.9	MS	5			
	PhD	2			
4 – 7.9	MS	10	66.0	<b>88.0</b>	100.0
	PhD	7		<b>102.0</b>	
8 – 11.9	MS	13	81.0	<b>90.0</b>	97.0
	PhD	12	85.0	<b>108.0</b>	150.0
12 – 19.9	BS	2			
	MS	25	104.0	<b>120.0</b>	141.0
	PhD	29	110.0	<b>125.0</b>	150.0
20 – 27.9	MS	24	90.0	<b>107.0</b>	139.0
	PhD	37	100.0	<b>130.0</b>	177.0
28+	BS	5			
	MS	13	96.0	<b>102.0</b>	150.0
	PhD	35	110.0	<b>140.0</b>	182.0

Table 18 provides information on annual salaries by gender and years of experience.

**Table 18. Annual Salaries (\$000) of Statisticians By Gender & Years of Experience**

Years of Experience	Highest Degree	Female		Male	
		N	Median	N	Median
0 – 1.9	BS	1		2	
	MS	13	<b>62.0</b>	13	<b>56.5</b>
	PhD	7	<b>83.0</b>	14	<b>83.0</b>
2 – 3.9	BS	1		2	
	MS	16	<b>72.0</b>	17	<b>67.0</b>
	PhD	7	<b>84.0</b>	20	<b>89.5</b>
4 – 7.9	BS	1		3	
	MS	37	<b>75.0</b>	42	<b>78.0</b>
	PhD	30	<b>95.0</b>	55	<b>98.0</b>
8 – 11.9	BS			2	
	MS	33	<b>90.0</b>	42	<b>90.0</b>
	PhD	13	<b>97.0</b>	52	<b>115.0</b>
12 – 19.9	BS	2		1	
	MS	47	<b>100.0</b>	71	<b>105.0</b>
	PhD	36	<b>106.0</b>	97	<b>125.0</b>
20 – 27.9	BS	1		4	
	MS	25	<b>100.0</b>	75	<b>110.0</b>
	PhD	29	<b>123.0</b>	117	<b>125.0</b>
28+	BS	1		14	<b>113.0</b>
	MS	21	<b>100.0</b>	52	<b>107.5</b>
	PhD	10	<b>116.0</b>	121	<b>132.0</b>

Table 19 provides information on annual salaries by region.

**Table 19. Annual Salaries (\$000) of Statisticians By Region**

Geographic Region	Highest Degree	N	Q1	Median	Q3
New England <sup>a</sup>	BS				
	MS	28	90.0	<b>104.0</b>	132.0
	PhD	49	97.0	<b>123.0</b>	165.0
Middle Atlantic <sup>b</sup>	BS	6			
	MS	84	85.0	<b>109.0</b>	125.0
	PhD	140	103.0	<b>124.0</b>	165.0
South Atlantic <sup>c</sup>	BS	19	92.0	<b>102.0</b>	120.0
	MS	151	81.0	<b>100.0</b>	117.0
	PhD	197	94.0	<b>114.0</b>	138.0
East North Central <sup>d</sup>	BS	2			
	MS	75	70.0	<b>88.0</b>	102.0
	PhD	63	90.0	<b>102.5</b>	150.0
West North Central <sup>e</sup>	BS	2			
	MS	55	71.0	<b>89.0</b>	99.5
	PhD	20	82.0	<b>100.0</b>	112.0
Pacific <sup>f</sup>	MS	60	70.0	<b>89.0</b>	118.0
	PhD	77	97.0	<b>117.0</b>	147.0
Other	BS	2			
	MS	51	66.0	<b>89.0</b>	100.0
	PhD	62	82.0	<b>100.0</b>	120.0

a: CT, MA, ME, NH, RI, VT

b: NJ, NY, PA

c: DE, DC, GA, FL, MD, NC, SC, VA, WV

d: IL, IN, MI, OH, WI

e: IA, KS, MN, MO, ND, NE, SD

f: AK, CA, HI, OR, WA

### **Additional Details**

The survey questionnaire can be viewed on the SPAIG web site at <http://web.utk.edu/~wparr/spaig.html>. This report is also presented on the SPAIG web site.

### **Future Surveys**

It is anticipated that a B/I/G salary survey will be conducted and reported on every 2-3 years. Valid current salary information is critical to understanding the value placed on statisticians by our society, and to recruiting future students into the profession of statistics.

### **Survey Limitations**

Some limitations of the survey are worth noting:

1. Since the primary sampling unit was individual statisticians, not organizations, the results of this survey characterize salaries of statisticians who are ASA members. Because the ASA membership has statisticians from numerous B/I/G organizations, it is likely that these results would generalize to the larger population of B/I/G statisticians, but that cannot be assured.
2. Some salaries may represent more than the annual base salary due to failure of a respondent to follow the survey questionnaire directions. If this occurred frequently enough, the salary quantiles would be inflated.
3. Some dates of first employment may be based on the current employer instead of the first employer, which was the intention of the survey and clearly stated in the instructions on the survey questionnaire. If this occurred frequently enough, the salary quantiles would tend to be inflated for the earlier intervals for years of experience.
4. The number of Bachelors statisticians responding to the survey is low relative to the previously conducted surveys. The previous method of sampling included statisticians who are not ASA members. Since Bachelors statisticians represent only 6% of the ASA membership, the sampling method used in this survey would not include many Bachelors statisticians.

### **Acknowledgements**

This survey was conducted with the assistance of the Center for Survey Statistics & Methodology, Iowa State University, under the direction of Dianne Anderson. The Center built the web application, communicated with survey recipients, and built the data base of survey results.