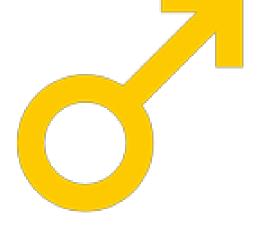
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ABSTRACT

The biosafety and biosecurity profession has seen significant growth over the past several decades. The implementation of biosafety-related regulations and associated guidance documents has helped fuel the need for technically qualified professionals in the field. The objective of this article is to evaluate the factors that contribute to the salaries of biosafety professionals. In our survey, five factors significantly predicted salary: 1) sex; 2) years of experience; 3) number of direct reports (i.e., number of employees reporting to an individual); 4) whether an individual is involved with the oversight of recombinant and synthetic nucleic acids; and 5) whether someone works in a right-to-work state.

INTRODUCTION



This study was performed to determine what factors contribute to salaries in the biosafety profession. Historically, a salary disparity between men and women has existed in the science and engineering fields¹. In 2008, the U.S. Census Bureau showed that on average, women earn less throughout their careers, and the salary gap generally grows over time. For example, women with a college degree and 3-6 years of experience were earning 34.8% less than men with the same education and years of experience². Many different theories regarding this disparity have been proffered:

- Women are more likely to take time off from work to raise children, thereby decreasing their years of experience³;
- Bias against women in science⁴; and
- The evidence that women are less likely to negotiate a higher salary when hired⁵.

Based upon our research, several other factor contributor positively to salary. These factors include years of experience, number of professional certifications, working at institutions with high-containment facilities, working in programs with dual-use activities, and working in programs with select agents. Whereas, a negative contributor to salary is performing data entry duties.

METHODS

During months of September and October in 2012, an assessment of biosafety professionals to determine current conditions for the profession, including an assessment of salaries. An 18-question survey was sent to 2,132 individuals who were listed as Institutional Biosafety Committee (IBC) and National Institutes of Health (NIH) Office of Biotechnology Activities, as well as individuals associated with ABSA. Of these individuals, 609 respondents began the survey, with 558 respondents fully completing the survey, equating to a 91.6%. completion rate.

PARTICIPANTS

There were 277 males and 283 females. The participants were a member of: a public academic institution (33.3%); n = 203; a private academic institution (17.2%; n = 105); a corporate or commercial for-profit organization (11.8\%; n = 72); the federal government (9.5%; n = 58); a private non-profit organization (9.0%, n = 55); consultant (6.9%; n = 42); healthcare (4.8%; n = 29); state/local government (3.4%; n = 21); and other (3.9%; n = 24). The average salary was \$80,000 - \$90,000, ranging from less than \$50,000 to more than \$200,000.

Gender and Salary In the Biosafety Profession

David Gillum*, Irene Alvarez Mendoza*, and Jennifer Marmo**

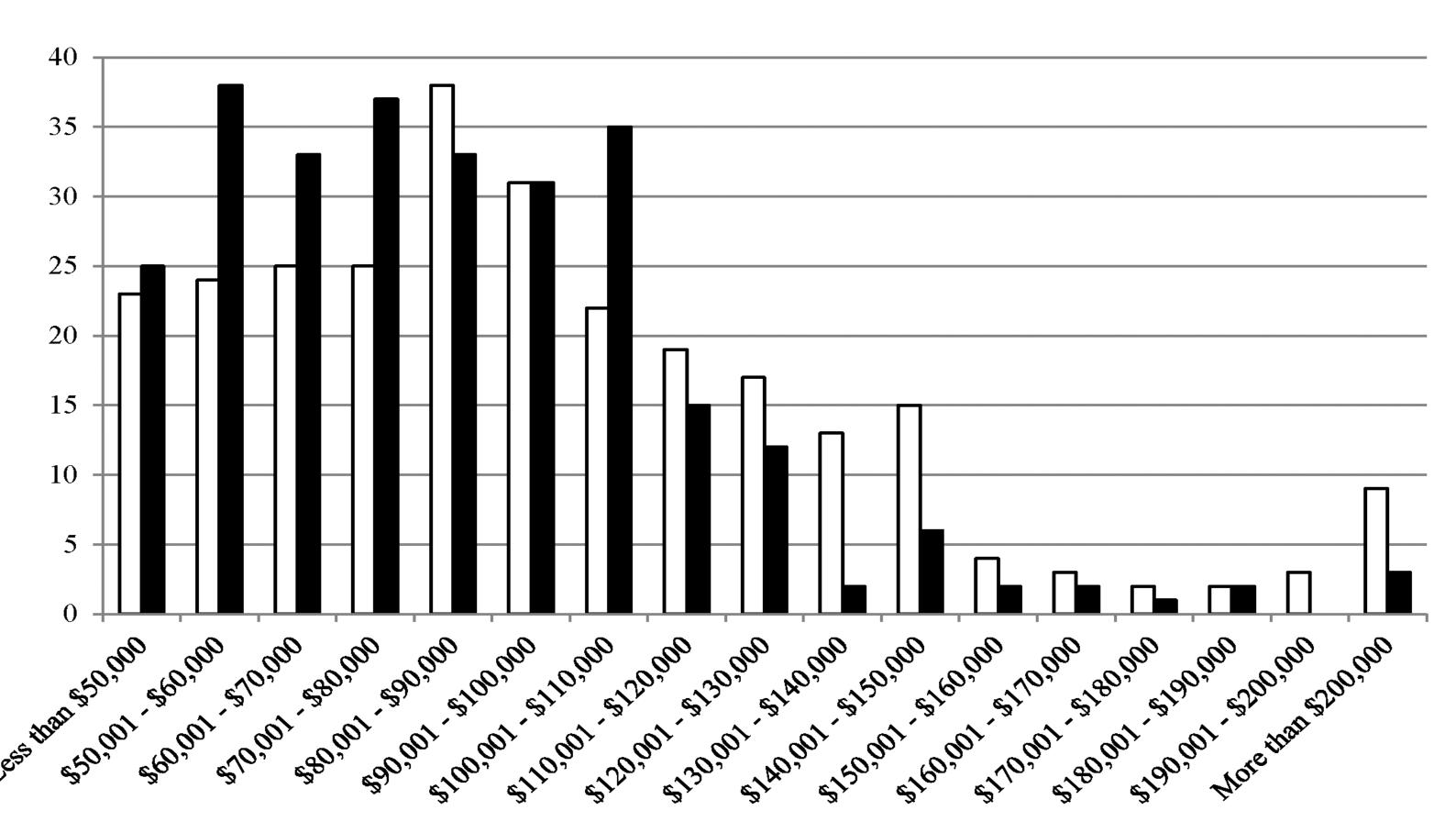
* Arizona State University. ** State of Arizona Department of Education.

HYPOTHESES

- Hypothesis 1: Men report higher salaries than women.
- Hypothesis 2: Individuals with more years of experience in the biosafety field report higher salaries than those with fewer years of experience.
- Hypothesis 3: Individuals with more biosafety certifications report higher salaries than those with fewer biosafety certifications.
- Hypothesis 4: Individuals performing data entry as part of their job report lower salaries than those who do not.
- Hypothesis 5: Individuals working at institutions with high-containment facilities report a higher salary than those who do not.
- Hypothesis 6: Individuals working at institutions with dual-use activities report a higher salary than those who are not.
- Hypothesis 7: Individuals working at institutions with select agents programs report a higher salary than those who are not.

Research Question: What factors predict salary for biosafety professionals?





□Male ■Female

 Table 1. Average Salary Ranges for Men and Women Based Upon Years of Experience

	<1 Year	1-4 Years	5-9 Years	10-14 Years	15+ Years
Female	\$50,001-60,000	\$60,001-70,000	\$70,001-80,000	\$90,001-100,000	\$90,001-100,000
Male	\$60,001-70,000	\$60,001-70,000	\$80,001-90,000	\$90,001-100,000	\$100,001-110,000

Table 2. Reported Number of Biosafety Certifications for Men and Women

	RBP Certification	CBSP Certification	RBP & CBSP	No Certification
Female	47	31	26	179
Male	49	23	16	189

Table 3. Salary Ranges for Men and Women by Biosafety Certification

	RBP Certification	CBSP Certification	RBP & CBSP	No Certification
	KDP Certification	CDSF Certification	Certifications	INO CERTIfication
Female	\$80,001-90,000	\$90,001-100,000	\$100,001-110,000	\$80,001-90,000
Male	\$90,001-100,000	\$100,001-110,000	\$100,001-110,000	\$90,001-100,000

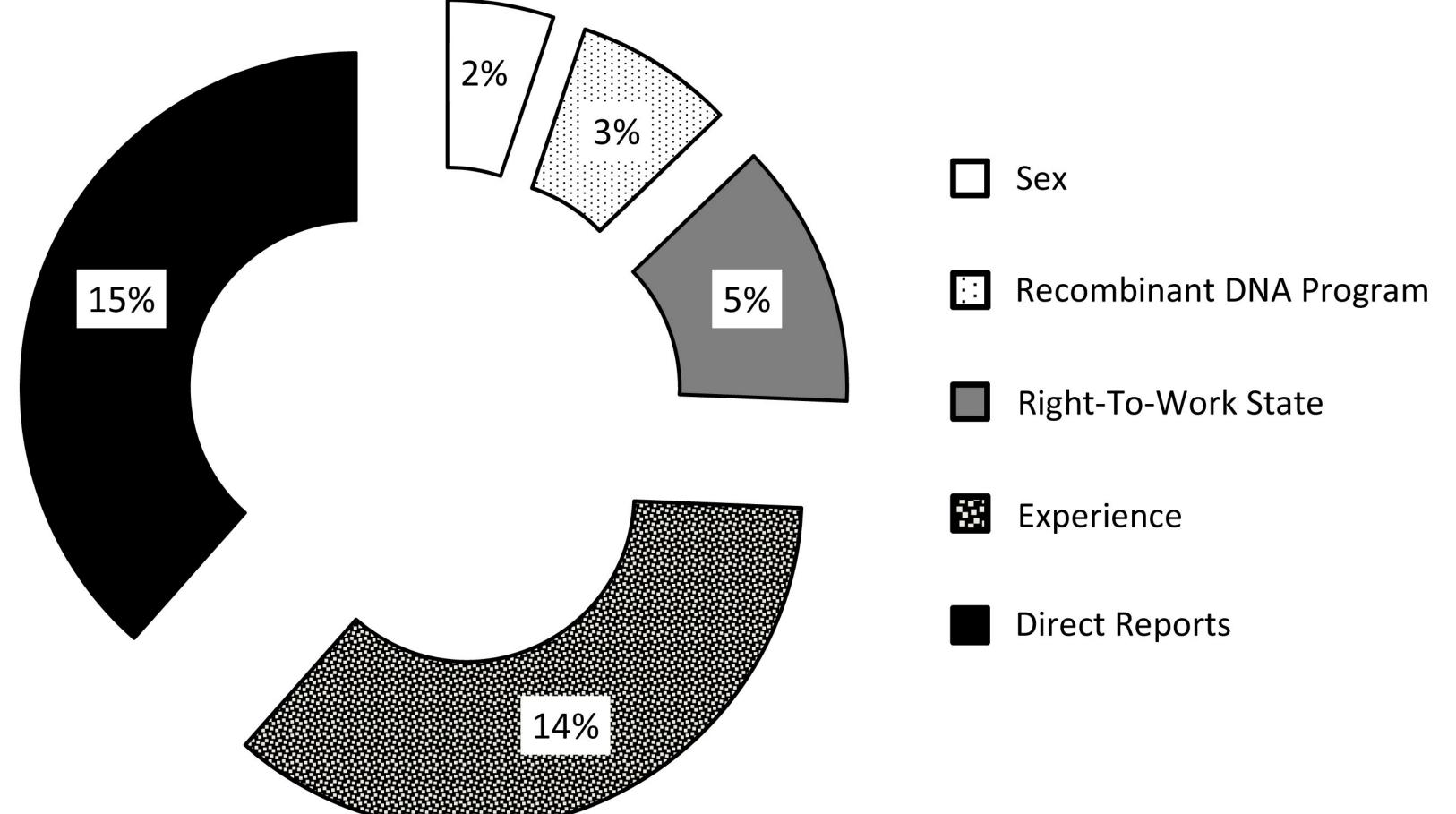


RESULTS

The number of years of experience that an individual possesses is a significant predictor of salary. Individuals with less than 1 year of experience reported lower salaries than those with more experience. Of the variables examined, five were found to significantly predict salary:

- 1) Sex;
- 2) Years of experience;
- 3) Number of direct reports;
- ic nucleic acids; and

These factors explain 38% of why someone receives the salary they do. Individually, having direct reports contributes the most (15%), followed by years of experience (14%), then living in a right-to-work state (5%), then working in a recombinant DNA program (3%) and finally sex (2%). As is evident, having direct reports and greater years of experience contributes the largest proportion to an individual's salary.



CONCLUSIONS

Several factors predict salaries of individuals in a particular field. The analysis is useful for scholars from diverse disciplines as a method to develop a baseline for determining salaries in new and existing job markets, to demonstrate the importance of certain key factors, and to develop strategies to address the salary gap between men and women. Future studies could include a more detailed analysis of the prescriptions, rules, and social norms that impact salaries for men and women.

REFERENCES

- 1. Long, 2001.
- 2. U.S. Census Bureau, 2008.
- 3. Casselman, 2013.
- 5. Babcock et al., 2003; Leibbrandt, 2012.
- 6. Women in Science, 2013.

For more information, please refer to: Gillum, David., Irene Mendoza and Jennifer Marmo. "Salary Indicators for Biosafety Professionals." Applied Biosafety. 18.3 (2013):106-115.



4) Whether an individual is involved with the oversight of recombinant and synthet-

5) Whether someone works in a right to work state.

4. Nosek et al., 2009; Raymond, 2013; Shen, 2013.

