Distribution Statement

Distribution A: Public Release.

The views presented here are those of the author and are not to be construed as official or reflecting the views of the Uniformed Services University of the Health Sciences, the Department of Defense or the U.S. Government.

Exploring Mentorship in Military Medicine through the Undergraduate Medical Education perspective

by

Col Kerry Latham, USAF, MC, FS

Thesis submitted to the Faculty of the
Health Professions Education Graduate Program
Uniformed Services University of the Health Sciences
In partial fulfillment of the requirements for the degree of
Masters in Health Professions Education 2019

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
DEPARTMENT OF MEDICINE
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814-4799
www.usuhs.edu

March 2, 2020

APPROVAL SHEET

Title of Thesis: **Exploring Mentorship in Military Medicine through the Undergraduate Medical Education Perspective**

Name of Candidate: Col Kerry Latham, USAF, MC, FS

3 MAR 2020 THESIS AND ABSTRACT APPROVED:

DATE:

[redacted]

3/3/20

Anthony R. Artino, Jr., PhD
DEPARTMENT OF MEDICINE
Committee Chairperson

[redacted]

3/3/20

Steven J. Durning, MD, PhD
DEPARTMENT OF MEDICINE
Thesis Advisor

[redacted]

3 Mar 20

Paul A. Hemmer, MD, MPH
DEPARTMENT OF MEDICINE
Thesis Advisor

ACKNOWLEDGMENTS

I am grateful for the mentorship and guidance provided to me by my research mentors, Dr. Steven Durning and Dr. Paul Hemmer. I am particularly indebted to Dr. Alexis Battista and the Long Term Career Outcomes Study (LTCOS) team who included me in their research and provided me further opportunities to be involved in research to understand gender and military medicine. Dr. Bautista is an incredible mentor who is skilled in guiding mentee growth and development and giving timely, effective direction to move the research further. Her expertise as a writer, educator, collaborator, and leader have made a significant impact on me and my interest in research.

The author hereby certifies that the use of any copyrighted material in the thesis manuscript entitled:

Exploring Mentorship in Military Medicine through the Undergraduate Medical Education perspective

is appropriately acknowledged and, beyond brief excerpts, is with the permission of the copyright owner.

Col Kerry Latham, USAF, MC, FS
MHPE
Uniformed Services University
Date 03/18/2020

DISCLAIMER

The views presented here are those of the author and are not to be construed as official or reflecting the views of the Uniformed Services University of the Health Sciences, the Department of Defense or the U.S. Government.

ABSTRACT

Exploring Mentorship in Military Medicine through the Undergraduate Medical Education perspective

Kerry Latham, MD 2019

Thesis directed by: Paul A. Hemmer, MD, MPH Col (ret), USAF, MC
Professor and Vice Chair, Educational Programs Department of Medicine
Uniformed Services University of the Health Sciences and
Steven J Durning, MD, PhD, FACP Professor of Medicine and Pathology
Director, Graduate Programs in Health Professions Education (HPE)
Vice Chair, Department of Medicine
Uniformed Services University of the Health Sciences

Purpose: This thesis seeks to explore mentorship in military medicine. Mentorship is thought to be critical to professional development and advancement for physicians.

Methods: Using data from the American Association of Medical College's Graduate Questionnaire, a survey sent to all medical students prior to graduation, items were coded as related to mentorship, guidance, and support and analyzed to compare responses of female and male students from graduating USU classes of 2010-2017.

Results: No significant difference was found between experiences of female and male survey respondents. Equitable experiences were consistent across time for the eight years of the study.

Conclusions: The UME cohorts at USUHS do not report experiencing disparity in perceptions of mentorship. It is reassuring that there is equity in military UME. Mentorship and equity should be studied at all levels of physician development.

TABLE OF CONTENTS

CHAPTER 1: Introduction

Gender disparity exists in civilian academic medicine.[1] Lack of female mentors, lack of confidence, sexual harassment, personal choice, child rearing, work life balance issues, and lack of opportunity in current academic medicine culture have all been cited as reasons for gender disparity in the civilian sector.[1-8] Despite recent studies[9] that show women physicians have better patient outcomes, studies in the civilian community have shown that they receive less grant funding, are paid less, are less likely to promote to Full Professor, and less likely to hold leadership positions such as residency program director and service chief than men.[10] As an example, within the field of Surgery, women are only 10% of full professors, [1-9] and 0.1% of Chairs of Surgery, despite the fact that rates of women in surgery residency increased from 13% in 2003 to 37% in 2014. Promotion and advancement is not keeping pace with the increase presence of women in surgery.[2]

There is little comparable literature on the military medical community with respect to gender differences as well as the potential impact of mentorship. Vertrees, et. al. found that gender differences between military and civilian medical students going into surgery happens before entry into medical school and that military female medical students are just as likely to enter surgery as their male counterparts.[11] Additionally, they reported that in the ten years from 2002 to 2012, female medical students at the Uniformed Services University (USU) represented 29% of the graduates increasing over that period from 21% to 39%. [11] Similarly, military females in 2002 and 2012 were 20% and 36% of surgical intern classes. This supports there is equity of experience at the

military undergraduate medical education (UME) level, suggesting that disparity may be apparent at later stages of physician development.

As the military Medical Corps workforce is changing, mentorship may play a key role to provide support and guidance to recruit, train, and retain the best talent with a mindset toward equity and inclusivity. Studies examining mentorship in medical education reveal that having access to, and receiving advice, problem solving, or support (i.e., mentoring activities) from a mentor can have positive impacts on career advancement, promotion and specialty selection - especially among women.[12] Mentorship is a key to professional development in academic medicine because mentors can positively influence personal development, offer career choice guidance, and enable research productivity, including providing access to opportunities to participate in publications and grants and supporting access to leadership opportunities.[12,13] Mentoring, especially among underrepresented populations, provides mentees with critical guidance and support (e.g., social or academic) that helps them overcome obstacles and challenges.[14] In turn, mentees develop characteristics and qualities that enable a successful career trajectory, including the ability to persist, which contributes to long-term success.[15] Universities and academic institutions are increasingly aware of the importance and benefits of mentorship to both the mentee and the mentor. For example, a meta-analysis conducted by Ghosh and Reio suggests that mentoring is reciprocal and that individuals who participate as a mentor report greater job satisfaction and commitment to their organization.[16] Some medical schools have developed formal, structured mentoring programs, often referred to as a top-down approach, ensuring that systems are in place to provide mentoring.[17] Others employ peer mentor groups as an

additional or alternate solution.[18] Levine and colleagues[19] and Babaria and colleagues[20] further emphasize that it may be important for mentees to have mentors they can identify with socially and culturally earlier in their medical careers.

The military has developed many formal mentoring programs but these largely focus on leadership and professional military development rather than diversity and inclusion in medicine.[21] Similar to the civilian sector, findings in these few studies suggest that mentees within the military report experiencing enhanced job satisfaction and greater access to opportunities to participate in research activities, with the additional outcome of a willingness to remain in the military.[21-4] Having access to a mentor may play a role in mitigating the challenges of military medical practice, such as multiple deployments, being required to practice outside of one's scope of practice, maintaining credentials and achieving recertification, and practicing in austere environments.[21]

Although the military medical corps workforce is male dominated it has become more inclusive and diverse. Great strides have been made to increase female representation in medical school classes and residencies. The civilian sector has led this change but the military has caught up nicely. Defense Manpower Data Center (DMDC) data showed women represent between 30-40% of physicians with a smaller percentage of female surgeons (24% in 2017 up from 13% in 2005). Even though the workforce is becoming more gender balanced, there remains a paucity of women in academic leadership (such as program director) or research leadership positions. Compared to men, the DMDC data shows women had a higher attrition rate when their service commitment was up and were less likely to continue to serve until retirement from 2005 to 2017.

Given the rising number of women in medicine, including at USU, the increased emphasis on understanding women's experiences, and the essential role that mentoring can play in helping women advance, it is important to understand mentorship, guidance and support experience throughout military members' careers. Evaluating mentorship in UME provides an understanding of this activity at the start of a military medical career. Specifically, questions that arise include: What are USU women medical students' self-reports of mentorship, guidance and support as compared to men? Are there differences in USU student experiences with respect to mentorship over time and between men and women?

This thesis focuses on mentorship for men and women as they enter military medical education to evaluate for any perceptions of disparity. This is of particular relevance given the rising number of women in medicine, including at USU, the increased emphasis on understanding women's experiences, and the essential role that mentoring can play in helping women advance. More specifically, the purpose of this thesis is to explore female medical students' self-reports of mentorship during their time at USU; whether women report similar levels of mentorship as compared to men; and whether levels of characteristics associated with mentoring (e.g., social support, academic guidance) changed over time.

Theoretical framework

The theoretical framework for the mentorship study was Grounded theory.[25] Grounded theory is a systematic methodology in the social sciences involving the construction of theories through methodical gathering and analysis of data. This research

methodology uses inductive reasoning, in which the premises are viewed as supplying *some* evidence for the truth of the conclusion.

All USU medical students take the Graduation Questionnaire (GQ) survey and this data is collected and reported by the Association of American Medical Colleges (AAMC). This survey asks questions to all the graduating medical students across the United States regarding their experience and their education. Included in those questions are topics including mentorship, guidance and support. Using grounded theory, the questions of interest were sorted into themes. We were able to use existing data over several years with full student participation to apply grounded theory to support our premise and providing some evidence for our findings about mentorship at USU.

Mentorship was selected as the topic of study because of the importance of social learning theory in medical education. [26] Through this lens, growth and development will occur when certain conditions are evident such as reflection, challenge, and support.[26] Mentoring is an important process that is critical to a person's development.[31] Social learning theory and apprenticeship models explain that people emulate the behavior of those they respect and admire.[27] Medicine is a career of life long learning where social learning theory is important throughout a physicians' career.

CHAPTER 2: Uniformed Services University Medical Student Mentorship Experiences and Gender From 2010 to 2017

This chapter's content was accepted for publication in *Military Medicine* on 31 Oct 2019.

Author Information: Col Kerry Latham, USAF, MC, FS [1]Ting Dong, PhD [2]Deanna Schreiber, MS [2]Dario Torre, MD PhD[2]Steve Durning MD PhD [2]Alexis Battista, PhD [2]

[1] Department of Surgery, Walter Reed National Military Medical Center, 8901 Rockville Pike Bldg 9 Rm 2612 20889

[2] Graduate Programs in Health Professions Education, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, MD, 20814

Acknowledgements: Dr. Paul Hemmer

Funding/Support: none

Other Disclosures: none

Ethical Approval: none

Disclaimer: The views expressed are solely those of the authors and do not reflect the official policy or position of USU, the US Army, US Navy, US Air Force, the Department of Defense, or the US Government.

Abstract

Introduction: Gender disparity in Medicine has drawn increased attention in the form of root cause analysis and programmatic solutions with the goal of equity. Research indicates that mentoring, guidance, and support, which include the provision of social and academic guidance and support from more experienced practitioners, can mitigate challenges associated with gender disparity. The purpose of this study was to explore women medical students' self-reports of mentorship during their time at Uniformed Services University (USU), if women report similar levels of mentorship as compared to

men, and if levels of characteristics associated with mentoring (e.g., social support, academic guidance) changed over time.

Materials and Method: Using data from the American Association of Medical College's Graduate Questionnaire, a survey sent to all medical students prior to graduation, items were coded as related to mentorship, guidance, and support and analyzed to compare responses of female and male students from graduating USU classes of 2010-2017.

Results: No significant difference was found between experiences of female and male survey respondents. Equitable experiences were consistent across time for the eight years of the study.

Conclusions: Although mentorship is cited as a key factor in mediating gender disparity in medicine, other STEM fields, and the military, the findings suggest there is equity at the USU undergraduate medical education level. Further studies are needed to understand if disparities in mentorship experiences occur at other stages of a military physician's career, such as graduate medical education, faculty and academic promotion levels.

Background

Gender disparity, defined as a lack of equality or similarity, persists in measures of success such as salary, leadership positions, and promotion in fields including Science, Technology, Engineering, and Math (STEM), the military, and medicine.[1-3] Today, women are increasingly represented in the physician workforce, with the number of women matriculating to medical schools in the United States (U.S.) exceeding the number of men yet, despite these gains, women in medicine, along with other STEM-

related fields, frequently cite a lack of mentorship as one of the most significant and common barriers to career advancement.[4] Reasons for this lack of equity are complex and multifactorial, but one of the most commonly cited factors in medicine and other STEM-related fields is limited access to mentoring, which includes the provision of social and academic guidance and support from more experienced practitioners provide to individuals which helps others succeed.

Studies examining mentorship in medical education reveal that having access to, and receiving advice, problem solving, or support (i.e., mentoring activities) from a mentor can have positive impacts on career advancement, promotion and specialty selection - especially among women.[5] Mentorship is especially key to professional development in academic medicine because mentors can positively influence personal development, offer career choice guidance, and enable research productivity, including providing access to opportunities to participate in publications and grants and supporting access to leadership opportunities.[5, 6] Mentoring, especially among underrepresented populations, provides mentees with critical guidance and support (e.g., social or academic) that helps students overcome obstacles and challenges.[7] In turn, mentees develop characteristics and qualities that enable a successful career trajectory, including the ability to persist, which contributes to long-term success.[8]

Universities and academic institutions are increasingly aware of the importance and benefits of mentorship to both the mentee and the mentor. For example, a metaanalysis conducted by Ghosh and Reio suggests that mentoring is reciprocal and that individuals who participate as a mentor report greater job satisfaction and commitment to their organization.[9] Some medical schools have developed formal, structured mentoring

programs, often referred to as a top-down approach, ensuring that systems are in place to provide mentoring. [10] Others employ peer mentor groups as an additional or alternate solution. [11] Levine and colleagues[12] and Babaria and colleagues[13] further emphasize that it may be important for mentees to have mentors they can identify with socially and culturally earlier in their medical careers.

Results of research examining these programs are mixed. Programs in Undergraduate Medical Education (UME) indicate that students report having a high satisfaction and that mentoring can lead to increased professional and research opportunities.[14] However, while some studies suggest that formal programs can benefit female physicians, [10] others indicate that women report more difficulty finding mentors than their male peers, and mentoring is not always a positive experience.[15] Given the potentially positive outcomes of mentoring, these studies suggest that research should examine both women's and men's experiences of mentoring.

Mentoring in military medicine

The military has developed many formal mentoring programs with a focus on leadership and professional development[16] but mentoring programs emerging in military medicine are infrequently reported in the literature. Similar to the civilian sector, findings in these few studies suggest that mentees report experiencing enhanced job satisfaction and a willingness to remain in the military, and when directed at medical trainees, can result in greater access to opportunities to participate in research activities.[16-19] Having access to a mentor may play a role in mitigating the challenges of military medical practice, such as multiple deployments, being required to practice outside of one's scope

of practice, maintaining credentials and achieving recertification, and practicing in austere environments.[16]

However, less attention has been dedicated to this issue within undergraduate military medicine. Instead, the few studies examining mentoring have examined the post-graduate population (e.g., residents, attendings) and nurses. Furthermore, similar to the civilian sector, only one study examined differences in women's and men's experiences, noting that men were more likely to report benefits associated with mentoring, such as job satisfaction.

Also, since Uniformed Services University (USU) is the only military medical school in the United States, where students combine the careers of both medicine and the military, there is relevance in exploring this topic at this institution. A recent study indicated that, like civilian sector medical schools, USU has experienced a parallel, albeit delayed, growth in women's enrollment.[20] Importantly, the military context may offer a unique opportunity to help inform this discussion as there should be no differences in the military system in terms of pay, rank, and leadership role given the emphasis on equality and work culture (e.g. code of conduct), which differs from civilian institutions.

Given the rising number of women in medicine, including at USU, the increased emphasis on understanding women's experiences, and the essential role that mentoring can play in helping women advance, the purpose of this study was to explore female medical students' self-reports of mentorship during their time at USU, if women report similar levels of mentorship as compared to men, and if levels of characteristics

associated with mentoring (e.g., social support, academic guidance) changed over time. The research questions were:

1. What are USU women medical students' self-reports of mentorship, guidance and support as compared to men?
2. Are there differences in USU student experiences with respect to mentorship over time and between men and women?

Methods

Study design and procedure

We conducted an exploratory retrospective descriptive analysis drawing from the Association of American Medical Colleges (AAMC) Graduate Questionnaire (GQ) after Institutional Review Board (IRB) approval. The GQ was established in 1978 as a method for the AAMC, medical schools, and other organizations to identify and address issues critical to the future of medical education and the well being of medical students. Among the issues addressed in the GQ surveys include: students' satisfaction with their educational program's ability to prepare medical students for residency; students' experiences of academic support; students' career and specialty plans; and students' experiences in diverse learning activities (e.g., clerkships, electives). Since its inception, data from the GQ has been used by medical schools, faculty, students, researchers, and the Liaison Committee on Medical Education (LCME) for benchmarking and improving medical education. Deidentified GQ items coded as related to experiences of mentorship, guidance and support were selected (see next section) for USU School of Medicine

(SOM) students for the recent graduating years of 2010 to 2017 to examine women's self-reported experiences as compared to USU men.

GQ item selection

We conducted a multi-phase analysis of the GQ codebook to identify variables that were thematically representative of mentoring (e.g., professional and personal assistance[21]), guidance or support (e.g., social or academic). We also identified variables that were likely to be affected by mentoring, guidance and/or support that were central to the undergraduate medical school experience, such as partaking in electives, career or specialty choices and clerkship experiences.

Phase one. To identify data in the GQ database three researchers jointly screened each of the 462 variables listed in the GQ codebook for possible inclusion. Coders read each variable description and definition for language that was consistent with characteristics or key terms related to mentoring, guidance, or support. For instances in which the coders disagreed, we discussed the variable, reviewing it against our operational definition of mentoring (e.g., the provision of social and academic guidance and support from more experienced practitioners) and key terms, until we reached consensus. Of 462 potential variables, we selected 128 for further consideration.

Phase two. Next, drawing on Charmaz's approach to grounded theory analysis, we (XX, YY, ZZ) conducted an initial coding pass of the selected 128 variables to identify themes or groups of variables [21-22]. The coders re-read each of the included variables and assigned potential categorical names. To achieve this, we re-read each variable, variable description and generated preliminary codes.

Phase three. To guide decisions about which coded categories to include or exclude, we presented our initial findings to an interpretive community of four people which was comprised of individuals who had not yet had prior exposure to coding efforts in phases one and two.[23] We presented our selected variables and their coded categories line-by-line and discussed which codes were a best fit for our research questions. We also re-examined included variables for consistency in data ranges, focusing on complete data sets between 2010 - 2017. Two selected categories, clerkships and faculty support, did not include data for the full date range. We chose to include clerkship experiences because research suggests that women often report higher rates of gender discrimination during their clerkship experiences when compared to the first two years of medical school[24]. Faculty support directly related to the constructs of guidance, mentoring and support, thus we also elected to include this variable.

This resulted in the elimination of an additional 45 variables leaving a total of 83 variables grouped into six categories for analysis (Table 1).

Statistical analysis

We calculated the score of each of the six categories by taking the mean of all the items coded as belonging to the particular category. We analyzed the descriptive statistics of the six categories of selected survey items and conducted an independent samples *t*-test to examine whether the differences of ratings on these categories were statistically significant between genders. We also examined the average ratings of female versus male students across graduating years by generating line charts.

Results

Sample demographics and response rate

A total of 1309 surveys were included for analysis; 397 were women and 912 were men. Response rates were similar for women and men for all included years ranging from 2010-2017. The gender distribution of the study cohort between 2010 and 2017 and their corresponding GQ survey response rates are shown in Table 2.

USU female and male medical students' self-reports of mentorship

Table 3 shows the means, standard deviations, and sample sizes of the six categories of survey items aggregating the data of USU SOM graduating classes of 2010 to 2017. It also shows the results of independent samples *t*-tests between genders. While the differences between men and women's ratings of academic support and clerkship experiences were small (Cohen's *d* of .14 and .19 respectively), they reached marginal statistical significance. Men scored their academic support higher and women their clerkship experience higher. Meanwhile, there were no statistically significant differences in the other mentoring categories: ratings of career choice planning, educational experiences, electives, and faculty support. These results appear stable over time.

Figure 1 reflects the average ratings of female students as compared to male students on Academic support, Career choice planning, Educational experiences, Electives, Clerkship Experiences, and Faculty Support survey items longitudinally across the graduating years of 2010 - 2017. The figure suggests that experiences for both men and women were similar.

Discussion

Mentorship, or the lack thereof, is an important factor that can mitigate challenges that contribute to gender disparity in medicine and other STEM fields.[1-3] We examined USU women medical students' experiences with respect to mentorship, guidance, and support, comparing them to men's experiences. Our study suggests two important findings. The first is that there was no meaningful difference in experiences for USU women and men based on their responses to the GQ survey domains we examined (e.g., mentorship, guidance), though men scored their academic support higher and women scored clerkship experiences higher. Secondly, this similarity in experiences when comparing women and men has been stable over the period ranging from 2010-2017. The findings from this study also add important insight to the broader category of studies examining mentorship experiences in the military and begin to fill in gaps involving comparisons of women and men and analyses of the UME population.

Our findings suggest that despite women's enrollment lagging behind men until 2018,[20] that USU has been able to sustain success in providing equity in reported mentorship. This is a notable achievement as gender disparity in mentorship is prevalent in STEM and in civilian UME, GME, and academic workplaces.[1-6] Although there are formal mentoring programs, interest groups, community mentoring programs and other unofficial mentoring programs most students are thought to find their own preferred mentors through these various channels.

While the scope of this study did not examine the underlying causal reasons for these findings, it is important to note that USU has multiple resources for UME students that may benefit women and men. For example, USU has numerous robust and well-attended interest groups (e.g., internal medicine, surgery), which often serve to support

the transition to residency. Furthermore, social media has become a significant resource for mentorship through Facebook pages such as Military Health System (MHS), MHS women physicians, physician moms group and other sites that inform women of opportunities and provide a platform for networking and sharing experiences. Many of these activities and supports have been in place during the period of time we studied.

USU also maintains a robust faculty development program which offers regular workshops and seminars in a variety of topics, including leadership, assessment, research design and conduct, and teaching, to name a few. Notably, although these courses may not formally teach mentoring, they may include subject matter that could be related to equity or mentoring. Research related to mentoring does suggest that to enhance and improve mentoring experiences, that the training of mentors is vital.[25] It will be important to continue to sustain and maintain currency in these programs to keep pace with the changing gender demographics of the USU UME classes to ensure sustained equity of experience.

Our study had several limitations. The AAMC GQ tool, while sent to all medical students, was not answered by all students. The GQ does not allow for additional questions to be introduced. Therefore, we were not able to further explore what aspects of mentorship worked well for the medical students at USU (e.g., special interest group participation, social media). Another limitation is that the GQ tool was not specifically designed to assess mentorship and is an indirect way to assess the student experience. We determined which variables on the GQ were most appropriate for the six categories of mentorship that we created and summing the means of the variables within the categories

implies a relationship among the variables that may not exist or may not have been intended by the survey authors.

Future studies could include analysis of experiences of mentorship at different stages of women's military medical careers (e.g., graduate medical education, fellowship, post-graduate, academic medicine). This may be of particular importance given that research indicates that women are more likely than men to leave the military once their initial service obligation is complete and because research suggests that access to mentoring can lead to job satisfaction and intentions to stay.[9, 26] In addition, given that this study examined the cumulative experiences of graduating students (women and men) between 2010 - 2017, we were unable to examine the year-to-year experiences of students which may reveal reasons why there were differences in men's reporting of academic support and women's' reports related to clerkship experiences. Also, given that some studies suggest that there are personal and professional benefits of being engaged in a mentoring relationship for both students and faculty, future research could also examine this important relationship. Lastly, given that these findings suggest that USU may be successful when it comes to equity in the mentorship experiences of UME students, another future opportunity could include examining reports of mentoring and guidance with United States civilian medical schools. Now that equity of mentorship experiences in UME at USU is established, we plan to explore how USU UME is able to successfully create an environment that fosters equity in mentorship, support, and guidance and to see if that could be applied at later career stages or to other sectors struggling to resolve gender disparity issues in mentorship.

Conclusions

Mentorship is thought to be a key factor leading to disparity in advancement for men and women in academic medicine. In our study evaluating military medical students self-reports' of mentorship suggests that USU has been able to provide all students equity in mentorship for medical students based on their self-reporting in the GQ survey. This success was shown to be stable over the eight year period studied.

Table 1. *Summary of Coded Categories, Operational Definitions, and Selected GQ Items*

Category Code Name and	**Operational Definition**	**Included GQ Items**
Academic Support (*n* = 14)	Addresses formal educational services or resources provided to students in an effort to provide social or academic support. This included questions related to receipt of counseling, social or personal guidance, feeling 'heard', responsiveness of faculty or administration representatives, and reported awareness of administration to student problems.	201,202,203,208,212,342,382,403,404,405,416,423,424,425
Career Choice/Planning (n = 29)	Addresses social factors, processes, and activities associated with choosing a career path. These questions included variables that may influence career choice, such as work life balance (e.g., plans to work full or part time), plans for continued advancement via fellowship, research, or entry to academic medicine.	102, 214, 215, 216, 230, 231, 233, 234, 235, 236, 244, 248, 250, 251, 253, 254, 256, 257, 258, 259, 304, 308, 309, 379, 380, 381, 387, 388, 391
Clerkship Experiences (*n* = 27)	Refers to items focusing on clerkship experiences.	43, 44, 45, 46, 47, 48, 49, 50, 51, 53, 57, 58, 60, 64, 65, 67, 71, 72, 74, 78, 79, 81, 85, 88, 92, 93, 344
Educational Experiences (*n* = 5)	Refers to items focusing on self-reports of achievement, confidence, and quality related to educational programing.	177, 406, 407, 408, 409
Electives (*n* = 11)	Refers to items focusing on coursework or educational programing in which students self-selected the activity.	103, 105, 106, 107, 108, 109, 116, 117, 196, 197, 207
Faculty Support (*n* = 1)	Refers to questions that directly examined student's perceptions of faculty support.	402

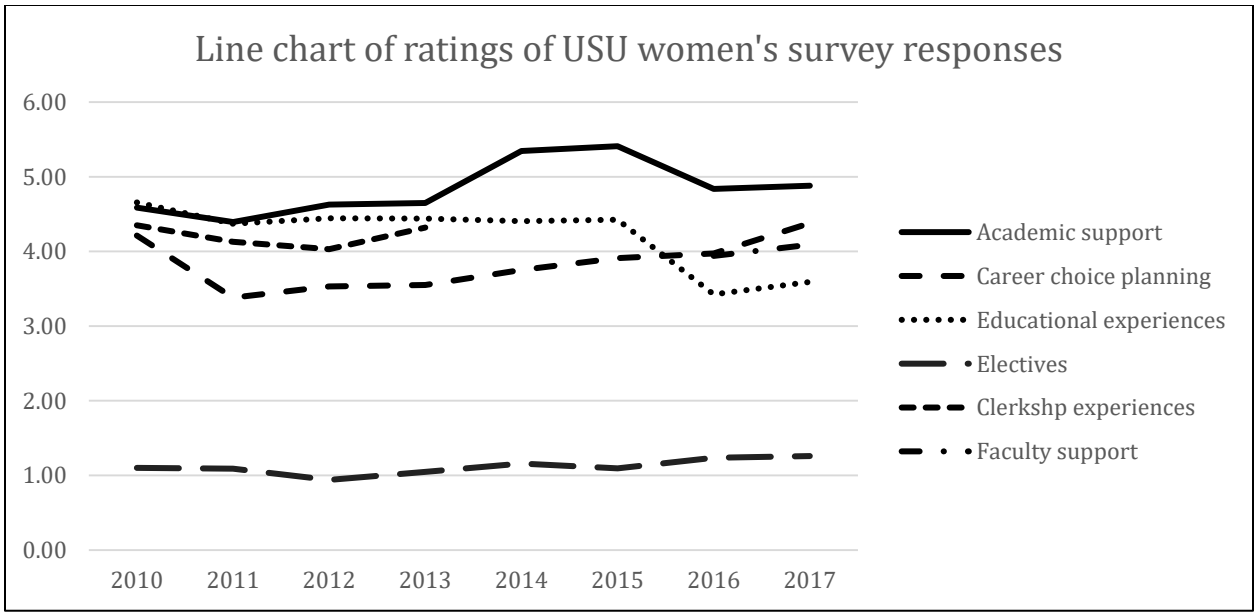
Note: Coded categories and selected AAMC GQ items were drawn from a version of the of the GQ Codebook last updated on October, 19, 2017 and retrieved on November 7, 2017.

Table 2. *USU Class Size and Makeup by Gender and Year (2010-2017)*

Year of Graduation	Gender & Response Rate Per Year			
	Female (*n*)		Male (*n*)	
	No. of Graduates	Response Rate	No. of Graduates	Response Rate
2010	40	85%	131	81%
2011	58	71%	106	68%
2012	50	64%	113	62%
2013	41	76%	120	71%
2014	48	88%	118	85%
2015	44	100%	112	96%
2016	59	95%	108	90%
2017	57	82%	104	84%

Table 3. *Average Ratings of Female vs. Male Students on the Survey Items for Classes 2010 to 2017*

	Female students			**Male students**			***t*-test**		
	Mean	SD	*N*	Mean	SD	*N*	*t* statistic	*P* value	95% CI
Academic Support	4.88	.98	304	5.02	1.09	659	-2.00	.05	(-.28, -.002)
Career Choice Planning	3.88	1.16	300	3.87	1.26	655	.11	.91	(-.16,.18)
Clerkship Experiences	4.20	.58	132	4.08	.65	317	1.93	.05	(-.002,.25)
Educational Experiences	4.14	.78	311	4.16	.81	671	-.35	.72	(-.13,.09)
Electives	1.13	.41	317	1.15	.41	692	-.43	.67	(-.07,.04)
Faculty Support	4.01	.93	101	4.03	.91	178	-.21	.84	(-.25,.20)



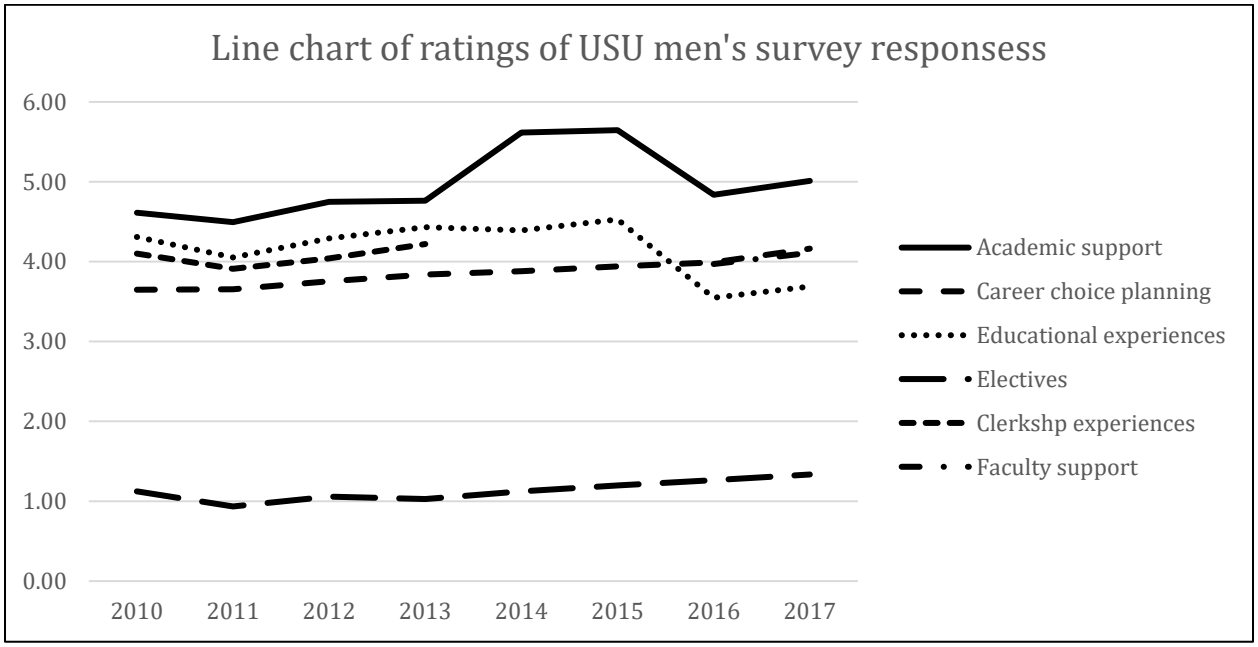


Figure 1. Line chart of self-ratings of Academic Support, Career Choice Planning, Educational Experiences, Electives, Clerkship experiences, and Faculty Support of women's and men's survey responses between 2010-17.

REFERENCES

1. Xu YJ, Martin CL. Gender differences in STEM disciplines: From the aspects of informal professional networking and faculty career development. Gender Issues. 2011 Sep 1;28(3):134.
2. Keller, KM, et al. Addressing Barriers to Female Officer Retention in the Air Force. Santa Monica, CA: RAND Corporation, 2018. https://www.rand.org/pubs/research_reports/RR2073.html.
3. Nichols C, Galbreath N, Raguindin S, Gallus J, Garst P, Rosen P, Lahm K, Cohen M, Zabecki J, Thompson J, Richards A. 2016 Workplace and Gender Relations Survey of Active Duty Members: Statistical Methodology Report. Office of People Analytics Alexandria United States; 2017 Mar 1.

4. Kashiwagi DT, Varkey P, Cook DA. Mentoring programs for physicians in academic medicine: a systematic review. Academic Medicine. 2013 Jul 1;88(7):1029-37.

5. Sambunjak D, Straus SE, Marušić A. Mentoring in academic medicine: a systematic review. JAMA. 2006 Sep 6;296(9):1103-15.
6. Ford J. Mentoring Women Psychiatry Residents: Implications for Academic Leaders and Educators. Acad Psychiatry. 2016;40(3):448-450. doi:10.1007/s40596-014-0237-1
7. Griffin KA, Perez D, Holmes AP, Mayo CE. Investing in the future: The importance of faculty mentoring in the development of students of color in STEM. New Directions for Institutional Research. 2010 Dec;2010(148):95-103.
8. Choo EK, Kass D, Westergaard M, et al. The Development of Best Practice Recommendations to Support the Hiring, Recruitment, and Advancement of Women Physicians in Emergency Medicine.Pines JM, ed. Acad Emerg Med. 2016;23(11):1203-1209. doi:10.1111/acem.13028
9. Ghosh R, Reio Jr TG. Career benefits associated with mentoring for mentors: A meta-analysis. Journal of Vocational Behavior. 2013 Aug 1;83(1):106-16.
10. Pololi L, Knight S. Mentoring faculty in academic medicine: a new paradigm? J Gen Intern Med. 2005;20(9):866-870.
11. Ragins BR, Cotton JL. Mentor functions and outcomes: a comparison of men and women in formal and informal mentoring relationships. J Appl Psychol. 1999;84(4):529-550.
12. Levine RB, Mechaber HF, Reddy ST, Cayea D, Harrison RA. "A Good Career Choice for Women": Female Medical Students' Mentoring Experiences A Multi-Institutional Qualitative Study. Academic Medicine. 2013 Apr 1;88(4):527-34.
13. Babaria P, Abedin S, Nunez-Smith M. The effect of gender on the clinical clerkship experiences of female medical students: Results from a qualitative study. Academic Medicine. 2009 Jul 1;84(7):859-66.
14. Frei E, Stamm M, Buddeberg-Fischer B. Mentoring programs for medical students-a review of the PubMed literature 2000-2008. BMC medical education. 2010 Dec;10(1):32.

15. Laver KE, Prichard IJ, Cations M, Osenk I, Govin K, Coveney JD. A systematic review of interventions to support the careers of women in academic medicine and other disciplines. BMJ Open. 2018;8(3):e020380
16. Saperstein AK, Viera AJ, Firnhaber GC. Mentorship and job satisfaction among Navy family physicians. Military medicine. 2012 Aug 1;177(8):883-8.
17. Hepburn MJ, Battafarano DF, Enzenauer RJ, Salzberg DJ, Murphy FT, Parisek RA, Kroenke K. Increasing resident research in a military internal medicine program. Military medicine. 2003 Apr 1;168(4):341-5.
18. Prevosto P. The effect of "mentored" relationships on satisfaction and intent to stay of company-grade US Army Reserve nurses. Military medicine. 2001 Jan 1;166(1):21-6.
19. Yoder LH. A descriptive study of mentoring relationships experienced by Army nurses in head nurse or nursing supervisor roles. Military medicine. 1992 Oct 1;157(10):518-23.
20. Cervero RM, Battista A, Schreiber-Gregory DN, Konopasky A, Torre D, Maggio LA, Boulet JR, Reamy BV, Durning SJ. Uniformed Services University Women's Enrollment and Career Choices in Military Medicine: A Retrospective Descriptive Analysis. Military medicine. 2018 Oct 6.
21. Saldaña J. The coding manual for qualitative researchers. Sage; 2015 Nov 2
22. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. Sage; 2006 Jan 13.
23. Maxwell JA. Validity: How might you be wrong? In, Qualitative research design: An interactive approach. Sage publications; 2012 Jun 8. Pp. 121 - 13.
24. www.rand.org/topics/gender-discrimination.html
25. Johnson, M. O., & Gandhi, M. (2015). A mentor training program improves mentoring competency for researchers working with early-career investigators from underrepresented backgrounds. *Advances in Health Sciences Education*, *20*(3), 683-689.
26. Stetto JE, Gackstetter GD, Cruess DF, Hooper TI. Variables associated with attrition from uniformed services university of the health sciences medical school. Military medicine. 2004 Feb 1;169(2):102-7.

CHAPTER 3: Discussion

Mentorship, or the lack thereof, is an important factor that can mitigate challenges that contribute to gender disparity in medicine and other STEM fields.[28-30] We examined USU women medical students' experiences with respect to mentorship, guidance, and support, comparing them to men's experiences. Our study suggests two important findings. The first is that there was no meaningful difference in experiences for USU women and men based on their responses to the GQ survey domains we examined (e.g., mentorship and guidance), though men scored their academic support higher and women scored clerkship experiences higher. Secondly, this similarity in experiences when comparing women and men has been stable over the period ranging from 2010-2017. The findings from this study also adds important insight to the broader category of studies examining mentorship experiences in the military and begin to fill in gaps involving comparisons of women and men and analyses of the UME population.

Research related to mentoring does suggest that to enhance and improve mentoring experiences, that the training of mentors is vital and this may be a target for further exploring and/or enhancing mentoring experiences at USU.[26-30] It will also be important to continue to sustain and maintain currency in these programs to keep pace with the changing gender demographics of the USU UME classes to ensure sustained equity of experience. Our findings of equity in mentorship in UME may signal that equity is being built into military medicine and professional development and that we will find similar equity at all levels as the physicians progress down the pipeline.

But, what do we know about equity as we progress down the pipeline? Previous studies have found that women in medical practice have equal engagement and aspirations as their male physician counterparts but report lower sense of belonging, support, and equity.[31] "Women are underrepresented as authors and editors, although the gap is closing. Junior women are less likely to co-author with senior men, which may be a disservice given current gender disparities in promotion and leadership."[1] Consistent with these findings and social learning theory, enhancing mentoring of women across the continuum of their medical careers may help to mitigate these findings.

Further qualitative studies have revealed gender differences in academic medicine. A study from 2000 showed "significant gender differences in faculty salaries, ranks, tracks, leadership positions, resources, and perceptions of academic climate. On average, women earned fewer US dollars ($12,777, or 11% less) than men, after adjusting for rank, track, degree, specialty, years in rank, and administrative positions ($p < .0003$). Of female faculty, 62% were assistant professors (49% of women were on-tenure-eligible assistant professors), while 55% of male faculty were promoted and tenured. Almost a third of women reported being discriminated against, compared with only 5% of men ($p < .00001$)."[32] Additionally, civilian literature supports that the gender disparity is more apparent as careers progress. Finally, the available military literature on academic promotion and the AAMC data identifies that there is a paucity of women who have attained titles of Professor or who are represented in senior leadership positions such as Dean or Department Chair.[33]

How do we reconcile our findings of equity in mentorship, guidance and support in UME with aforementioned literature in GME and professional practice, which

demonstrates gender disparity? It could be that UME experiences do not persist into the hectic clinical environment of practice, which should be a subject of future study. Indeed, we are unaware of experiences of gender equity in mentoring at other medical schools, which could also be explored. We prefer to hypothesize that a positive change in culture has already been made at USU and moving forward equity will continue. However, data from the military is still showing reduced academic promotion rate, higher attrition and fewer leadership positions for women and this data should continue to be monitored to see if positive UME experiences mitigate these findings. We suspect these other indicators will also continue to improve over time, but we also believe that it is important to evaluate mentorship and equity at all points in a military physician's career to better understand the experience and be aware of any biases or inequities so they may be corrected. It may be that those who are senior faculty now (the current culture) are products of a different culture (their med school experience would have been different than what was found in the current AAMC study) and that we are simultaneously changing the existing culture with the growth of new. As more senior military faculty retire and are replaced by new faculty, we should observe for desired changes in gender equity.

Recommendations for Future Directions

Our findings suggest that despite women's enrollment lagging behind men until 2018,[34] USU has been able to sustain success in providing equity in reported mentorship experiences. This is a notable achievement as gender disparity in mentorship is prevalent in STEM and in civilian UME, GME, and academic workplaces.[1,3,14] Although there are formal mentoring programs, interest groups, community mentoring programs and other unofficial mentoring programs most students are thought to find their own preferred mentors through these various channels.[35] Future directions should seek to understand the mentorship, guidance, and support experiences for physicians at other levels in their career including GME, junior and senior faculty. There may be opportunities to incorporate some of the successful strategies at USU UME later in GME and in faculty development.

Another future direction includes exploring the impact of the lack of same-gender role models at the higher levels of advancement and achievement for military physicians. Further studies to explore inclusion and diversity at higher levels of military academic achievement are indicated as well as exploring strategies to enhance equity. Enhancing our understanding of gender differences in military academic medicine is needed in order to optimize equity, inclusion and diversity at all professional levels.

REFRENCES

1. Seemann NM, Webster F, Holden HA, et al. Women in academic surgery: why is the playing field still not level? *Am J Surg.* 2016;211(2):343-349.
2. Webster F, Rice K, Christian J, et al. The erasure of gender in academic surgery: a qualitative study. *Am J Surg.* 2016;212(4):559-565.
3. Sexton KW, Hocking KM, Wise E, et al. Women in academic surgery: the pipeline is busted. *J Surg Educ.* 2012;69(1):84-90.
4. Bates C, Gordon L, Travis E, et al. Striving for Gender Equity in Academic Medicine Careers: A Call to Action. *Acad Med.* 2016;91(8):1050-1052.
5. Abelson JS, Chartrand G, Moo TA, Moore M, Yeo H. The climb to break the glass ceiling in surgery: trends in women progressing from medical school to surgical training and academic leadership from 1994 to 2015. *Am J Surg.* 2016;212(4):566-572 e561.
6. Carr PL, Gunn C, Raj A, Kaplan S, Freund KM. Recruitment, Promotion, and Retention of Women in Academic Medicine: How Institutions Are Addressing Gender Disparities. *Womens Health Issues.* 2017;27(3):374-381.
7. Schwarz L, Sippel S, Entwistle A, Hell AK, Koenig S. Biographic Characteristics and Factors Perceived as Affecting Female and Male Careers in Academic Surgery: The Tenured Gender Battle to Make It to the Top. *Eur Surg Res.* 2016;57(3-4):139-154.
8. Cochran A, Hauschild T, Elder WB, Neumayer LA, Brasel KJ, Crandall ML. Perceived gender-based barriers to careers in academic surgery. *Am J Surg.* 2013;206(2):263-268.
9. Sharoky, C. E., Sellers, M. M., Keele, L. J., Wirtalla, C. J., Karakousis, G. C., Morris, J. B., & Kelz, R. R. (2018). Does surgeon sex matter?: practice patterns and outcomes of female and male surgeons. *Annals of surgery*, *267*(6), 1069-1076.
10. Blumenthal DM, Bergmark RW, Raol N, Bohnen JD, Eloy JA, Gray ST. Sex Differences in Faculty Rank Among Academic Surgeons in the United States in 2014. *Ann Surg.* 2018.
11. Vertrees A, Laferriere N, Elster E, Shriver CD, Rich NM. Female military medical school graduates entering surgical internships: are we keeping up with national trends? *Am J Surg.* 2014;208(4):550-555.
12. Sambunjak D, Straus SE, Marušić A. Mentoring in academic medicine: a systematic review. JAMA. 2006 Sep 6;296(9):1103-15.
13. Ford J. Mentoring Women Psychiatry Residents: Implications for Academic Leaders and Educators. Acad Psychiatry. 2016;40(3):448-450. doi:10.1007/s40596-014-0237-1
14. Griffin KA, Perez D, Holmes AP, Mayo CE. Investing in the future: The importance of faculty mentoring in the development of students of color in STEM. New Directions for Institutional Research. 2010 Dec;2010(148):95-103.
15. Choo EK, Kass D, Westergaard M, et al. The Development of Best Practice Recommendations to Support the Hiring, Recruitment, and Advancement of Women Physicians in Emergency Medicine.Pines JM, ed. Acad Emerg Med. 2016;23(11):1203-1209. doi:10.1111/acem.13028
16. Ghosh R, Reio Jr TG. Career benefits associated with mentoring for mentors: A meta-analysis. Journal of Vocational Behavior. 2013 Aug 1;83(1):106-16.
17. Pololi L, Knight S. Mentoring faculty in academic medicine: a new paradigm? J Gen Intern Med. 2005;20(9):866-870.

18. Ragins BR, Cotton JL. Mentor functions and outcomes: a comparison of men and women in formal and informal mentoring relationships. J Appl Psychol. 1999;84(4):529-550.
19. Levine RB, Mechaber HF, Reddy ST, Cayea D, Harrison RA. "A Good Career Choice for Women": Female Medical Students' Mentoring Experiences A Multi-Institutional Qualitative Study. Academic Medicine. 2013 Apr 1;88(4):527-34.
20. Babaria P, Abedin S, Nunez-Smith M. The effect of gender on the clinical clerkship experiences of female medical students: Results from a qualitative study. Academic Medicine. 2009 Jul 1;84(7):859-66.
21. Saperstein AK, Viera AJ, Firnhaber GC. Mentorship and job satisfaction among Navy family physicians. Military medicine. 2012 Aug 1;177(8):883-8.
22. Hepburn MJ, Battafarano DF, Enzenauer RJ, Salzberg DJ, Murphy FT, Parisek RA, Kroenke K. Increasing resident research in a military internal medicine program. Military medicine. 2003 Apr 1;168(4):341-5.
23. Prevosto P. The effect of "mentored" relationships on satisfaction and intent to stay of company-grade US Army Reserve nurses. Military medicine. 2001 Jan 1;166(1):21-6.
24. Yoder LH. A descriptive study of mentoring relationships experienced by Army nurses in head nurse or nursing supervisor roles. Military medicine. 1992 Oct 1;157(10):518-23.
25. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. Sage; 2006 Jan 13.
26. Johnson, M. O., & Gandhi, M. (2015). A mentor training program improves mentoring competency for researchers working with early-career investigators from underrepresented backgrounds. *Advances in Health Sciences Education*, *20*(3), 683-689.
27. Frei E, Stamm M, Buddeberg-Fischer B. Mentoring programs for medical students-a review of the PubMed literature 2000-2008. BMC medical education. 2010 Dec;10(1):32.
28. Xu YJ, Martin CL. Gender differences in STEM disciplines: From the aspects of informal professional networking and faculty career development. Gender Issues. 2011 Sep 1;28(3):134.
29. Laver KE, Prichard IJ, Cations M, Osenk I, Govin K, Coveney JD. A systematic review of interventions to support the careers of women in academic medicine and other disciplines. BMJ Open. 2018;8(3):e020380
30. Kashiwagi DT, Varkey P, Cook DA. Mentoring programs for physicians in academic medicine: a systematic review. Academic Medicine. 2013 Jul 1;88(7):1029-37.
31. Hirayama M, Fernando S. Organisational barriers to and facilitators for female surgeons' career progression: a systematic review. *J R Soc Med.* 2018;111(9):324-334.
32. Foster, S. W., McMurray, J. E., Linzer, M., Leavitt, J. W., Rosenberg, M., & Carnes, M. (2000). Results of a gender-climate and work-environment survey at a midwestern academic health center. *Academic Medicine*, *75*(6), 653-660.
33. Herrick-Reynolds, K., Brooks, D., Wind, G., Jackson, P., & Latham, K. (2019). Military Medicine and the Academic Surgery Gender Gap. *Military medicine*, *184*(9-10), 383-387.
34. Cervero RM, Battista A, Schreiber-Gregory DN, Konopasky A, Torre D, Maggio LA, Boulet JR, Reamy BV, Durning SJ. Uniformed Services University Women's

Enrollment and Career Choices in Military Medicine: A Retrospective Descriptive Analysis. Military medicine. 2018 Oct 6.
35. Kellermann A. F. Edward Herbert School of Medicine Policies for the Academic Administration of the Faculty. In. *Instruction 1100A*: Department of Defense; 2017:60.