2019-10-15

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Et al.

ACADEMIC MEDICINE
Journal of the Association of American Medical Colleges

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DOI: 10.1097/ACM.0000000000003038

Academic Medicine

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Women's Representation Among Members and Leaders of National Medical Specialty Societies

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Acknowledgements: The authors gratefully acknowledge the contributions of Barbara Fivush, Rebecca Ganetzsky, Marin Gillis, Martha Gulati, and other members of the Association of American Medical Colleges (AAMC) Group on Women in Medicine and Science (GWIMS) Steering Committee for their assistance in data collection, which they provided without compensation, along with the staff supporting the AAMC's GWIMS and Council of Faculty and Academic Societies.

Funding/Support: None reported.

Other disclosures: Ms. Lautenberger is a paid employee of the Association of American Medical Colleges (AAMC), and all other authors have served on the steering committee of the AAMC's Group on Women in Medicine and Science. Dr. Jagsi reports unrelated grants from the National Institutes of Health, the Doris Duke Charitable Foundation, the Susan Komen Foundation, and the Greenwall Foundation; consulting fees from Amgen and Vizient; and stock options for serving as

an advisor to Equity Quotient. Dr. Flotte reports unrelated consulting fees for serving as an advisor to Beam Therapeutics.

Ethical approval: This work was considered research on organizations (not human subjects research requiring institutional review board [IRB] approval) and no individual-level or private data were obtained; therefore, no IRB approval was needed or sought.

Data: Each society providing data granted the authors permission to use the information provided for this analysis. The authors provided each society with a summary of the data pertinent to that society only for review prior to submitting this manuscript to *Academic Medicine*. The authors rounded all data to the tenth place—except, in an effort to maintain maximum fidelity to the information provided, where the data were rounded to the ones place by the submitting organization.

Abstract

Purpose

National medical specialty societies speak for their respective fields in policy debates, influence research, affect trainees' specialization decisions, provide career development opportunities, and confer awards and recognitions. This study provides a comprehensive overview of the gender demographics of society members and leaders.

Method

In 2016, the Group on Women in Medicine and Science (of the Association of American Medical Colleges) sought to characterize the gender of members and leaders of specialty societies from 2000-2015. This report provides descriptive data, including how many of the responding societies (representing each of 30 major medical specialties) had substantial (> 10%) increases in women's representation among leadership between the first and second halves of the study period.

Results

The average proportion of female full members in responding societies was 25.4% in 2005; 29.3% in 2015. The proportion of women serving as the highest-ranking elected leader between 2000-2015 in each specialty ranged from 0 to 37.5% (mean 15.8%). The mean proportion of women on governing boards ranged from 0 to 37.3% (mean of means, 18.8%) in 2000-07 and from 0 to 47.6% (mean of means, 25.2%) in 2008-2015. In 9 specialties, the mean percentage of women serving on governing boards increased by > 10% from the first to second half of the study period.

Conclusions

Although many women are full members of specialty societies, women still constitute a minority of leaders. This report establishes a baseline from which to evaluate the effect of societies' efforts to improve diversity, equity, and inclusion.

Women constitute half of the medical student body[1] and half of the patient population served by physicians, but they remain underrepresented in senior positions in the profession of medicine. In 2017, only 16% of deans and 17% of department chairs at US medical schools were women.[2] Moreover, women's distribution among the trainees and practicing physician workforce varies dramatically across specialties.[3,4]

The National Academies identified the important potential for professional and specialty societies to advance women in science as long ago as 2002,[5] but little is known, even 17 years later, about women's participation and leadership within the national organizations or societies that represent and support the medical profession. National medical specialty societies speak for the profession of medicine and for the fields they represent in policy debates. They also influence the direction of research, affect trainees' decisions about which specialty to pursue, provide career development opportunities for physicians, and confer awards and important recognitions.[6] A comprehensive understanding of the demographics of the membership and leadership of specialty societies is therefore essential.

Reports from select fields suggest that few women have served as officers of national medical specialty societies. A 2006 report from radiation oncology was among the first to raise concerns about a possible glass ceiling in these organizations.[7] A 2013 report from general surgery reported that in its 100 years of existence, the American College of Surgeons had had only 4 women chairs of its board of governors, and that 2012 marked the first year in which a woman was elected to serve as chair of its board of regents.[8] A 2017 report noted that women's representation among overall membership of the American College of Radiology and their participation in certain leadership roles, including on the national board of chancellors, increased from 2001 to 2015, but representation at the highest-national-officer level did not.[9] A 2018

report[10] noted that at the time of writing the American College of Cardiology had only three female presidents (out of a total of sixty-six[11]): the author, who was then serving in the role, and two others, whose terms were in, respectively, 1982-83 and 2005-06. Recently, a report described the dearth of women holding the senior-most elected positions within multiple professional specialty societies from 2008-2017, but the authors did not have access to full data on women's representation in overall membership or other leadership positions.[12]

Through the current study, we sought to provide a more systematic and comprehensive analysis of women's participation in medical specialty societies than previously reported. We included a broad array of large societies representing all major medical specialties, and we collected and evaluated data on both membership and leadership in the same years across all societies.

Method

In 2016, the Group on Women in Medicine and Science (GWIMS; a constituent group of the Association of American Medical Colleges [AAMC]) initiated a query to characterize the gender of members and leaders of specialty societies from 2000-2015. GWIMS requested that medical societies provide the following: (1) the gender of the highest-ranking elected officer (president or chair); (2) the number of total and female members among its governing body (e.g., board of directors) in each year from 2000-2015; and (3) the total number and percent of female members in 2005 and 2015. We allowed societies to define for themselves "full and active members," but guided societies to omit trainees and emeritus members if possible. We made initial contacts with each society's membership director or, where present, with our own contacts who served on the senior staff (in positions such as executive director) at each society. When initial requests were not answered, we made follow-up requests to ask senior female leaders within the society (identified through the societies' public-facing websites) to facilitate contact with an appropriate

society staff member. We collected all data using a standardized Microsoft Excel spreadsheet (version 1907; Redmond, Washington).

This report provides descriptive analyses of data received from the largest societies providing responses from each of the major specialties of medicine. We have included a specialty if, based on AAMC data, 300 or more residents were enrolled in its training programs in 2015 (21 specialties, including, for example, anesthesiology, ophthalmology, urology) or if the specialty was one of 9 major internal medicine subspecialties (internal medicine is a broad category with over 11,000 total residents enrolled in training programs in 2015).[13]

For context, we included data on the proportion of trainees who were female in each field, as collected, by the AAMC[2] for all major specialties, and by the Accreditation Council for Graduate Medical Education (ACGME)[14] for the internal medicine subspecialties whose data had not been reported by the AAMC. We calculated percentages from the ACGME data (derived from the 2005-06 and 2015-16 ACGME resource books)[14, 15] following the same approach the AAMC used (i.e., by dividing the number of women by the total number of men and women in each field). For hematology, we included trainees in hematology programs and in combined hematology/oncology. Likewise, for oncology, we included trainees in oncology programs and those in combined hematology/oncology. For each specialty, we have reported the proportion of female trainees and corresponding specialty society members who were female in 2005 and 2015. We have calculated and reported, for each society, the proportion female among the highest-elected leaders from 2000 to 2015. We have also calculated and reported, for each society (1) the mean of the proportion female on its governing body in each year from 2000 to 2015 and (2) the mean of the proportion female for the governing body in the first 8 years of the study period (2000-2007) and the last 8 years (2008-2015). We have further summarized these

data across all reporting specialties by describing the mean and range of the proportion female among members, highest-elected leaders, and governing bodies (weighting each society equally rather than by the size of its membership or governing bodies).

We evaluated how many organizations had an increase in the percentage of women who were members or leaders. We specifically investigated how many organizations had more than a 10% increase in the percentage of women serving on governing boards between the first half and the second half of the study period. A priori, we designated 10% as a threshold for representing a substantial change over time.

We compared the percentage of women serving on governing bodies in 2008-2015 to the percentage of women who were full and active members in 2005 so as to identify specialties with a large difference (either positive or negative) between the proportion of women among those eligible and those selected for leadership (we have presented these results fully and then summarize using a threshold of > 5% divergence).

Finally, we summarized women's representation among leadership in the subset of specialties in which women constituted a majority of trainees in 2005.

This work was considered research on organizations and not human subjects research requiring IRB approval.

Results

We received data from societies in all 30 specialties that met inclusion criteria. The proportion of women serving as highest-ranking leader from 2000 to 2015 ranged from 0 to 37.5% (Figure 1); the mean proportion across societies was 15.8%. Five specialty societies (in urology, thoracic surgery, radiology, orthopedic surgery, and neurosurgery) had no women as the highest-ranking leader from 2000-2015. The mean proportion of women serving on governing boards ranged

from 0 to 37.3% (mean of means, 18.8%) in 2000-07 and from 0 to 47.6% (mean of means, 25.2%) in 2008-2015 (Figure 2). Only one specialty society (in urology) had no women serving on its governing board from 2000-2015.

Table 1 lists the proportion of women among trainees and among professional society members in each of the 30 specialties in 2005 and 2015. In all but two specialties (radiation oncology and radiology, in which the proportion fell by, respectively, 3.1% and 1.6%), the proportion of women among trainees was higher in 2015 than in 2005. The smallest increase in trainee percent female was by 0.6% (in pathology) and the largest was by 14.9% (in plastic surgery). Similarly, in all societies for which data were available in both years excepting one (pathology, in which the proportion fell by 4%), the proportion of women among full and active members was higher in 2015 than 2005. The mean of the proportion of women among full and active members in each society was 25.4% in 2005 (reported by 21 societies) and 29.3% in 2015 (reported by 29 societies). When restricted to the 21 societies reporting data in 2005, the mean of the proportion of women among full and active members in 2015 was 31.2%.

Table 2 lists the proportion of women among professional society members and leaders in each of the 30 specialties from 2000 to 2015. In 25 of 28 specialties with data for both time periods evaluated in this study (2000-2007 and 2008-2015), the mean percentage of women serving on governing boards increased; in 9 of these, it increased by > 10% from the first to second half of the study period. The 3 exceptions were emergency medicine, family medicine, and thoracic surgery.

For 16 of the 21 specialties with available data on both the proportion of women among the highest-ranking elected officer during the study period and among membership in 2005, the percentage of females as the highest-ranking elected officer from 2000-2015 was lower than the percentage of females among society members in 2005 (Table 2). The 5 exceptions were as follows: internal medicine (the American College of Physicians), oncology (the American Society of Clinical Oncology), endocrinology (the Endocrine Society), otolaryngology (the American Academy of Otolaryngology), and psychiatry (the American Psychiatric Association). Table 2 also shows the difference between the mean percentage of women serving on a society governing body in 2008-15 and the proportion of women among full and active members in 2005. In 4 of 19 specialties with data available, the mean percentage of women serving on governing bodies in 2008-15 was more than 5% *lower* than among full/active members in 2005; in 6, it was more than 5% *higher*.

Data regarding trainees in 2005 reveals that 8 specialties had greater than 50% female trainees: dermatology, family medicine, endocrinology, rheumatology, obstetrics/gynecology, pathology, pediatrics, and psychiatry. Yet the percentage of females on the governing boards of these societies from 2008-2015 (Tables 1 and 2, data are available for all but psychiatry) was substantially lower. In those 8 societies, the mean percentage of women serving as highest-elected leader was 23.5% (range 12.5% to 37.5%) for 2000-2015. In the 7 societies with available data, the mean of the mean percentage of women serving on governing boards was 31.2% (range 22.4% to 37.3%) for 2000-2007 and 36.3% (range 25.5% to 47.6%) for 2008-2015.

Discussion and Conclusions

This overview of women's participation as members and leaders of large medical specialty societies reveals that although women generally represent a growing proportion of trainees in many fields, the gender demographics among full members and leaders of professional societies vary considerably across specialties—both in absolute magnitude and in change over time. Only a minority of leaders of national medical specialty societies during the study period were female. Even in specialties where women constitute the majority of trainees, and in societies with thousands of female members theoretically eligible for consideration for leadership positions, few women have served as the senior-most leader. This report establishes a baseline from which to evaluate the effectiveness of societies' laudable efforts to improve diversity.

In most societies included in this study (25 of 28 reporting data on membership), the representation of women among members increased from 2005 to 2015. Societies varied in whether the proportion of women leaders changed between the earlier and later halves of the study period and in how closely the proportion of women leaders mirrored the proportion of women members. In some societies, the proportion of women leaders was similar to or even exceeded the proportion of women members; understanding the processes those specific societies use to develop their leaders may provide valuable lessons.

A key insight from this study is that using the pipeline to explain why so few women are in leadership positions in certain societies (i.e., women leaders are fewer because fewer women have trained in the specialty) is insufficient. Certainly, women have only recently begun to join certain specialties, and promotions processes take many years causing a delay before any members of a cohort reach the seniority necessary for consideration for the prestigious positions considered in this study. However, even in several specialties where women have long

constituted a substantial proportion of trainees (e.g., pediatrics, obstetrics/gynecology), remarkably few women (especially when considered in absolute numbers rather than percentages) have achieved leadership positions. A number of other well recognized phenomena, including stereotype threat[16] and implicit bias,[17] likely contribute to the relative paucity of women seeking or receiving leadership positions. Male-dominated nomination processes, frequently led by former elected leaders, may perpetuate a lack of diversity if leaders focus on identifying and cultivating those who remind them of their younger selves. Further complicating the situation are the greater work-life integration challenges faced by women in a society that still generally expects a gendered division of domestic labor, including among physicians.[18-20] Research suggests, for example, that attending meetings and conferences may be particularly difficult for women with families[21]—and, this should motivate further research to determine whether creative solutions such as on-site childcare, as implemented by some societies,[22] might help.

Specialty societies offer multiple opportunities and resources for enhancing and advancing physicians' careers. They engage in political advocacy and quality improvement, facilitate the development of mentoring relationships, and provide a host of educational opportunities for members at all levels of seniority.[23] For these reasons, national specialty societies are uniquely positioned to facilitate gender equity within medicine,[24] and monitoring women's inclusion at both the member and leadership levels is critically important.

Leaders of specialty societies have a critical influence on the direction of scholarly inquiry and research in each of their fields. As Ioannides has noted:

> Each professional society creates its cadre of leaders, with meetings making these leaders visible to the members who usually participate passively by listening. Given the dynamics of large professional societies and conferences, leadership is sometimes judged not on scientific merit, hard work, and organization of thought, but on the ability to navigate power circles.[25]

Ensuring that leadership-selection processes favor those who are most able—not simply the best-networked—is essential to ensure the rigor and integrity of the broader scientific and medical enterprise. Given documented gender differences in behaviors ranging from social interactions to self-promotion,[26] monitoring the demographics of leaders is one way to evaluate whether processes are likely to have been fair or systematically biased against certain subgroups.

Limitations of the current study include the restriction to large societies in major specialties. Other professional societies, including societies of chairs or other subgroups within a field, may differ meaningfully in the diversity of their members and leaders. Several included societies (including ones listed at 0%) have elected female leaders since this study has ended, and future analyses should document whether sustained and consistent increases in female representation occur over time.

Medical professional specialty societies have good reasons to consider diversifying their leadership. Visible female role models are needed not only to encourage half of the available talent pool to consider a specialty but also to reflect patient populations. Diversity also broadens the viewpoints represented and improves collective intelligence.[27] The time is overdue for organizations to ensure that all members are aware of opportunities for service and advancement, so that each specialty, and medicine overall, may reap the benefits of the diversity and inclusion of the full talent pool.

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Figure Legends

Figure 1

Proportion of women serving as the highest-ranking elected officer (e.g., president or chair) from 2000 to 2015 for a large medical specialty society representing each of 30 specialties. Data were reported by each organization; detailed numerical results are provided in Table 2. The proportion for 5 societies was 0.

Figure 2

Proportion of women serving on the governing body (e.g., board of directors, executive council) for a large medical specialty society representing 28 of 30 specialties (two societies were unable to provide the data requested). Data were reported by each organization; detailed numerical results are provided in Table 2.

Table 1

Proportion of Women Among Trainees and Specialty Society Members in 30 Medical Specialties in 2005 and 2015

	%[a] of female trainees[b]		%[a] of female society members	
Specialty: Society	**2005**	**2015**	**2005**	**2015**
Anesthesiology: American Society of Anesthesiologists	31.1	36.8	21.7	27[c]
Dermatology: American Academy of Dermatology	61.1	62.9	32.8	42.8
Emergency Medicine: American College of Emergency Physicians	35.8	37.3	23.3	28.3
Family Medicine: American Academy of Family Physicians	51.7	54.5	37.3	41.6
Internal Medicine: American College of Physicians	42.3	43.2	21.2	27.6
Internal Medicine Subspecialties				
Cardiology: American College of Cardiology	16.9	19.3	NA	20.7
Endocrinology: The Endocrine Society	64.0	72.2	34	42
Gastroenterology: American Gastroenterological Association	25.8	33.9	13	21
Hematology: American Society of Hematology	42.1	45.0	26	30
Infectious Disease: Infectious Disease Society of America	44.0	54.6	30	35
Nephrology: American Society of Nephrology	30.6	36.5	NA	30.4
Oncology: American Society of Clinical Oncology	42.8	44.6	23	30
Pulmonology: American Thoracic Society	25.9	31.6	NA	28.2
Rheumatology: American College of Rheumatology	60.5	62.3	NA	NA
Neurological surgery: American Association of Neurological Surgeons	10.4	17.3	4.8	7.3
Neurology: American Academy of Neurology	41.4	48.4	23.3[d]	35.8
Obstetrics and Gynecology: American College of Obstetricians and Gynecologists[e]	75.3	82.8	44	54
Ophthalmology: American Academy of Ophthalmology	35.6	42.6	NA	19.8
Orthopedic surgery: American Academy of Orthopedic Surgeons[f]	10.9	14.8	4.4	7.9
Otolaryngology: American Academy of Otolaryngology	26.4	36.1	12	18
Pathology: American Society for Clinical Pathology[g]	51.4	52.0	78	74
Pediatrics: American Academy of Pediatrics	66.5	71.1	55	62
Physical Medicine and Rehabilitation: American Academy of Physical Medicine and Rehabilitation	37.1	39.8	NA	34.6
Plastic Surgery: American Society of Plastic Surgeons	21.0	35.9	10	15
Psychiatry: American Psychiatric Association	53.2	54.1	32.7	38.3

Radiation Oncology: American Society of Radiation Oncology	31.8	28.7	NA	23.8
Radiology: American College of Radiology	27.4	25.8	NA	23.2
Surgery: American College of Surgeons	28.0	38.2	NA	14
Thoracic Surgery: Society of Thoracic Surgeons	10.1	22.0	1.9	8.1
Urology: American Urological Association	18.7	25.6	4	10

Abbreviations: N indicates number; NA, not available.

[a]The authors rounded all data to the tenth place—except, in an effort to maintain maximum fidelity to the information provided, where the data were rounded to the ones place by the submitting organization.

[b]Data for all specialties except internal medicine subspecialties on the percent of trainees who are female are from the following: Association of American Medical Colleges (AAMC). Table 2: Distribution of residents by specialty, 2005 compared to 2015. In The State of Women in Academic Medicine: The Pipeline and Pathways to Leadership, 2015-2016. © 2016. https://www.aamc.org/members/gwims/statistics/. Accessed August 7, 2019. Notes on the internal medicine subspecialties: The authors calculated the percentages for each large category (or subspecialty)—those with > 11,000 residents enrolled in training that was not further subdivided in the AAMC report—following the same approach as in the AAMC report (i.e., by dividing the number of women by the total number of men and women in each field). The authors gleaned the data from the 2005-06 and 2015-16 ACGME resource books. https://www.acgme.org/About-Us/Publications-and-Resources/Graduate-Medical-Education-Data-Resource-Book/GraduateMedicalEducation/GraduateMedicalEducationDataResourceBook. For hematology, the pool of trainees included those in hematology programs and those in combined hematology/oncology programs. Likewise, for oncology, the pool of trainees include those enrolled in oncology programs and in combined hematology/oncology programs.

[c]Data were available only for 2014 rather than 2015 for membership in American Society of Anesthesiologists.

[d]Data were available only for 2004 rather than 2005 for membership in the American Academy of Neurology.

[e]American College of Obstetricians and Gynecologists includes medical students and life fellows in full/active member totals.

[f]American Academy of Orthopedic Surgeons includes in its full/active member totals: fellow, associate, candidate, international, resident, international resident, and emeritus members.

[g]American Society for Clinical Pathology considers non-MD professionals to be full members.

Table 2

Women Among Specialty Society Members and Specialty Society Leaders in 30 Medical Specialties, 2005-2015

	Society members				Society leadership			
	2005		2015		Mean %[a] of governing body[b] female		%[a] of highest-ranking elected officers[b] (over 16 years) who are female, 2000-2015	Difference between proportion of women members in 2005 and proportion of women leaders in 2008-2015[c]
Specialty: Society	Total N	%[a] female	Total N	%[a] female	2000-2007	2008-2015		
Anesthesiology: American Society of Anesthesiologists	40,223	21.7	52,617[d]	27	NA	NA	6.3	Not calculable
Dermatology: American Academy of Dermatology	3,307	32.8	5,383	42.8	26.0	35.4	12.5	2.6%
Emergency Medicine: American College of Emergency Physicians	23,559	23.3	34,049	28.3	21.2	18.5	18.8	-4.8%
Family Medicine: American Academy of Family Physicians	58,560	37.3	67,973	41.6	32.4	28.7	12.5	-8.6%
Internal Medicine: American College of Physicians	80,861	21.2	83,337	27.6	24.0	32.3	31.3	11.1%
Internal Medicine Subspecialties								
Cardiology: American College of Cardiology	NA	NA	7,125	20.7	7.2	11.3	6.3	Not calculable
Endocrinology: The Endocrine Society	12,680	34	18,010	42	37.2	47.6	37.5	13.6%
Gastroenterology: American Gastroenterological Association	10,847	13	15,223	21	11.7	14.2	6.3	1.2%
Hematology: American Society of Hematology	13,837	26	16,409	30	30.4	36.5	25	10.5%
Infectious Disease: Infectious Disease Society of America	7,855	30	10,507	35	22.8	34.8	18.8	4.8%
Nephrology: American Society of Nephrology	6,421	NA	15,855	30.4	5.4	23.2	12.5	Not calculable

Oncology: American Society of Clinical Oncology	16,581	23	22,752	30	22.0	35.6	31.3	12.6%
Pulmonology: American Thoracic Society	NA	NA	15,478	28.2	24.4	35.9	25.0	Not calculable
Rheumatology: American College of Rheumatology	6,263	NA	7,516	NA	37.3	40.4	25.0	Not calculable
Neurological surgery: American Association of Neurological Surgeons	3,259	4.8	3,822	7.3	2.5	17.2	0	12.4%
Neurology: American Academy of Neurology	17,872[e]	23.3	29,297	35.8	22.1	25.3	12.5	2%
Obstetrics and Gynecology: American College of Obstetricians and Gynecologists[f]	49,564	44	57,476	54	22.4	25.5	12.5	-18.5%
Ophthalmology: American Academy of Ophthalmology	NA	NA	21,530	19.8	14.2	22.6	12.5	Not calculable
Orthopedic surgery: American Academy of Orthopedic Surgeons[g]	25,596	4.4	35,091	7.9	12.5	13.3	0	8.9%
Otolaryngology: American Academy of Otolaryngology	10,883	12	11,143	18	11.5	16.7	18.8	4.7%
Pathology: American Society for Clinical Pathology[h]	NA	78	110,593	74	35.3	37.0	18.8	-41%
Pediatrics: American Academy of Pediatrics	47,000	55	50,600	62	27.9	39.4	31.3	-15.6%
Physical Medicine and Rehabilitation: American Academy of Physical Medicine and Rehabilitation	NA	NA	7,575	34.6	18.3	21.6	25	Not calculable
Plastic Surgery: American Society of Plastic Surgeons	4,762	10	5,486	15	11.6	13.4	6.3	3.4%
Psychiatry: American Psychiatric Association	35,086	32.7	36,490	38.3	NA	NA	37.5	Not calculable
Radiation Oncology: American Society of Radiation Oncology	NA	NA	4,242	23.8	11.8	25.5	18.8	Not calculable
Radiology: American College of Radiology[i]	NA	NA	21,442	23.2	11.2	26.4	0	Not calculable

Surgery: American College of Surgeons	NA	NA	38,452	14	15.2	22.0	12.5	Not calculable
Thoracic Surgery: Society of Thoracic Surgeons[j]	3,347	1.9	7,012	8.1	6.6	5.7	0	3.8%
Urology: American Urological Association	14,877	4	21,252	10	0	0	0	-4%
Overall[k]	**22,420**	**25.4**	**27,791**	**29.3**	**18.8**	**25.2**	**15.8**	

Abbreviations: N indicates number; NA, not available.

[a]The authors rounded all data to the tenth place—except, in an effort to maintain maximum fidelity to the information provided, where the data were rounded to the ones place by the submitting organization.

[b]Specialty society staff or elected leaders were asked to identify the gender of the "highest-ranking elected officer (President or Chair)" of the organization, the number of members of its "governing body (Board of Directors, Executive Council, etc.)," and number females in its governing body in each year from the year 2000 to 2015.

[c]Calculation was the mean percent of women serving on governing boards in 2008-15 minus proportion of women among members in 2005, so a negative number means a higher proportion of women among members than among leaders.

[d]Data were available only for 2014 (rather than 2015) for membership in the American Society of Anesthesiologists.

[e]Data were available only for 2004 (rather than 2005) for membership in the American Academy of Neurology.

[f] The American College of Obstetricians and Gynecologists includes medical students and fellows in full/active member totals.

[g]The American Academy of Orthopedic Surgeons was able to provide exact numbers for board of directors' membership in only 2005 and 2015, but believed that those were representative years for each half of the study period. It also includes the following in its full/active member totals: fellow, associate, candidate, international, resident, international resident, and emeritus members.

[h]The American Society for Clinical Pathology considers non-MD professionals to be full members.

[i]The American College of Radiology has a complex leadership structure with separate executive and legislative bodies described in detail in Ref. 9. The highest leader for the present analysis was defined as the Board of Chancellors' Chair.

[j]This does not include a woman who, based on precedent, was likely to be elected to serve in the society's presidential line (as second vice president), nor a woman who was elected President of Society of Thoracic Surgeons posthumously in 2013.

[k]Overall means are calculated with each specialty society weighted equally (not weighted for differences in membership numbers).

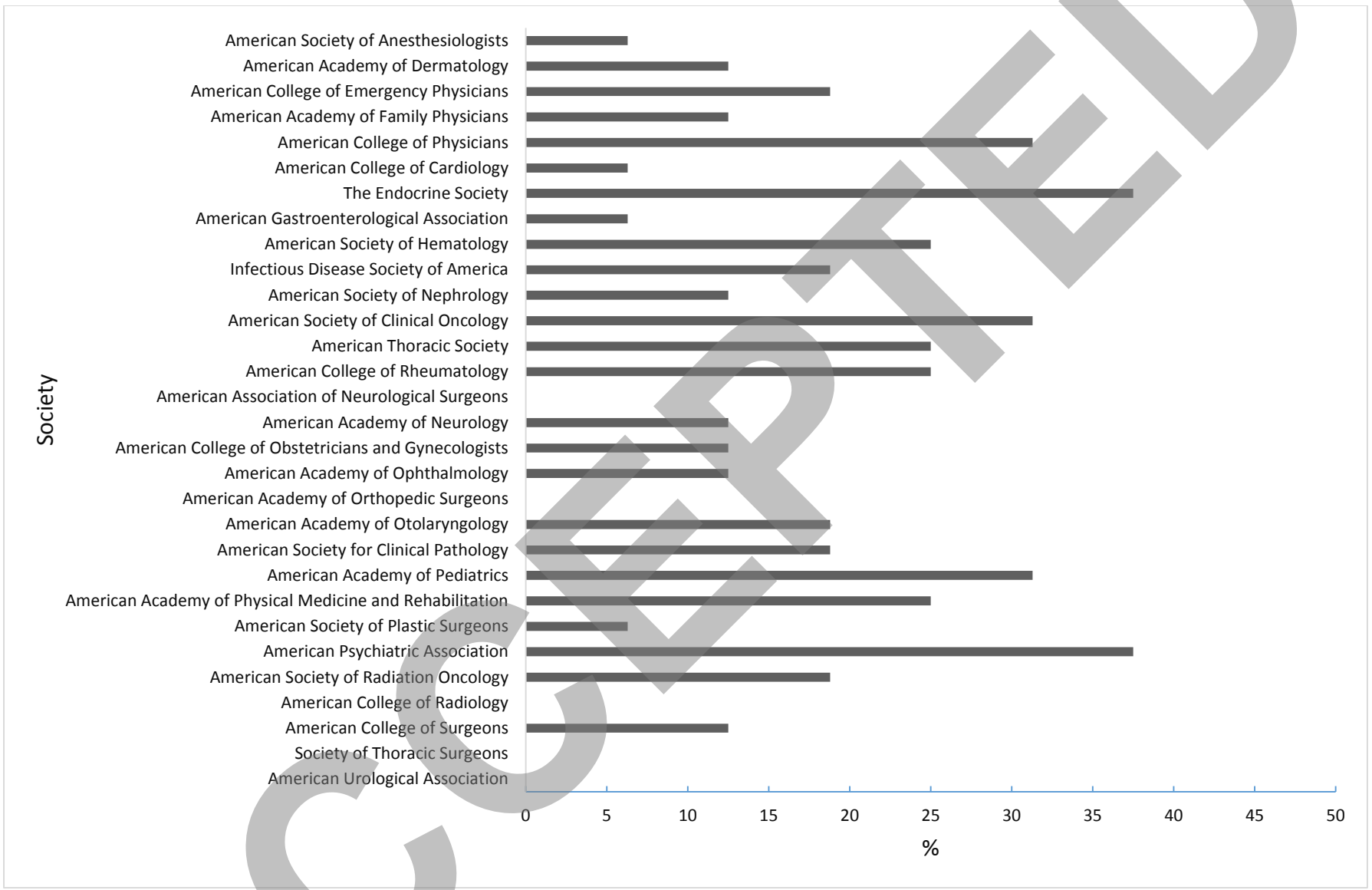

Figure 1

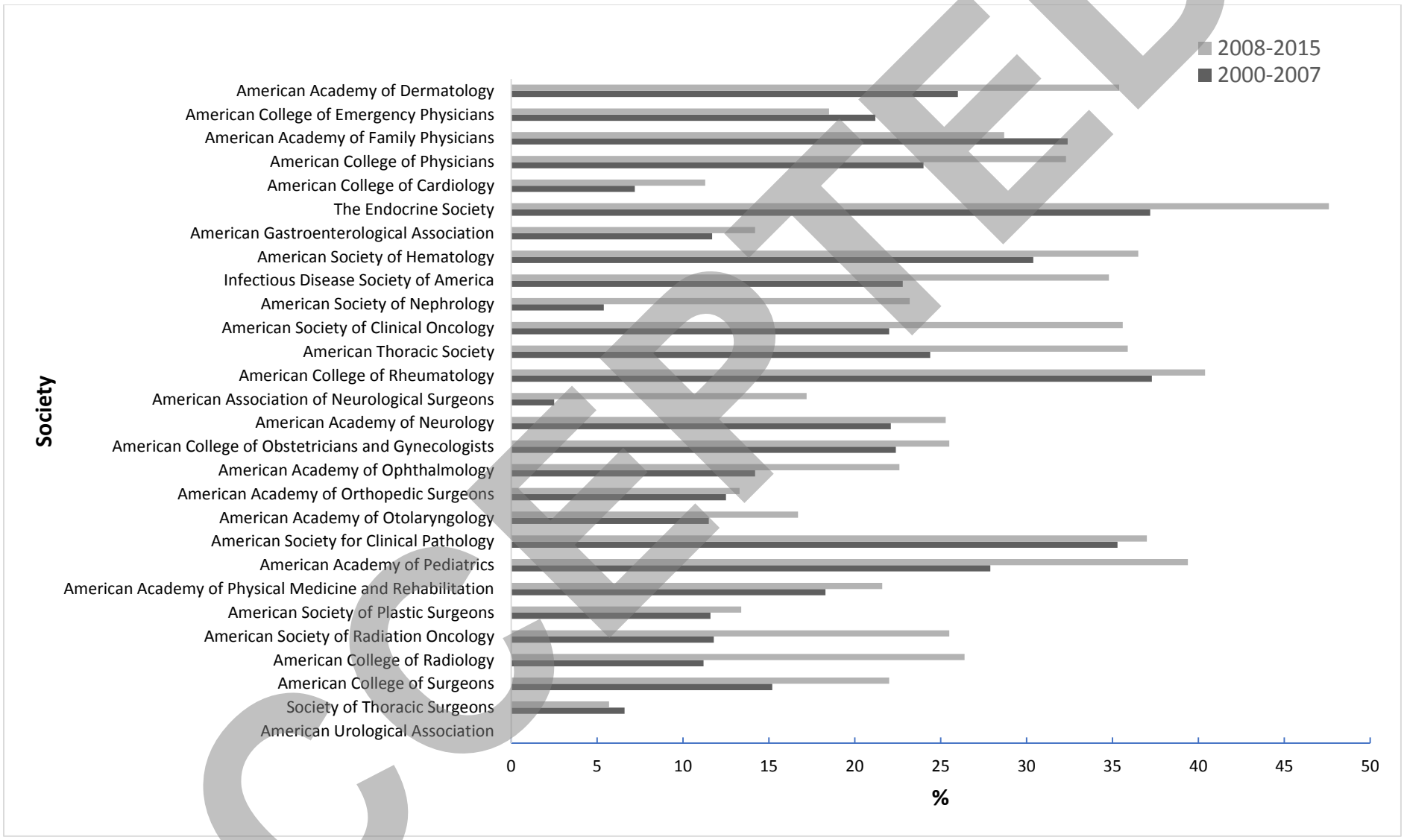

Figure 2