


Disparity in Gender Representation of Speakers at National Emergency Medical Services Conferences: A Current Assessment and Proposed Path Forward

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Conflicts of interest/funding: No funding was used to support the development of this manuscript. The authors have no financial conflicts of interest.

Keywords: conference; Emergency Medical Services; female; gender; gender equity; speaker

Abbreviations:

EMS: Emergency Medical Services
EMT: emergency medical technician
US: United States

Received: February 4, 2021

Revised: April 4, 2021

Accepted: April 5, 2021

doi:[10.1017/S1049023X21000571](https://doi.org/10.1017/S1049023X21000571)

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Abstract

Introduction: Gender disparities between Emergency Medicine physicians with regards to salary, promotion, and scholarly recognition as national conference speakers have been well-documented. However, little is known if similar gender disparities impact their out-of-hospital Emergency Medical Services (EMS) colleagues. Although there have been improvements in the ratio of women entering the EMS workforce, gender representation has improved at a slower rate for paramedics compared to emergency medical technicians (EMTs). Since recruitment, retention, and advancement of females within a specialty have been associated with the visibility of prominent, respected female leaders, gender disparity of these leaders as national conference speakers may contribute to the “leaky pipeline effect” seen within the EMS profession. Gender representation of these speakers has yet to be described objectively.

Study Objective: The primary objective of this study was to determine if disparity exists in gender representation of speakers at well-known national EMS conferences and trade shows in the United States (US) from 2016–2020. The secondary objective was to determine if males were more likely than females to return to a conference as a speaker in subsequent years.

Methods: A cross-sectional analysis of programs from well-known national conferences, specifically for EMS providers, which were held in the US from 2016–2020 was performed. Programs were abstracted for type of conference session (pre-conference, keynote, main conference) and speakers’ names. Speaker gender (male, female) was confirmed via internet search.

Results: Seventeen conference programs were obtained with 1,709 conference sessions that had a total of 2,731 listed speaker names, of whom 537 (20%) were female. A total of 30 keynote addresses had 39 listed speaker names of whom six (15%) were female. No significant difference was observed in the number of years males returned to present at the same conference as compared to females.

Conclusion: Gender representation of speakers at national EMS conferences in the US is not reflective of the current best estimate of the US EMS workforce. This disparity exists not only in the overall percent of female names listed as speakers, but also in the percent of individual female speakers, and is most pronounced within keynote speakers. Online lecture platforms, as an unintentional consequent of the COVID-19 pandemic, coupled with intentional speaker development and mentorship initiatives, may reduce barriers to facilitating a new pipeline for more females to become speakers at national EMS conferences.

Davic A, Carey E, Lambert E, Luckingham T, Mongiello N, Peralta R, Puccio N, Rivera K, Torre K, Maloney LM. Disparity in gender representation of speakers at national Emergency Medical Services conferences: a current assessment and proposed path forward. *Prehosp Disaster Med.* 2021;36(4):445–449.

Introduction

Gender disparity within Emergency Medicine in the United States (US) has been repeatedly demonstrated. Female Emergency Medicine physicians with equivalent training to their male counterparts are less likely to be published authors,^{1,2} speak at national conferences,^{3,4} serve as reviewers⁵ or editors of peer-reviewed journals,^{5,6} receive national awards,⁷ and be

promoted or retained in academic settings.^{1,2,8} However, little is formally known as to whether similar professional gender disparities impact their out-of-hospital colleagues in the field of Emergency Medical Services (EMS).

Thus far, literature has confirmed the long-standing underrepresentation of females entering the US EMS workforce compared to the percentage of females in the US population.⁹ Of the individuals who obtained an initial national EMS certification in 2017, only 35% of those achieving emergency medical technician (EMT) certifications and 23% of those achieving paramedic certifications were female.⁹ Although the proportion of females entering the EMS workforce has improved over the last decade, gender representation has improved at a slower rate for paramedics as compared to EMTs.⁹

The “leaky pipeline effect” is used to describe the reduction in females at each advancing level of training, academic promotion, or leadership within a particular field of medicine or science.^{10–12} It encompasses inequalities in the ratio of females entering into a specialty, as well as the subsequent disproportionate attrition of females leaving a specialty.¹¹ While the “leaky pipeline effect” is multifactorial, a lack of visibility for females succeeding in prestigious, respected roles is likely a major contributor.^{11,13,14} For example, the absence of prominent, publicly visible female role models likely contributes to the lower number of females entering a specialty.^{10,11,14,15} In addition, it makes it more challenging for females already in the specialty to literally and figuratively “see” themselves as not only being qualified for these advancing roles, but also being successful in them.^{14,16,17}

One of the most high-impact, highly visible roles is as an invited speaker at national professional conferences.^{14,15,17} Since conference speakers are generally selected due to their expertise on a specific topic,¹⁸ being featured in these highly prestigious roles affords them wide-spread public recognition for their achievements.¹¹ Individuals selected for the most highly coveted of the conference speaker spots, the keynote speaker, must therefore represent the most influential leaders of the specialty.^{18,19} As such, gender disparity for these conference speaker roles may contribute to the low proportions of females entering into and advancing within the EMS profession. While anecdotally there seems to be few female speakers at national EMS conferences, their true gender representation has yet to be described objectively.

The primary objective of this study was to determine if disparity exists in gender representation of speakers at well-known national EMS conferences and trade shows in the US from 2016–2020. The secondary objective was to determine if males were more likely than females to return to a conference as a speaker in subsequent years.

Materials and Methods

Study Design and Population

A cross-sectional analysis was performed to examine the gender of speakers listed in conference programs of well-known national conferences and trade shows specifically for EMS providers in the US from 2016 through 2020 (American Ambulance Association Annual Conference & Trade Show; Air Medical Transport Conference; Critical Care Transport Medicine Conference; EMS Today; EMS World Expo; and National Association of EMS Educator’s Symposium). Conference programs were pursued by internet search and by contacting conference organizers.

Measurements

One author (LMM) abstracted the conference programs using a pre-defined data abstraction tool: conference name, conference

year, type of conference session (pre-conference session, keynote address, main conference session), and speakers’ names were recorded, including panelists and moderators. Sessions were excluded if speakers’ names were not listed, or if the session was only open to physicians (eg, National Association of EMS Physicians National EMS Medical Direction Overview Course). If both a schedule graphic and a detailed list of sessions were included in the conference program, only the detailed list of sessions was abstracted.

Speaker gender (male, female) was determined by conducting a Google (Google Inc.; Mountain View, California USA) search for speaker interviews and profiles on conference, agency, institution, or professional networking websites.

In addition, it was important to evaluate if many individuals were listed as conference speakers, or rather if it was a small group of individuals who gave many conference presentations. For example, an individual may have been listed as a speaker for three different conference sessions. As such, “listed speaker name” refers to every name that is listed as a conference session speaker. These names were then distilled down into a list of unique, individual speakers which is referred to as “individual speakers.” This was performed for each conference (eg, EMS World 2020), series of conferences (eg, EMS World 2016 – 2020), and for all included conferences.

Statistical Analysis

Categorical data were evaluated using descriptive statistics on Microsoft Excel 2020 (Microsoft Corp.; Redmond, Washington USA). Mann-Whitney U testing on SPSS Statistics Faculty Pack 26 (IBM Corporation; Armonk, New York USA) was performed to determine if male speakers were more likely to return to present at conferences in subsequent years than female speakers, with statistical significance at $P < .05$.

Results

Seventeen conference programs were obtained, with a total of 1,709 conference sessions identified for inclusion in the analysis (Figure 1).

Of note, one conference was cancelled due to the COVID-19 pandemic (2020 American Ambulance Association Annual Conference & Trade Show) and three conferences were virtual instead of in-person (2020 Air Medical Transport Conference; 2020 EMS World Expo; and 2020 National Association of EMS Educator’s Symposium).

The 1,709 included conference sessions had a total of 2,731 listed speaker names, of whom 537 (20%) were female. The listed speaker names were determined to represent 1,112 individual speakers of whom 289 (26%) were female.

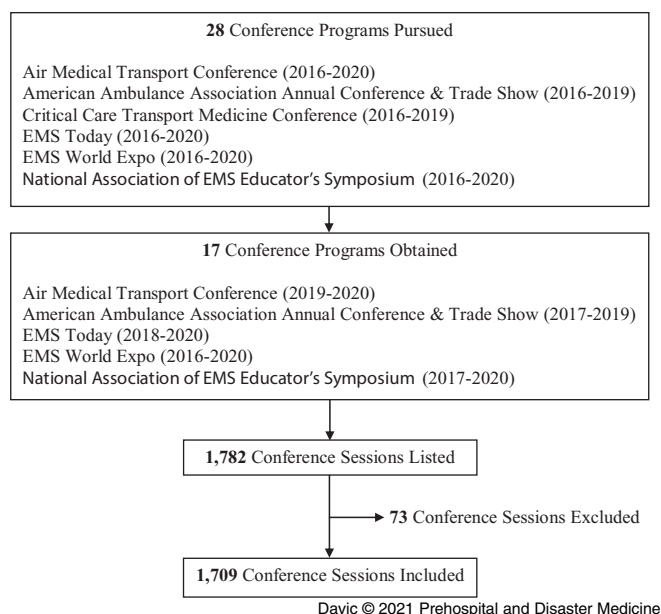
There was a total of 30 keynote addresses with 39 listed speaker names of whom six (15%) were female. The 39 listed keynote speaker names were determined to represent 34 individual speakers of whom six (18%) were female.

Table 1 details the speaker representation for each conference session type (pre-conference session, keynote address, main conference session) for each of the 17 conferences.

Finally, there was no statistically significant difference in the number of years males returned to a conference in subsequent years as a speaker compared to females (Table 2).

Discussion

This cross-sectional analysis suggests that disparity exists in gender representation of speakers at well-known national EMS



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Figure 1. Conference Session Search Strategy. Abbreviation: EMS, Emergency Medical Services.

conferences and trade shows in the US from 2016–2020. Furthermore, the gender representation of national EMS conference speakers is not reflective of the current best estimate of the gender representation of the EMS workforce. This under-representation exists not only in the overall percent of female names listed as speakers (20%), but also in the percentage of individual female speakers (26%). This gender disparity is most notable for keynote presentations, with only 15% of keynote speakers being female.

Although some conferences met or exceeded ratios reflective of the EMS workforce for a particular type of conference session in a given year, cumulatively, all stakeholders at play – conference attendees, program committee members, conference speakers, industry sponsors, departmental or agency leadership, and clinical and educational medical directors – need to strive for better gender representation. Eventual gender equity in national EMS conference speakers, by being proactive in promoting and then expecting to see female conference speakers, could ideally help to improve gender disparities in the specialty as a whole.

Speculations about the causes of persistent gender disparities in conference speakers across medical and scientific specialties have been proposed. Intrinsic self-selection, possibly coupled with self-doubt or professional under-estimation, may result in fewer females submitting speaker applications to conferences.^{13,20} These issues are likely perpetuated by the persistent under-representation of female peers and mentors as conference speakers such that fewer females are likely to see themselves being successful in such a role.^{15,16,21} Finally, habitual speaker invitations coupled with a desire to publicize well-known, prestigious speakers likely compounds the selection process.^{3,22,23} This analysis, however, suggests there is no significant difference in the tendency for males versus females to return as a speaker to a particular conference in subsequent years.

Initiatives have been undertaken by conference program committees to successfully reduce speaker gender disparity. For example, improved balance in conference speakers has been achieved by intentionally including females on the

program committee,^{11,14,24,25} as well as by giving the program committee direct instruction to “do better” with regards to gender balance in speaker selection.²⁵ Finally, public disclosure of speaker demographics by conferences has been repeatedly recommended.^{22,25,26}

Just as important to these program committee-level initiatives is to identify and recruit female EMS providers into the prospective speaker pipeline and thereby grow the applicant pool. This could be done by surveying peers for recommendations or nominations of females in EMS with a personal interest or experience with a given topic. It may also be useful to assemble a list of female authors on recent EMS-related publications.¹⁷ These methods could yield providers who otherwise under-estimate their specialized knowledge, or who hadn’t previously considered becoming a conference speaker. Finally, a speakers’ bureau could be created, much like that of FemInEM.org,²² in which EMS providers could list their interests, background, and even post sample recordings of lectures they have given.

Once new prospective female speakers have been identified, intentional mentorship on how to submit for and then deliver a conference session could be initiated. That strategy could be similar to the creation of a Speakers Development Program, as described by Sunga, et al.²⁷ This program engages prospective speakers into a three-phase-program, where each phase lasts one year: Year 1, self-directed learning about delivering presentations using free open-access medical education online resources; Year 2, developing and delivering a grand rounds presentation for their department followed by a critique of the recording with a mentor; and Year 3, submitting and delivering a presentation at a national conference. The program seemed to be effective at improving participants’ skills and confidence.²⁷ Key elements of the program’s success were mentor engagement, support from leadership, and accountability from peers.²⁷ The abrupt change to the delivery of medical education from in-person to online due to the COVID-19 pandemic makes this approach to speaker development even more realistic and generalizable.

While the skills involved in delivering conference presentations vary from those of webcast sessions, both experiences are likely meaningful for professional development, building self-confidence, and increasing visibility of female experts of the field. Year 1 could be completed entirely asynchronously, with input from a local or remote mentor. Given travel restrictions, many institutions may be utilizing more local faculty for grand rounds presentations, thus creating the opportunity for participants to hone their skills locally during Year 2. Since the travel previously required to attend or speak at national conferences can be expensive, time consuming, and limited by professional and personal obligations, the new virtual landscape of national conferences could make presentation opportunities during Year 3 more easily obtainable. This shift to online educational platforms reduces, if not obliterates, many of the previous barriers which prevented new speakers, both male and female, from joining the lecture circuit. Moreover, this silver-lining to the COVID-19 pandemic offers an opportunity to harness this innovation to improve conference speaker gender representation and speaker diversity.

Limitations

The most significant limitation to this study is the possible bias in determination of gender. Ideally, each speaker would be contacted

Conference	No. of Included Conference Sessions	Female Names Listed as Preconference Speakers n (%)	Female Names Listed as Keynote Speakers n (%)	Female Names Listed as Main Conference Speakers n (%)	Individual Speakers who are Female n (%)
AAA					
2017	28	N/A	1(33%)	6(18%)	7(26%)
2018	27	3(50%)	0(0%)	4(11%)	5(20%)
2019	58	3(60%)	0(0%)	10(13%)	8(16%)
AMTC					
2019	132	1(33%)	1(50%)	61(35%)	58(37%)
2020	58	N/A	1(50%)	19(31%)	19(35%)
EMS Today					
2018	110	6(14%)	0(0%)	19(9%)	21(11%)
2019	137	4(15%)	0(0%)	44(21%)	40(22%)
2020	117	2(13%)	0(0%)	17(11%)	18(14%)
EMS World Expo					
2016	160	1(7%)	0(0%)	31(16%)	18(16%)
2017	195	4(22%)	0(0%)	38(15%)	29(21%)
2018	241	12(29%)	2(22%)	61(18%)	48(21%)
2019	212	7(20%)	1(14%)	61(20%)	46(23%)
2020	72	10(40%)	0(0%)	59(32%)	48(34%)
NAEMSE					
2017	45	4(24%)	N/A	7(18%)	9(26%)
2018	53	6(40%)	N/A	11(22%)	11(27%)
2019	43	4(31%)	N/A	10(26%)	9(27%)
2020	21	N/A	N/A	6(23%)	6(23%)

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Table 1. Subset Analysis of the Speaker Composition for the Different Types of Conference Sessions for Each of the Included Conferences

Abbreviations: AAA, American Ambulance Association Annual Conference & Trade Show; AMTC, Air Medical Transport Conference; NAEMSE, National Association of EMS Educator's Symposium; N/A, appears if a type of conference session was not offered; EMS, Emergency Medical Services.

Conference	No. of Years in Analysis	Individual Speakers who are Female n (%)	Number of Years Female Speakers Returned to Present (Median [IQR])	Number of Years Male Speakers Returned to Present (Median [IQR])
EMS World	5	135(25%)	1 [1-1]	1 [1-2]
NAEMSE	4	22(27%)	1 [1-2]	1 [1-2]
EMS Today	3	69(17%)	1 [1-1]	1 [1-1]
AAA	3	14(19%)	1 [1-1.75]	1 [1-1]
AMTC	2	75(38%)	1 [1-1]	1 [1-1]

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Table 2. Mann-Whitney U Testing Revealed No Statistically Significant Difference in the Number of Years Male Speakers Returned to a Conference to Present in Subsequent Years than Female Speakers

Abbreviations: NAEMSE, National Association of EMS Educator's Symposium; AAA, American Ambulance Association Annual Conference & Trade Show; AMTC, Air Medical Transport Conference; EMS, Emergency Medical Services.

to ask how they describe their gender, which may not be limited to male or female. This was not feasible given the number of speakers and lack of contact information in conference programs. It is possible there were changes in speakers between the time that the conference program was published and the actual conference. Omission of a session title or speaker name was possible due to human error. Finally, because the study was limited to well-known national conferences, an analysis of gender representation of

speakers at regional or smaller EMS conferences may lead to a different conclusion.

Conclusion

Gender representation of speakers at national EMS conferences in the US is not reflective of the current best estimate of the US EMS workforce. This disparity exists not only in the overall percent of female names listed as speakers, but also in

the percent of individual female speakers, and is most pronounced within keynote speakers. Online lecture platforms as an unintentional consequent of the COVID-19 pandemic, coupled with intentional speaker development and mentorship initiatives, may reduce barriers to facilitating a new pipeline for more females to be featured as speakers at national EMS conferences.

Author Contributions

All authors meet ICMJE requirements for authorship: study concept and design (AD, LM); acquisition of the data (all authors); analysis and interpretation of the data (AD, LM); drafting of the manuscript (AD, LM); critical revision of the manuscript for important intellectual content (all authors); and statistical expertise (LM).

References

- Bennett CL, Raja AS, Kapoor N, et al. Gender differences in faculty rank among academic emergency physicians in the United States. *Acad Emerg Med.* 2019;26(3):281–285.
- Cydulka RK, D'Onofrio G, Schneider S, Emerman CL, Sullivan LM. Women in academic emergency medicine. *Acad Emerg Med.* 2000;7(9):999–1007.
- Carley S, Carden R, Riley R, et al. Are there too few women presenting at emergency medicine conferences? *Emerg Med J.* 2016;33(10):681–683.
- Joshi N. Gender Representation in Speakers at Emergency Medicine National Conferences Analysis of Trends from 2011–2015. 2017 Society of Academic Emergency Medicine Annual Meeting. Orlando, Florida USA; 2017.
- Kaji AH, Meurer WJ, Napper T, et al. State of the journal: women first authors, peer reviewers, and editorial board members at *Annals of Emergency Medicine*. *Ann Emerg Med.* 2019;74(6):731–735.
- Gottlieb M, Krzyzaniak SM, Mannix A, et al. Sex distribution of editorial board members among emergency medicine journals. *Ann Emerg Med.* 2021;77(1):117–123.
- Krzyzaniak SM, Gottlieb M, Parsons M, Rocca N, Chan TM. What emergency medicine rewards: is there implicit gender bias in national awards? *Ann Emerg Med.* 2019;74(6):753–758.
- Madsen TE, Linden JA, Rounds K, et al. Current status of gender and racial/ethnic disparities among academic emergency medicine physicians. *Acad Emerg Med.* 2017;24(10):1182–1192.
- Crowe RP, Krebs W, Cash RE, Rivard MK, Lincoln EW, Panchal AR. Females and minority racial/ethnic groups remain underrepresented in Emergency Medical Services: a ten-year assessment, 2008–2017. *Prehosp Emerg Care.* 2020;24(2):180–187.
- Clark Blickenstaff J. Women and science careers: leaky pipeline or gender filter? *Gender and Education.* 2005;17(4):369–386.
- Sardelis S, Drew JA. Not “pulling up the ladder:” women who organize conference symposia provide greater opportunities for women to speak at conservation conferences. *PLoS One.* 2016;11(7):e0160015.
- Paulus JK, Switkowski KM, Allison GM, et al. Where is the leak in the pipeline? Investigating gender differences in academic promotion at an academic medical center. *Perspect Med Educ.* 2016;5(2):125–128.
- Jones TM, Fanson KV, Lanfear R, Symonds MR, Higgie M. Gender differences in conference presentations: a consequence of self-selection? *PeerJ.* 2014;2:e627.
- Casadevall A, Handelsman J. The presence of female conveners correlates with a higher proportion of female speakers at scientific symposia. *mBio.* 2014;5(1):e00846–913.
- Ruzycki SM, Fletcher S, Earp M, Bharwani A, Lithgow KC. Trends in the proportion of female speakers at medical conferences in the United States and in Canada, 2007 to 2017. *JAMA Netw Open.* 2019;2(4):e192103.
- Boiko JR, Anderson AJM, Gordon RA. Representation of women among academic grand rounds speakers. *JAMA Intern Med.* 2017;177(5):722–724.
- Klein RS, Voskuhl R, Segal BM, et al. Speaking out about gender imbalance in invited speakers improves diversity. *Nat Immunol.* 2017;18(5):475–478.
- Larson AR, Sharkey KM, Poorman JA, et al. Representation of women among invited speakers at medical specialty conferences. *J Womens Health.* 2020;29(4):550–560.
- Shishkova E, Kwiecien NW, Hebert AS, Westphall MS, Prenni JE, Coon JJ. Gender diversity in a STEM subfield - analysis of a large scientific society and its annual conferences. *J Am Soc Mass Spectrom.* 2017;28(12):2523–2531.
- Bismark M, Morris J, Thomas L, Loh E, Phelps G, Dickinson H. Reasons and remedies for under-representation of women in medical leadership roles: a qualitative study from Australia. *BMJ Open.* 2015;5(11):e009384.
- Cejka MA, Eagly AH. Gender-stereotypic images of occupations correspond to the sex segregation of employment. *Personality Social Psychology Bulletin.* 1999;25(4):413–423.
- Mehta S, Rose L, Cook D, Herridge M, Owais S, Metaxa V. The speaker gender gap at critical care conferences. *Crit Care Med.* 2018;46(6):991–996.
- Amrein K, Stoisser S, Hoffmann M. Women at medical conferences 2016 - still hitting their head at the glass ceiling. *Wien Klin Wochenschr.* 2017;129(7–8):287–288.
- Lithgow KC, Earp M, Bharwani A, Fletcher S, Ruzycki SM. Association between the proportion of women on a conference planning committee and the proportion of women speakers at medical conferences. *JAMA Netw Open.* 2020;3(3):e200677.
- Casadevall A. Achieving speaker gender equity at the American Society for Microbiology General Meeting. *mBio.* 2015;6(4):e01146.
- Martin JL. Ten simple rules to achieve conference speaker gender balance. *PLoS Comput Biol.* 2014;10(11):e1003903.
- Sunga KL, Kass D. Taking the stage: a development program for women speakers in emergency medicine. *Emerg Med J.* 2019;36(4):199–201.