

Research Articles

The Majority of Abstracts Presented at the American Association for Hand Surgery Annual Meetings Are Later Published

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Objectives

The American Association of Hand Surgery (AAHS) is a national organization devoted to advancing hand surgery. It hosts an annual meeting with a podium and poster presentations highlighting relevant research. To better understand the value of AAHS, this study aimed to report the publication rate of AAHS annual meeting presentations from 2017-2020 and describe the traits of published abstracts. It was hypothesized that at a minimum of two years of follow-ups, most AAHS meeting presentations would be published, and the publication rate would be positively correlated with a higher level of evidence (LOE) and podium presentation.

Methods

AAHS meeting abstracts from 2017 to 2020 were collected from the AAHS website. PubMed and Google Scholar were queried using titles, keywords, and authors. Titles, author lists, abstracts, and journal qualities of successfully published articles were recorded.

Results

Between 2017 and 2020, 1,268 abstracts were presented at the AAHS annual meeting, and 786 (62%) were published at least 45 months after presentation. Publication rates for podium presentations (rate 68%, 280/413) were higher than posters (rate 59%, 506/855). Surprisingly, level IV abstracts (rate 78%, 296/378) were significantly more likely to be published than level I abstracts (rate 58%, 22/38, $P < 0.001$). Podium presentations had similar LOE, were published in journals with a similar impact factor, and had a similar number of citations relative to poster presentations.

Conclusions

Most presentations at the 2017-2020 AAHS annual meetings were published, demonstrating the value of the AAHS annual meeting. Podium presentations were published more often than posters but showed few other significant differences. The high publication rate of level IV relative to the level I abstracts may result from several factors, such as the extra time and complexity required to complete level I studies and the sample's predominance of level IV studies. These findings underscore the value of AAHS podium presentations for disseminating research.

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INTRODUCTION

Medical society annual meetings are important avenues for physician education, exchanging ideas, networking, and research presentations.¹ The American Association for Hand Surgery (AAHS) is one conference dedicated to advancing hand and upper extremity conditions. Founded in 1970, the AAHS provides a platform for sharing scientific knowledge between all providers of hand care, from therapists to surgeons.² Abstracts presented at annual meetings can also impact clinical education, and conferences strive to present high-quality research before the content is published in a journal.^{3,4}

Previous literature uses the publication rate of presented abstracts into published full-length manuscripts to evaluate a meeting's quality. AAHS abstracts from 2007-2016 have shown an overall publication rate of 47%, ranging from 45% for poster abstracts and up to 58% for podium abstracts.^{5,6} Abstracts presented from 1992-2014 at another hand surgery organization, the American Society for Surgery of the Hand (ASSH), had a publication rate of 46-54% overall, ranging from 44% for posters to 54% for podiums.^{5,7-9} The literature on these hand surgery conferences is imperfect as several reports study only podium presentations, do not stratify results between poster and podium abstracts, or include only abstracts related to specific anatomic regions.^{5,8,9} This could skew the perception of research presented at these conferences and create gaps in the assessment of poster presentations and the understanding of the upper extremity research landscape. Conference presentations at other surgical subspecialty conferences have a wide range of publication rates (between 44% and 71%), depending on the conference, timeframe, and presentation type.¹⁰⁻¹⁸

To better understand the value of AAHS presentations toward ultimate journal publication, this study aimed to report the publication rate of AAHS annual meeting presentations from 2017-2020 and describe the traits of published abstracts. It was hypothesized that at a minimum of two years of follow-ups, most AAHS meeting presentations would be published, and the publication rate would be positively correlated with a higher level of evidence (LOE) and podium presentation.

METHODS

Per institutional guidelines, this study was exempt from the institutional review board as no patient information was examined, and only published public online information was studied. Abstracts presented at the AAHS annual meetings from 2017 to 2020 were identified from the AAHS website. Conferences after 2020 were not studied to allow for at least two years of follow-up. Pre-publication data were collected from each abstract, including the title, author, presentation type (poster or podium), anatomic region, general topic, and LOE. Anatomic regions were defined as "Finger/Hand," "Wrist/Forearm," "Elbow/Humerus," "Shoulder/Axilla/Neck," "Multiple," and "Other," as was used by previously Kuczmarski *et al.*⁵ LOE were either

recorded as reported directly in the abstract or determined by the reviewers per American Association of Orthopaedic Surgeons (AAOS) guidelines introduced in Swiontkowski *et al*, with disagreements resolved by reviewer discussion or escalation to a senior author.¹⁹ Non-clinical studies were excluded from LOE analysis.

Both PubMed and Google Scholar were queried to determine publication status. Abstract titles were searched first, followed by adding the first authors. If this failed to return a match, searches were conducted with keywords from the abstract, title, and additional co-authors. The abstract was marked as unpublished if no full-length manuscript matches were found in either database after each of these searches. If a full-length manuscript match was found, the publication date, journal name, journal impact factor (IF), the list of authors, LOE, and number of citations were collected. The two-year IF represents the number of citations garnered in a given year divided by the total number of articles published in the journal's preceding two years and is a widely utilized measure of a journal's contribution to the literature. The 2022 IF was obtained from each journal's website and utilized for analysis in this study. Citation data was gathered from Google Scholar.

Data was analyzed using descriptive statistics with means for continuous data and percentages for categorical data, where appropriate. Students' t-tests were performed for continuous variables, and Pearson chi-square tests were conducted to make bivariate comparisons for categorical variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The overall publication rate of abstracts presented at the AAHS annual meeting from 2017 to 2020 was 62% (786 of 1,268 abstracts). Podium presentations were significantly more likely to be published than poster presentations (*P=0.003), with 280 of the 513 podium (68%) and 506 of the 855 poster presentations (59%) later published. Publication rates varied over the study period; podium presentations varied the most, ranging from 59% (58/99) to 77% (82/106) [Figure 1]. The number of yearly abstracts also increased from 276 in 2017 to 404 in 2020. The mean time-to-publication (TTP) did not significantly differ between podiums and posters (20.0 months vs 19.4 months, *P=0.91). Furthermore, the number of authors increased by 43% (337/786) of published abstracts between the meeting presentation and final publication.

Abstracts from the AAHS annual meeting were published in 55 unique journals. Among these, the most common journals of publication were the Journal of Hand Surgery: American Volume (*J Hand Surg Am*, 163 abstracts), *HAND* (*HAND*, 161 abstracts), and Plastic and Reconstructive Surgery (*Plast Reconstr Surg*, 43 abstracts); these abstracts represented 29% (367/1254) of the total presented abstracts.

Level I studies made up just 3.0% of the total abstracts presented (38/1254), followed by level II studies (9.3%, 117/1254), non-clinical studies (20.%, 256/1254), level IV stud-

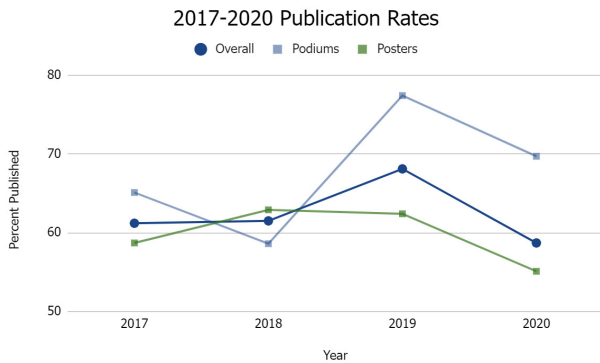


Figure 1. Shows the overall publication rate for abstracts presented at the AAHS annual meetings from 2017-2020.

Podium presentations showed more variance than poster presentations but had a significantly higher publication rate overall. The decline in the last year correlates with a sharp increase in the abstracts presented (276 to 404). A similar but smaller decline is seen from 2017 to 2018, where the number of abstracts presented increased from 276 to 312.

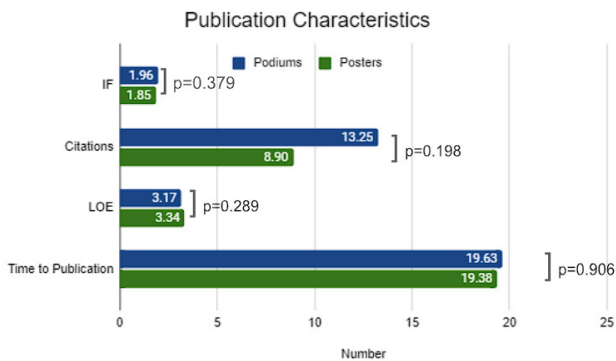


Figure 2. Displays the average characteristics of published ASSH abstracts.

IF = impact factor, LOE = Level of Evidence. After publication, podium and poster abstracts did not differ significantly in any of the metrics measured.

ies (30%, 378/1254), and level III studies (37%, 465/1254). Compared to poster presentations, podium presentations had similar LOE (3.2 vs. 3.3, $*P=0.29$), were published in journals with a similar IF (2.0 vs. 1.9, $*P=0.38$), and received a similar number of citations compared to poster presentations (13 vs 8.9, $*P=0.20$) [Figure 2]. However, a significant association was observed between LOE and publication rate ($P<0.001$); 78% (296/378) of abstracts demonstrating level IV evidence were published, contrasted with 58% (22/38) of abstracts with level I evidence.

Table 1 shows the publication rates for posters and podium presentations by topic and region [Table 1]. There was no significant association between anatomic region and publication rate ($*P=0.07$). When analyzed by region or topic, podium presentations had significantly higher publication rates than posters in wrist/forearm ($*P=0.002$) and basic science (other, $*P=0.01$). Among anatomic regions, the 'elbow/humerus' category exhibited the highest publication rate (67%, 80/120), followed by 'multiple re-

gions' (64%, 93/146). No significant association was found between abstract topics and publication rate ($*P=0.07$). However, significant differences in publication rates between podiums and posters were observed for basic science abstracts (85% [11/13] vs 52% [13/25], $*P=0.05$) and neuropathy abstracts (72% [36/50] vs 42% [31/74], $P<0.001$). Abstracts focusing on medical education demonstrated the highest publication rate (79% [22/28]), followed by biomechanics (72% [53/74]) and anatomy (69% [49/71]).

DISCUSSION

The publication rate of abstracts presented at a conference can speak to the quality of the research presented and helps communicate the value of the conference as a platform for spreading new knowledge ahead of manuscript publication. This study found the AAHS had an overall publication rate of 62.0% from 2017 to 2020, higher than the previously reported rate of 47% from 2011 to 2015.⁶ Furthermore, the poster and podium rates were 59.2% and 67.8%, respectively, in 2017-2020, compared with previous podium rates of 49-58% and poster rates of 45%.^{5,6} This increase may suggest that the scientific rigor of AAHS meeting presentations has increased in recent years, such that a higher percentage now go on to publication. Still, it could also reflect changes in overall publication trends, including increased publications expected for academic advancement, increased availability of online open-access journals, or an overall increase in journal articles published yearly.²⁰⁻²² There has also been an upward trend in the number of abstracts presented at each conference, which is likely multifactorial and may reflect changes in meeting format to accommodate more presentations or an increased focus on delivering research at the AAHS annual meeting. The rate of publication reported here is also comparable to the ASSH overall rates (62%), podium rates (49-72%), and poster rates (44%).^{5,7-9} The AAHS publication rate compares favorably with other subspecialty meetings, which range from 44% to 71% overall, with poster rates from 38% to 63% and podium rates from 36% to 90%. Several other subspecialty meetings have also shown an upward trend in publication rates.^{1, 11-15,17,18,23}

Interestingly, level I studies were published significantly less frequently than level IV studies in our sample. Though the reason for this is beyond the scope of this paper, this could reflect the longer-than-average TTP for level I studies relative to higher LOE studies, the 10 to 1 level IV to level I sample size discrepancy, or the additional challenges intrinsic to completing a level I study (recruitment, expense, rigid study design, etc.). Furthermore, some authors of level I studies may opt to present their preliminary findings at the meeting to continue enrollment before completing the final study for journal publication.

The mean TTP across many disciplines is around 18.4 months, with some estimates ranging between 3-21 months.^{23,24} The AAHS and ASSH had a similar TTP, ranging from 11-25.2 months.⁵⁻⁸ Previous studies for other orthopaedic conferences have reported a shorter TTP (11.4-17.4 months).^{1,10,13-17} Mean LOE for AAHS abstracts

Table 1. Poster and Podium Publication Rates by Topic and Region.

	Podium Publication Rate (%)	Poster Publication Rate (%)	p-value	Overall Publication Rate (%)
Topic				
Anatomy	80.0 (16/20)	64.7 (33/51)	0.2	69.0** (49/71)
Basic Science	84.6 (11/13)	52.0 (13/25)	0.05*	63.2 (24/38)
Biomechanics	77.8 (21/27)	68.1 (32/47)	0.4	71.6** (53/74)
Cost Analysis	80.0 (4/5)	56.5 (13/23)	0.3	60.7 (17/28)
Degenerative	52.0 (26/50)	57.8 (37/64)	0.5	55.3 (63/114)
Medical Education	100.0 (4/4)	75.0 (18/24)	0.3	78.6** (22/28)
Microsurgery	47.4 (9/19)	57.4 (27/47)	0.5	54.5 (36/66)
Neuropathies	72.0 (36/50)	41.9 (31/74)	0.001*	54.0 (67/124)
Pediatrics/ Congenital	52.9 (18/34)	57.9 (22/38)	0.7	55.6 (40/72)
Trauma	62.5 (55/88)	56.7 (135/238)	0.3	58.3 (190/326)
Other	76.7 (23/30)	62.7 (74/118)	0.2	65.5 (97/148)
Region				
Finger/Hand	57.7 (75/130)	55.9 (165/295)	0.7	56.5 (240/425)
Wrist/Forearm	72.6 (106/146)	57.4 (155/270)	0.002*	62.7 (261/416)
Elbow/Humerus	63.2 (24/38)	68.3 (56/82)	0.6	66.7** (80/120)
Shoulder/Axilla/ Neck	56.3 (9/16)	35.7 (5/14)	0.3	46.7 (14/30)
Multiple	69.6 (32/46)	61.0 (61/100)	0.3	63.7** (93/146)
Other	95.0 (19/20)	66.3 (53/80)	0.01*	72.0** (72/100)

Compares the podium and poster publication rates by topic and region. Podium presentations outperformed posters in the basic science ("other" region), neuropathy, and wrist/forearm categories. The categories with the highest overall publication rates were anatomy, biomechanics, medical education, elbow/humerus, and multiple region categories. Significant p-values are marked with a single asterisk (*), and the top three publication rates for each category are marked with two asterisks (**).

was 3.2 for podiums and 3.3 for posters; previously reported ASSH podium abstracts have a slightly weaker mean LOE (3.3 vs 3.5).⁵ Previous studies of orthopaedic subspecialty meetings found that most presented abstracts were level III or IV evidence, the number of abstracts representing level I or II increased over time, level I or II abstracts were associated with a significantly higher publication rate, and podium presentations had a stronger LOE than posters.^{6,8,10,12,14,16,17,25} Journal IF has generally increased over time, and most orthopaedic journals have an IF below four.^{26,27} The mean IF of journals publishing AAHS abstracts was 1.9 (2.0 podium, 1.9 poster). Other orthopaedic subspecialty meetings also did not always show a significant difference in mean journal IF between podium and poster presentations.^{10,12,14,17} The mean number of citations that published AAHS manuscripts received was 11.1 (13.2 for podiums, 8.9 for posters). Other orthopaedic subspecialty meetings found significantly higher citations for podium abstracts over poster abstracts, reaching a mean of 36.^{10,12,17} Podium and poster presentations had similar average LOE (3.2 vs. 3.3, $P=0.29$). Due to this similarity, other factors may influence the selection of podium presentations, such as filling pre-determined presentation categories or inherent bias in the abstract selection committees. Furthermore, there were no significant differences between published podium or poster presentations in TTP, journal IF,

or citation count, suggesting similar publication quality for both poster and podium presentations that are later published.

The anatomic region was not associated with the likelihood of publication, but basic science abstracts were more likely to be published. Historically, the AAHS has presented more on neuropathy but less on basic science and pediatric or congenital conditions than the ASSH.⁵ Historically common topics for both conferences include trauma (28.1%), degenerative conditions (19.2%), and biomechanical studies (10%).⁵ Other subspecialty meetings also found no impact of anatomic region on publication rate and no significant differences in the topics presented among similar subspecialty meetings.^{5,9,12,14,17}

The most common journal of publication for conference presentations is often an associated journal, with many journals publishing 25-50% of the successfully published presentations.^{1,5-18} The two most common journals of publication for AAHS abstracts were *J Hand Surg Am* (20.7%, 163/786) and *HAND* (20.4%, 161/786), up from 30% and 21% in recent years (respectively).⁶ These two journals are affiliated with the ASSH and AAHS societies and are often referred to as the two most highly regarded journals in hand surgery. The high percentage of abstracts published in these top journals could be interpreted differently. First, this may reflect that abstracts accepted for publication at

the annual meeting are preferentially submitted to these highly regarded journals. Alternatively, it may reflect that studies presented at the annual meeting are more likely to be accepted by these top journals.

This study was not without limitations. There is a chance that some abstracts were published but not identified in the analysis. This could be due to human error, publications not indexed in PubMed or Google Scholar, or abstracts with a notable change in the title or author list between conference presentation and publication. Including these would only raise the publication rates, so the results of this study could be considered an underestimate. Most abstracts are published within two years of presentation, so this limitation is small; however, this may disproportionately affect level I studies.²³ The anatomy and topic data are not necessarily validated or codified, and the subjectivity may skew the data. Finally, the journal IF data relies on accurate self-reporting by each journal on their website.

CONCLUSIONS

This study of AAHS annual conference abstracts from 2017-2020 found that 62.0% of abstracts went on to be published, an increase from previous years. Podium presentations were more likely to be published overall than posters. When stratified by topic or region, only podiums involving basic science or the wrist and forearm were published more often than posters. The level of evidence, mean TTP, mean IF of publishing journals, and mean number of citations did not differ significantly between poster and podium publi-

cations. These findings demonstrate the value of presentation at a national conference like the AAHS, with publication rates across several conferences trending upward over time and most studies representing level III or IV evidence.

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DECLARATION OF CONFLICT OF INTEREST

The authors do NOT have any potential conflicts of interest for this manuscript.

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DECLARATION OF ETHICAL APPROVAL FOR STUDY

This study did not require IRB approval.

DECLARATION OF INFORMED CONSENT

There is no information present in the submitted manuscript that can be used to identify patients.

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