Oral presentation to publication: publication rates of abstract presentations across two pediatric neurosurgical meetings

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OBJECTIVE Both the American Association of Neurological Surgeons/Congress of Neurological Surgeons Joint Section on Pediatric Neurological Surgery (AANS/CNS Pediatric Section) and the International Society for Pediatric Neurosurgery (ISPN) annual meetings provide a platform for pediatric neurosurgeons to present, discuss, and disseminate current academic research. An ultimate goal of these meetings is to publish presented results in peer-reviewed journals. The purpose of the present study was to investigate the publication rates of oral presentations from the 2009, 2010, and 2011 AANS/CNS Pediatric Section and ISPN annual meetings in peer-reviewed journals.

METHODS All oral presentations from the 2009, 2010, and 2011 AANS/CNS Pediatric Section and ISPN annual meetings were reviewed. Abstracts were obtained from the AANS/CNS Pediatric Section and ISPN conference proceedings, which are available online. Author and title information were used to search PubMed to identify those abstracts that had progressed to publication in peer-reviewed journals. The title of the journal, year of the publication, and authors' country of origin were also recorded.

RESULTS Overall, 60.6% of the presented oral abstracts from the AANS/CNS Pediatric Section meetings progressed to publication in peer-reviewed journals, as compared with 40.6% of the ISPN presented abstracts ($p = 0.0001$). The journals in which the AANS/CNS Pediatric Section abstract-based publications most commonly appeared were *Journal of Neurosurgery: Pediatrics* (52%), *Child's Nervous System* (11%), and *Journal of Neurosurgery* (8%). The ISPN abstracts most often appeared in the journals *Child's Nervous System* (29%), *Journal of Neurosurgery: Pediatrics* (14%), and *Neurosurgery* (9%). Overall, more than 90% of the abstract-based articles were published within 4 years after presentation of the abstracts on which they were based.

CONCLUSIONS Oral abstract presentations at two annual pediatric neurosurgery meetings have publication rates in peer-reviewed journal comparable to those for oral abstracts at other national and international neurosurgery meetings. The vast majority of abstract-based papers are published within 4 years of the meeting at which the abstract was presented; however, the AANS/CNS Pediatric Section abstracts are published at a significantly higher rate than ISPN abstracts, which could indicate the different meeting sizes, research goals, and resources of US authors compared with those of authors from other countries.

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KEY WORDS pediatric neurosurgery; abstract; publication; annual meeting

PUBLISHING work in peer-reviewed journals helps to advance research by allowing individuals to contribute to the growing literature, promote the research topic, and introduce novel and innovative approaches to the research community. It also affords scientists the opportunity to work in a collaborative environment to advance their field of study.

In particular, neurosurgical conferences provide a unique opportunity for clinicians and researchers to present, discuss, and disseminate important developments in neurosurgery and neurosurgical subspecialties.³ Such conferences are held annually by the American Association of Neurological Surgeons/Congress of Neurological Surgeons Joint Section on Pediatric Neurological Surgery

ABBREVIATIONS AANS/CNS Pediatric Section = American Association of Neurological Surgeons/Congress of Neurological Surgeons Joint Section on Pediatric Neurological Surgery; ISPN = International Society for Pediatric Neurosurgery.

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TABLE 1. Cumulative publication rates of abstracts presented at the AANS/CNS Pediatric Section meeting

Yr	No. (%)			
	2009	2010	2011	Total
Meeting yr	2 (2.4)	8 (9.9)	6 (6.7)	16 (6.3)
1st yr after	16 (19.3)	28 (34.6)	29 (32.2)	73 (28.7)
2nd yr after	25 (30.1)	43 (53.1)	46 (51.1)	114 (44.9)
3rd yr after	33 (39.8)	49 (60.5)	52 (57.8)	134 (52.8)
4th yr after	39 (47.0)	52 (64.2)	57 (63.3)	148 (58.3)
>4th yr after	42 (50.6)	54 (66.7)	58 (64.4)	154 (60.6)

(AANS/CNS Pediatric Section) and by the International Society for Pediatric Neurosurgery (ISPN). These two organizations share similar mission statements, with the goal of promoting the health of children through the exchange of scientific information.^{1,7} The ultimate aim of these meetings is to reach a large audience and eventually publish the presented results in a peer-reviewed journal to further increase the dissemination of knowledge. This aim is in line with the goals of individual investigators, who often submit abstracts to meetings with the intention of publishing a full-length article.^{10,12} These publications, while primarily aimed at improving clinical practice, also promote the efficient use of research resources by preventing the replication of redundant studies.^{4,5,9,10,12}

The purpose of the current study was to investigate the publication rates of oral presentations from the 2009, 2010, and 2011 AANS/CNS Pediatric Section and ISPN annual meetings in peer-reviewed journals. We hope that our findings and suggestions will lead to the development of new strategies to improve publication rates and prevent publication bias.

Methods

All oral presentations from the 2009, 2010, and 2011 AANS/CNS Pediatric Section and ISPN annual meetings were reviewed. These years were selected to allow adequate time for publication following the meeting (that is, at least 5 years). Abstracts were obtained from the AANS/CNS Pediatric Section and ISPN conference proceedings, which are available online. If an abstract had gone to publication, the title of the publishing journal, year of the publication, and authors' country of origin were also recorded.

A PubMed search (May 2016) was conducted using the author and title of these abstracts to determine whether they had progressed to peer-reviewed publication. A match was defined as adequate similarity between the abstract and publication with regard to title, authors, methods, and results. If there were differences in the authors or title, the content of the full text was reviewed for similarity. If methods, protocols, or conclusions were different, the publication was not considered a match. If no match was found, the abstract was considered not to have progressed to publication.

Yearly publication rate was determined by dividing the number of published abstracts from that year by the total number of presented abstracts per year.

TABLE 2. Cumulative publication rates of abstracts presented at the ISPN meeting

Yr	No. (%)			
	2009	2010	2011	Total
Meeting yr	12 (8.6)	17 (13.3)	13 (9.7)	42 (10.5)
1st yr after	29 (20.9)	32 (25.0)	33 (24.6)	94 (23.4)
2nd yr after	45 (32.4)	46 (35.9)	42 (31.3)	133 (33.2)
3rd yr after	49 (35.3)	51 (39.8)	47 (35.1)	147 (36.7)
4th yr after	53 (38.1)	51 (39.8)	51 (38.1)	155 (38.7)
>4th yr after	58 (41.7)	53 (41.4)	52 (38.8)	163 (40.6)

Statistical analysis was conducted using Fisher's exact test to compare the two meetings. A p value < 0.05 was considered statistically significant.

Results

A total of 254 abstracts from the 2009–2011 AANS/CNS Pediatric Section and 401 abstracts from the 2009–2011 ISPN annual meetings were presented at the meetings. Overall, 60.6% of the presented abstracts from the AANS/CNS Pediatric Section meetings progressed to publication in peer-reviewed journals, as compared with 40.6% of the ISPN presented abstracts (p = 0.0001). Publication rates for each meeting are detailed in Tables 1 and 2. The cumulative rate of abstract-based publications each year of and after the meetings is shown in Fig. 1. Over 90% of the abstract-based papers were published within 4 years after presentation of the abstracts on which they were based (Fig. 2). The AANS/CNS Pediatric Section abstract-based articles were published in 32 different journals but appeared most commonly in *Journal of Neurosurgery: Pediatrics* (52%), *Child's Nervous System* (11%), and *Journal of Neurosurgery* (8%; Table 3). The ISPN abstracts were published in 53 different journals but most often appeared in *Child's Nervous System* (29%), *Journal of Neurosurgery: Pediatrics* (14%), and *Neurosurgery* (9%; Table 4). Authors from 28 countries had their ISPN abstracts published, with most authors' country of origin the US (17%), Korea (12%), or India (10%; Table 5).

Discussion

In this study, two prominent pediatric neurosurgery meetings had 60.6% (AANS/CNS Pediatric Section) and 40.6% (ISPN) of presented abstracts progress to publication. These rates are similar to previously reported abstract publication rates for other neurosurgery meetings. Patel et al. reported 42% and 41% publication rates for oral abstract presentations from AANS and CNS annual meetings, respectively.¹⁶ Jamjoom et al. reported a publication rate of 37% but did not distinguish between oral and poster abstracts from the Society of British Neurological Surgeons meeting.⁸ Large meetings focused on the spine had similar publication rates between 40% and 48%.^{19,22} More recently, the Cervical Spine Research Society documented a 66% oral abstract publication rate.¹³

Expanding on past neurosurgery meetings, authors of a

FIG. 1. Cumulative publication rate of presented abstracts. The y-axis represents the percentage of presented abstracts that progressed to publication.

study in 2016 showed that the publication rate for a large clinical oncology annual meeting was around 61%.¹² Furthermore, a Cochrane review of abstract publication rates from numerous specialties revealed that only 53% of abstracts (combined oral and poster) are published in full.¹⁷ Factors contributing to higher publication rates included oral presentations, randomized controlled trials, studies with positive results, and smaller meetings.

We observed that US authors had a higher rate of ISPN abstract-based publications than the authors from any other country and that the AANS/CNS Pediatric Section meeting had an overall higher publication rate than the ISPN meeting. Similar findings have been reported for meetings within other surgical subspecialties, such as urology.^{2,6,14,20} In a meta-analysis of meetings for numerous specialties, US meetings were also found to have significantly higher rates of publication than meetings held outside the US.²¹

Several reasons for low publication rates have been proposed. For example, studies can be discontinued due to insufficient funding or inconsistent results^{4,5,10,11,17} or a lack of time to complete the project.^{18,20} Sprague et al. surveyed authors who had submitted abstracts to the 1996 Annual Meeting of the American Academy of Orthopaedic Surgeons and whose abstracts had not progressed to full-text publication.²⁰ Among the responders, 35.7% of their abstracts had not been submitted for publication for reasons such as insufficient time for research, confusion regarding who should author the manuscript, difficulty completing the manuscript given issues with coauthors, and lack of desire to publish.²⁰ Similarly, 57% of investigators with unpublished abstracts from the Brazilian urological meeting cited a lack of interest or intent to publish.¹⁴

FIG. 2. Cumulative publication rate percentages of presented abstracts. The y-axis represents the percentage of the total number of abstracts published.

TABLE 3. Journals publishing AANS/CNS Pediatric Section abstract-based articles*

Journal Name	No. of Published Articles (%)
1. <i>Journal of Neurosurgery: Pediatrics</i>	80 (51.9)
2. <i>Child's Nervous System</i>	17 (11.0)
3. <i>Journal of Neurosurgery</i>	13 (8.4)
4. <i>Journal of Neuro-Oncology</i>	8 (5.2)
5. <i>Neurosurgery</i>	5 (3.2)
6. <i>Journal of Neurosurgery: Spine</i>	3 (1.9)
7. <i>Epilepsy and Behavior</i>	2 (1.3)
7. <i>Pediatric Neurosurgery</i>	2 (1.3)
7. <i>World Neurosurgery</i>	2 (1.3)
7. <i>American Journal of Neuroradiology</i>	2 (1.3)

* That is, those journals publishing > 1 abstract-based article. Thirty-two journals published the abstract-based articles.

Another common reason for low publication rates may be publication bias, whereby journals tend to disproportionately publish studies with statistically or clinically significant findings and reject those with negative results. Despite this, some research has shown that there is little difference in the acceptance rate of positive versus negative or null studies.^{13,15} Nonetheless, a disproportionate number of positive studies are submitted for publication due to publication bias, leading to a relative lack of non-positive studies in the literature.¹³ A lack of awareness of these unpublished results can have a negative impact on both academic and clinical practice, potentially leading to duplication of efforts in the reproduction of previous failed studies.⁵

Given the findings of our study, as well as those in the literature, we list the following recommendations for in-

TABLE 4. Journals publishing ISPN abstract-based articles*

Journal Name	No. of Published Articles (%)
1. <i>Child's Nervous System</i>	48 (29.4)
2. <i>Journal of Neurosurgery: Pediatrics</i>	23 (14.1)
3. <i>Neurosurgery</i>	14 (8.6)
4. <i>Pediatric Neurosurgery</i>	11 (6.7)
5. <i>Acta Neurochirurgica</i>	5 (3.1)
6. <i>Journal of Korean Neurosurgical Society</i>	3 (1.8)
6. <i>Journal of Neurosurgery</i>	3 (1.8)
6. <i>Journal of Pediatric Neurosciences</i>	3 (1.8)
6. <i>Neurology India</i>	3 (1.8)
10. <i>Archives of Disease in Childhood</i>	2 (1.2)
10. <i>Clinical Neurosurgery</i>	2 (1.2)
10. <i>Journal of Craniofacial Surgery</i>	2 (1.2)
10. <i>Pediatric Blood and Cancer</i>	2 (1.2)
10. <i>Proteomics</i>	2 (1.2)
10. <i>World Neurosurgery</i>	2 (1.2)

* That is, those journals publishing > 1 abstract-based article. Fifty-three journals published the abstract-based articles.

TABLE 5. Authors' country of origin (all countries) among ISPN publications*

Country	No. of Articles Published (%)
1. United States of America	28 (17.2)
2. Republic of Korea	20 (12.3)
3. India	17 (10.4)
4. United Kingdom	14 (8.6)
5. Germany	12 (7.4)
6. Italy	10 (6.1)
7. Japan	9 (5.5)
8. Turkey	7 (4.3)
9. Canada	6 (3.7)
10. Brazil	5 (3.1)
10. France	5 (3.1)
12. Israel	3 (1.8)
12. Nigeria	3 (1.8)
12. South Africa	3 (1.8)
12. Sweden	3 (1.8)
16. Argentina	2 (1.2)
16. China	2 (1.2)
16. Denmark	2 (1.2)
16. Taiwan	2 (1.2)
16. Spain	2 (1.2)
21. Australia	1 (0.6)
21. Czech Republic	1 (0.6)
21. Finland	1 (0.6)
21. Greece	1 (0.6)
21. Iran	1 (0.6)
21. Mexico	1 (0.6)
21. Netherlands	1 (0.6)
21. Poland	1 (0.6)

* Authors from 28 countries had abstracts that progressed to publication.

investigators hoping to publish their presented work: 1) Ensure that the study methodology is sound (especially for preliminary data). This, in turn, would result in a lower chance of rejection by reviewers and would ensure validity of the data. 2) Have dedicated time for completion of the work, answering the problem of researchers who referred to a "lack of time" as a challenge to publishing. 3) Have a committed group of coauthors with defined roles a priori to dissuade conflicts. 4) Perform thorough literature reviews to avoid replicating previously reported results. 5) Encourage authors to publish their results even if they are negative because such findings are important to the literature, as discussed above.

It should be noted that our study does have some limitations. We report the publication rate for two large pediatric neurosurgery meetings, one held in the US and one held outside the US. However, there are several other national and international meetings that we did not capture, including the American Society of Pediatric Neurosurgeons (ASPN). The ASPN annual meeting was not included because of its high proportion of case discussions, complica-

tions, invited speakers, and guest presentations and lack of submitted abstract presentations. Neither did we compare published and unpublished studies based on study type or content, nor did we investigate the publishing rate of abstracts accepted in poster format. Finally, our comparison of publication rates across conferences is limited by a lack of data on publication rates from other international meetings as broad as the one held by the ISPN, and suggestions for improving publication rates may not be generalizable to developing countries, where dedicated time for research is unlikely and resources for research are sparse. However, future research, conducted among a broader selection of pediatric neurosurgery meetings, should focus on determining common characteristics of unpublished studies to improve our understanding of this problem.

Conclusions

Oral abstract presentations at two annual pediatric neurosurgery meetings have publication rates in peer-reviewed journals comparable to those for oral abstracts at other national and international neurosurgery meetings. The vast majority of abstract-based papers are published within 4 years of the meeting at which the abstract was presented; however, the AANS/CNS Pediatric Section abstracts are published at a significantly higher rate than ISPN abstracts, which could indicate the different meeting sizes, research goals, and resources of US authors compared with those of authors from other countries.

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References

1. American Association of Neurological Surgeons: About the AANS. **AANS.org**. (<http://www.aans.org/About-Us>) [Accessed January 19, 2018]
2. Daruwalla ZJ, Huq SS, Wong KL, Nee PY, Murphy DP: "Publish or perish"—presentations at annual national orthopaedic meetings and their correlation with subsequent publication. **J Orthop Surg Res** 10:58, 2015
3. Eksi MS, Kaplan SC, Yilmaz B, Akakin A, Toktas ZO, Konya D, et al: Publication rates of presentations at annual scientific meetings of the Turkish Neurosurgical Society. **Turk Neurosurg** 27:142–145, 2017
4. Furness HN, Miller GW, Lewis TL: Publication fate of abstracts presented at British association of clinical anatomists annual meetings. **Clin Anat** 30:133–139, 2017
5. Greene DN, Wilson AR, Bailey NM, Schmidt RL: Publication outcome of abstracts presented at the AACC annual meeting. **Clin Chim Acta** 456:49–55, 2016
6. Hoag CC, Elterman DS, Macneily AE: Abstracts presented at the American Urological Association Annual Meeting: determinants of subsequent peer reviewed publication. **J Urol** 176:2624–2629, 2006
7. International Society For Pediatric Neurosurgery: Our mission. **ISPNeurosurgery.org**. (<http://www.ispneurosurgery.org/our-mission>) [Accessed January 19, 2018]
8. Jamjoom AA, Hughes MA, Chuen CK, Hammersley RL, Fouyas IP: Publication fate of abstracts presented at Society

- of British Neurological Surgeons meetings. **Br J Neurosurg** **29**:164–168, 2015
9. Janssen T, Bartels R, Lind B, Villas Tome C, Vleggeert-Lankamp CL: Publication rate of paper and podium presentations from the European Section of the Cervical Spine Research Society Annual Meeting. **Eur Spine J** **25**:2311–2316, 2016
 10. Kocaaslan R, Kayalı Y, Tok A, Tepeler A: Publication rates of full-text journal articles converted from abstracts presented during the 22nd Turkish National Urology Congress. **Turk J Urol** **42**:16–20, 2016
 11. Krzyzanowska MK, Pintilie M, Tannock IF: Factors associated with failure to publish large randomized trials presented at an oncology meeting. **JAMA** **290**:495–501, 2003
 12. Massey PR, Wang R, Prasad V, Bates SE, Fojo T: Assessing the eventual publication of clinical trial abstracts submitted to a large annual oncology meeting. **Oncologist** **21**:261–268, 2016
 13. Okike K, Kocher MS, Mehlman CT, Heckman JD, Bhandari M: Publication bias in orthopaedic research: an analysis of scientific factors associated with publication in the Journal of Bone and Joint Surgery (American Volume). **J Bone Joint Surg Am** **90**:595–601, 2008
 14. Oliveira LR, Figueiredo AA, Choi M, Ferrarez CE, Bastos AN, Netto JM: The publication rate of abstracts presented at the 2003 urological Brazilian meeting. **Clinics (São Paulo)** **64**:345–349, 2009
 15. Olson CM, Rennie D, Cook D, Dickersin K, Flanagan A, Hogan JW, et al: Publication bias in editorial decision making. **JAMA** **287**:2825–2828, 2002
 16. Patel AJ, Cherian J, Fox BD, Whitehead WE, Curry DJ, Luerssen TG, et al: Publication patterns of oral and poster presentations at the annual meetings of the Congress of Neurological Surgeons and the American Association of Neurological Surgeons. **J Neurosurg** **115**:1258–1261, 2011
 17. Scherer RW, Langenberg P, von Elm E: Full publication of results initially presented in abstracts. **Cochrane Database Syst Rev** (2):MR000005, 2007
 18. Scherer RW, Ugarte-Gil C, Schmucker C, Meerpohl JJ: Authors report lack of time as main reason for unpublished research presented at biomedical conferences: a systematic review. **J Clin Epidemiol** **68**:803–810, 2015
 19. Schulte TL, Huck K, Osada N, Trost M, Lange T, Schmidt C, et al: Publication rate of abstracts presented at the Annual Congress of the Spine Society of Europe (years 2000–2003). **Eur Spine J** **21**:2105–2112, 2012
 20. Sprague S, Bhandari M, Devereaux PJ, Swiontkowski MF, Tornetta P III, Cook DJ, et al: Barriers to full-text publication following presentation of abstracts at annual orthopaedic meetings. **J Bone Joint Surg Am** **85-A**:158–163, 2003
 21. von Elm E, Costanza MC, Walder B, Tramèr MR: More insight into the fate of biomedical meeting abstracts: a systematic review. **BMC Med Res Methodol** **3**:12, 2003
 22. Wang JC, Yoo S, Delamarier RB: The publication rates of presentations at major Spine Specialty Society meetings (NASS, SRS, ISSLS). **Spine (Phila Pa 1976)** **24**:425–427, 1999

Disclosures

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

Author Contributions

Conception and design: Bonfield, Naftel, Wellons. Acquisition of data: Bonfield, Pellegrino, Berkman. Analysis and interpretation of data: Bonfield, Pellegrino, Berkman. Drafting the article: Bonfield, Pellegrino, Berkman, Shannon. Critically revising the article: Bonfield, Naftel, Shannon, Wellons. Reviewed submitted version of manuscript: Bonfield, Naftel, Shannon, Wellons. Approved the final version of the manuscript on behalf of all authors: Bonfield. Statistical analysis: Bonfield. Administrative/technical/material support: Shannon. Study supervision: Bonfield, Wellons.

Supplemental Information

Previous Presentations

Portions of this work were presented in abstract form at the International Society for Pediatric Neurosurgery (ISPN) annual meeting, Kobe, Japan, October 2016.

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