Publication outcomes for research presented at a Canadian surgical conference

Sean A. Crawford, MD, MSc
Graham Roche-Nagle, MD, MBA

Accepted Oct. 25, 2016; Early-released
Feb. 1, 2017

Correspondence to:

G. Roche-Nagle
Toronto General Hospital
6th Floor, Room 218
200 Elizabeth Street EN
Toronto ON M5G 2C4
graham.roche-nagle@uhn.ca

DOI: 10.1503/cjs.010916

Background: The failure of investigators to publish research in peer-reviewed journals following acceptance at a national or international meeting can lead to significant publication biases in the literature. Our objective was to evaluate the abstract to manuscript conversion rate for abstracts presented at the Canadian Society for Vascular Surgery (CSVS) annual meeting and to evaluate the conversion rate for CSVS-awarded research grants.

Methods: We searched for authors of abstracts accepted at the CSVS Annual Meeting (2007–2013) and recipients of CSVS research awards (2005–2013) on Scopus and PubMed databases to identify related publications.

Results: We identified 84 publications from 188 research abstracts (45%) and 17 publications from 39 research grants (44%). The mean time to publication was 1.8 years and the mean impact factor was 2.7. Studies related to endovascular therapies demonstrated a trend toward a higher rate of publication relative to open surgical therapies (64 [56%] v. 37 [27%]). Additionally, we observed a similar trend in research grant topics related to endovascular therapies relative to open surgical therapies (9 [67%] v. 8 [38%]). Finally, CSVS research grant recipients who subsequently published had a significantly higher h-index at the time of receipt than those who had not published.

Conclusion: The CSVS annual meeting's abstract to publication conversion rate is comparable to that of its Canadian peers as well as to other medical specialties; however, a substantial publication gap remains. We identified several potential areas that may help to improve the effectiveness of CSVS research grants.

Contexte : Le fait que des chercheurs ne publient pas leurs recherches dans des revues évaluées par les pairs après acceptation de leur résumé à un congrès national ou international peut entraîner des biais de publication importants dans la littérature scientifique. Notre but était d'évaluer le taux de conversion de résumé à manuscrit pour les résumés présentés au congrès annuel de la Société canadienne de chirurgie vasculaire (SCCV) ainsi que le taux de conversion dans le cas des subventions de recherche accordées par la SCCV.

Méthodes : Nous avons interrogé les bases de données de Scopus et PubMed afin d'identifier les auteurs de résumés acceptés au congrès annuel de la SCCV (2007–2013) ainsi que les récipiendaires de subventions de recherche de la SCCV (2005–2013) et les publications connexes.

Résultats : Nous avons relevé 84 publications à partir de 188 résumés de recherche (45 %) ainsi que 17 publications liées à 39 subventions de recherche (44 %). Le délai moyen de publication était de 1,8 année et le facteur d'impact moyen, de 2,7. Les études sur les thérapies endovasculaires avaient un taux de publication plus élevé comparativement à celles sur les traitements chirurgicaux ouverts (64 [56 %] c. 37 [27 %]). De plus, nous avons observé une tendance similaire lorsque le sujet des recherches subventionnées était lié aux thérapies endovasculaires comparativement aux traitements chirurgicaux ouverts (9 [67 %] c. 8 [38 %]). Enfin, les récipiendaires de subventions de recherche de la SCCV qui publiaient par la suite avaient un indice h beaucoup plus élevé au moment de recevoir la subvention que les chercheurs qui n'avaient pas publié.

Conclusion : Le taux de conversion de résumé à publication du congrès annuel de la SCCV est comparable à celui de ses pairs au Canada et à celui d'autres spécialités médicales. Il reste néanmoins une lacune importante au niveau de la publication. Nous avons cerné plusieurs aspects susceptibles d'améliorer l'efficacité des subventions de recherche de la SCCV.

One of the primary goals of investigative research is the dissemination of information.¹ The first opportunity to achieve this is often at a national or international scientific meeting. Although these meetings serve to provide critical appraisal and often helpful critique of the presented work, they cannot achieve the same rigorous peer review that comes with publication in a peer-reviewed journal.^{2,3} There is a well-documented gap between acceptance of an abstract at a scientific meeting and its subsequent publication in a peer-reviewed journal.⁴⁻⁶ This failure to convert conference abstracts to peer-reviewed publications results in a publication bias that can in turn result in a duplication of effort and wasted resources.^{7,8}

A wealth of studies documenting the rates of publication following abstract submission exists, and such studies have often been used as a marker of conference quality both within a particular specialty and across specialties.^{3,6,8-12} The most recent systematic review⁶ reports a weighted mean publication rate following a conference presentation of 44.5%; however, the publication rates for individual conferences can vary substantially (8%–81%). With respect to vascular surgery, the Vascular Society of Great Britain and Ireland Annual Meeting of 2001 and 2002 reported mean publication rates of 59.4%, whereas the Canadian Cardiovascular Congress has reported mean publication rates of 24.1%.^{10,11}

The primary objective of the present study was to determine the rates of publication in an indexed, peer-reviewed journal following abstract acceptance for the Canadian Society of Vascular Surgery (CSVS) annual meetings from 2005 to 2013. Our secondary objective was to determine the publication rate following receipt of a CSVS research grant. Finally, we evaluated rates of publication in relation to the study subject matter, journal impact factor and senior author affiliation.

METHODS

Inclusion criteria

All abstracts accepted for a podium presentation at the CSVS annual meetings between 2007 and 2013 were included in the primary analysis. Abstracts were identified from abstract books and published conference proceedings. We recorded the author names and affiliations, publication dates and abstract titles.

As part of the secondary objective, we recorded the names of CSVS research grant recipients and their corresponding project titles. The CSVS research grants included the Cook Research Award for Endovascular Therapy, the Gore Research Award, the John L. Provan Education Award and the National Student Research Awards. This information was provided by the CSVS for the years 2005–2013. As a comparison group, we also collected information for grants administered by 2 similar societies: the

Canadian Association of General Surgeons (CAGS) Research Fund Grants (2005–2013) and the Society of Vascular Surgery (SVS) Seed Grants (2012–2013). These data were published on their respective society websites.^{13,14}

Publication search strategy

To determine if the abstract or research grant resulted in a subsequent publication, we conducted a detailed literature search using the Scopus, MEDLINE, and PubMed databases for the period between January 2002 and June 2016. We successively searched authors beginning with the first and last author within the Scopus database to identify a publication related to the abstract. If the search of the Scopus database was unsuccessful, we searched the MEDLINE and PubMed databases using author names and appropriate keywords. If a publication was identified, we recorded the date of publication, journal of publication, topic category and senior author h-index. We obtained the journal impact factor from the Thomson Reuters Journal Citation Reports.

Statistical analysis

As appropriate, we used a Student *t* test or 1-way analysis of variance (ANOVA) to compare continuous variables and the χ^2 test to compare categorical variables. All *p* values were 2-sided, and we considered results to be significant at *p* < 0.05.

RESULTS

Publication rates of podium presentations

Between 2007 and 2013, 184 abstracts were accepted for a podium presentation. The mean number of podium presentations per year was 26. The geographic distribution of institutional affiliations of the authors of accepted abstracts is outlined in Table 1, with the majority of abstracts coming from Ontario (59%), Quebec (16%) and British Columbia (17%). Only 9 of the 184 abstracts (5%) were submitted by authors from nonacademic centres, as defined by an affiliation with a University with an accredited vascular training program.

Table 1. Number of accepted abstracts and corresponding publications by provincial affiliation

Provincial affiliation	No. of abstracts	No. (%) of publications
Ontario	109	44 (40)
Quebec	31	17 (55)
British Columbia	18	8 (44)
Saskatchewan	7	2 (28)
Alberta	4	2 (50)
Manitoba	3	1 (33)
Nova Scotia	1	0 (0)
International	15	10 (67)

The pooled rate for abstract conversion to a peer-reviewed publication was 45% (Fig. 1A). The highest publication rate was in 2012 (61%), and the lowest publication rate was in 2009 (37%); however, there was no significant difference in publication rates across the years evaluated. There was no significant difference in publication rates across provinces (Table 1); however, there was a trend toward increased rates of publication of abstracts from internationally affiliated authors (67%) compared with Canadian authors (43%). Additionally, abstracts receiving the Josephus C. Luke Award for best abstract presented at the annual meeting were more likely to result in conversion to a peer-reviewed publication (6 [66%]).

The mean time to publication following presentation at the annual meeting was 1.8 ± 0.13 years (Fig. 1B). Two manuscripts were published prior to presentation at the CSVS annual meeting. Based on these data, the study cut-off time of 3 years would capture 89% of publications in the final year of the study. Abstracts were published in 31 different journals with a mean impact factor of 2.7 (Table 2). Most were published in the *Journal of Vascular Surgery* (25 [30%]), followed by the *Canadian Journal of Surgery* (10 [12%]), *Vascular and Endovascular Surgery* (7 [8.3%]) and the *European Journal of Vascular and Endovascular Surgery* (6 [7.1%]). We sorted the presented abstracts into 7 broad categories: endovascular aortic therapies, open aortic surgery, peripheral vascular disease, venous disease and vascular access, carotid disease, education and patient safety. There was a trend toward higher rates of publication of studies evaluating endovascular aortic therapies versus open aortic therapies (56% v. 27%; Fig. 2).

Publication rates of CSVS research grants

Between 2005 and 2013, 39 grants were awarded, resulting in a pooled publication rate of 44% (Fig. 3). The

Cook Endovascular Research Award had the highest publication rate (67%), and the National Student Research Award had the lowest publication rate (36%). The primary target journals for publication of research receiving a CSVS grant are listed in Table 3. The majority of grant recipients were affiliated with Ontario institutions (64%), but there was no significant difference in publication rate among Canadian provinces.

The CSVS research grants were associated with lower publication rates overall than the CAGS Research Fund Grants (24 [83%]) and the SVS Seed Grants (6 [66%]); however, the difference was not statistically significant. Additionally, grant recipients who subsequently published in a peer-reviewed journal had a significantly higher h-index at the time of grant receipt (Fig. 4B).

DISCUSSION

Publication in a scientific journal after abstract presentation at a scientific meeting is an important step in the widespread dissemination of research findings.¹⁵ We found that 44% ($n = 187$) of abstracts accepted for podium presentation at CSVS annual meetings were subsequently published in journals with a mean impact factor of 2.7. Abstracts that received the Josephus C. Luke award for best clinical or basic research abstract had a relatively higher publication rate (6 [66%]). Finally, the overall publication rate following receipt of a CSVS research award was 44% ($n = 39$).

As mentioned previously, rates of publication following acceptance of an abstract at a scientific meeting can vary substantially both within and among specialties.⁶ The only other report of a national vascular meeting was Bhasin and Scott's report on the publication rates of the Vascular Society of Great Britain and Ireland Annual meetings.¹⁰

Fig. 1. (A) Number of abstracts accepted for oral presentation at the Canadian Society for Vascular Surgery (CSVS) annual meetings per year relative to the number of abstracts resulting in publication. **(B)** Cumulative percentage of published abstracts over time.

Table 2. Target journal for abstract publication

Journal	No. of publications	Impact factor (2015)
<i>Journal of Vascular Surgery</i>	25	3.5
<i>Canadian Journal of Surgery</i>	10	1.5
<i>Vascular and Endovascular surgery</i>	7	0.8
<i>European Journal of Vascular and Endovascular Surgery</i>	6	2.9
<i>Annals of Vascular Surgery</i>	5	1.0
<i>Vascular</i>	3	0.6
<i>American Journal of Surgery</i>	2	2.4
<i>Journal of Endovascular Therapy</i>	2	3.1
<i>Journal of Vascular Ultrasound</i>	2	NA
<i>Canadian Journal of Emergency Medicine</i>	1	1.1
<i>Canadian Medical Association Journal</i>	1	6.7
<i>Clinical Kidney Journal</i>	1	NA
<i>Hemodialysis International</i>	1	2.0
<i>International Journal of Vascular Medicine</i>	1	1.5
<i>Journal of Applied Biomaterials and Functional Materials</i>	1	1.5
<i>Journal of Biomaterials Applications</i>	1	2.8
<i>Journal of Biomechanical Engineering</i>	1	1.8
<i>Journal of Biomechanics</i>	1	2.4
<i>Journal of Biomedical Materials</i>	1	3.4
<i>Journal of Evaluation in Clinical Practice</i>	1	1.1
<i>Journal of Long-Term Effect of Medical Implants</i>	1	NA
<i>Journal of Patient Safety</i>	1	1.5
<i>Journal of Research in Medical Sciences</i>	1	0.7
<i>Journal of Surgical Research</i>	1	2.1
<i>Journal of Vascular and Interventional Radiology</i>	1	2.6
<i>Lancet</i>	1	44.0
<i>Scientific Reports</i>	1	5.2
<i>The Surgeon</i>	1	1.1
<i>Vascular Health Risk Management</i>	1	NA
<i>Vascular Medicine</i>	1	1.4
<i>Wilderness and Environmental Medicine</i>	1	1.2

NA = not available.

Fig. 2. Influence of abstract topic on rate of publication. (χ^2 , $p = 0.20$). CI = confidence interval.

Fig. 3. Publication rate following receipt of a Canadian Society for Vascular Surgery (CSVS) research grant. CI = confidence interval.

Table 3. Target journal following receipt of CSVS Research Grant		
Journal	No. of publications	Impact factor (2015)
Journal of Vascular Surgery	6	3.5
Vascular	2	0.6
Canadian Journal of Surgery	2	1.5
Journal of Biomechanical Engineering	1	1.8
Journal of Long-term Effects of Medical Implants	1	NA
Clinical and Investigative Medicine	1	1.2
The Surgeon	1	1.1
European Journal of Vascular and Endovascular Surgery	1	2.9
Annals of Vascular Surgery	1	1.0
Journal for Vascular Ultrasound	1	NA

CSVS = Canadian Society for Vascular Surgery; NA = not available.

Fig. 4. Comparison of publication rates between the Canadian Society for Vascular Surgery (CSVS; *n* = 39), the Canadian Association of General Surgeons (CAGS; *n* = 24) and the Society of Vascular Surgery (SVS; *n* = 6) grants.

Although this was a relatively small data set representing only 2 consecutive years and 106 abstracts, the reported publication rate was 59.4% in journals with a mean impact factor of 3.5.¹⁰ On the other hand, the reported publication rate following the Canadian Cardiovascular Congresses from 2006 to 2010 and representing 3565 abstracts was only 24.1% in journals with a mean impact factor of 5.2.¹¹ This suggests a substantial variation among conferences within the vascular surgery specialty. Several large meta-analyses evaluating publication rates following abstract acceptance suggest that the mean publication rate across all specialties and meetings is 44.5%.⁴⁻⁶

The publication rate of 45% reported for the CSVS in this study is similar to that in reports from conferences spanning many specialties; however, it also suggests Canadian surgeons and trainees must strive to close this publication gap. Although abstract topic was not a significant predictor of publication in this data set, there was a trend for endovascular topics to have higher rates of publication than open surgical topics, with publication rates of 56% and 27%, respectively. A similar trend was also seen among publication rates following receipt of a CSVS research grant, in which the Cook Endovascular Research Award had a subsequent publication rate of 67% relative to the open surgical topics of the Gore Research Award, which had a publication rate of 38%. This trend toward lower publication rates for open surgical topics may in part be explained by decreased interest both from key journals and surgeons in light of the dramatic increase in the use of endovascular techniques during the study time period.¹⁶

We expected to see a higher publication rate following receipt of a CSVS research grant. Compared with either the CAGS Research Fund Grants or the SVS Seed Grants, which had publication rates of 88% and 66%, respectively, the CSVS research grants had a lower overall publication rate of 44%. There are several potential reasons for this discrepancy. The first may be that CSVS research award applications are assessed solely based on the merit of the proposed research project, whereas both the CAGS Research Fund Grants and the SVS Seed Grants include an assessment of the applicant's research and academic history.¹⁷⁻¹⁹ In support of this possibility, we noted that grant recipients who subsequently published their study results had a significantly higher h-index at the time of receipt than those who did not publish their study results. This may highlight the importance of assessing an applicant's research history and/or research potential in conjunction with the merit of the overall research proposal. The second major difference between the CSVS research grants and its societal counterparts is the relative monetary value of the award, which may also influence the quality, size and ultimately the ability to publish a proposed research project. The CSVS awards have a monetary value of \$5000 compared with \$10 000 and \$15 000 for the CAGS Research Fund and SVS Seed Grant, respectively.

Limitations

The publication rate determined in the present study represents the minimum true publication rate for several reasons. First, authors were not personally surveyed in regards to publication or reasons for not publishing. As such, any research articles that were not indexed in Scopus, MEDLINE, or PubMed would not have been captured with our search strategy. Second, the timing of this study allowed for a 3-year timeframe between the final abstract acceptance and our literature search. Previous studies have demonstrated that 88% of full-text manuscripts are published within 3 years of presentation at a scientific meeting. Similarly, extrapolating from the results of this study, 90% of the captured articles were published at the 3-year time point, with a mean time to publication of 1.8 years. This may explain the relative dip in publication rate for the 2013 conference year. Finally, as conference abstracts often represent preliminary research it is possible that a small subset of abstracts were published with a title sufficiently different than that of the abstract and thus would not have been captured by our search strategy.

CONCLUSION

We found that 44% of both abstracts presented at CSVS annual meetings and receiving CSVS research grants were subsequently published in peer-reviewed journals. Although this finding is representative of the published literature on this topic, our study highlights potential areas for future improvement. Most notably, the inclusion of an assessment of research productivity may in turn increase the effectiveness of the CSVS research grants in promoting quality research publications.

Affiliations: Both authors are from the Division of Vascular Surgery, Peter Munk Cardiac Centre, Toronto General Hospital, University Health Network, University of Toronto, Toronto, Ont.

Competing interests: None declared.

Contributors: Both authors designed the study. S. Crawford acquired and analyzed the data and wrote the article, which both authors reviewed and approved for publication.

References

1. Von Elm E, Costanza MC, Walder B, et al. More insight into the fate of biomedical meeting abstracts: a systematic review. *BMC Med Res Methodol* 2003;3:12-11.
2. De Sio M, Yakoubi R, De Nunzio C, et al. Reporting quality of abstracts presented at the European Association of Urology Meeting: a critical assessment. *J Urol* 2012;188:1883-6.
3. Sawatsky AP, Beckman TJ, Edakkanambeth Varayil J, et al. Association between study quality and publication rates of medical education abstracts presented at the Society of General Internal Medicine Annual Meeting. *J Gen Intern Med* 2015;30:1172-7.
4. Scherer R, Langenberg P. Full publication of results initially presented in abstracts.v (Cochrane Methodology Review.) Cochrane Library. Oxford: Update Software; 2001.

5. Scherer RW, Dickersin K, Langenberg P. Full publication of results initially presented in abstracts: a meta-analysis. *JAMA* 1994;272:158-62.
6. Scherer RW, Langenberg P, von Elm E. Full publication of results initially presented in abstracts. *Cochrane Database Syst Rev* 2007; MR000005.
7. Song F, Hooper L, Loke YK. Publication bias: What is it? How do we measure it? How do we avoid it? *Open Access J Clin Trials* 2013;5:71-81.
8. Greene DN, Wilson AR, Bailey NM, et al. Publication outcome of abstracts presented at the AACCC annual meeting. *Clin Chim Acta* 2016;456:49-55.
9. Hopewell S, Clarke M, Stewart L, et al. Time to publication for results of clinical trials. *Cochrane Database Syst Rev* 2007;MR000011.
10. Bhasin N, Scott DJA. Publication outcome for research presented at the Vascular Society of Great Britain and Ireland Annual Meetings. *Ann R Coll Surg Engl* 2007;89:292-7.
11. Abuzeid W, Fosbol EL, Fosbol PL, et al. Rate and predictors of the conversion of abstracts presented at the Canadian Cardiovascular Congress scientific meetings to full peer-reviewed publications. *Can J Cardiol* 2013;29:1520-3.
12. Beker-Acay M, Fidan N, Unlu E, et al. The fate of abstracts presented at Turkish national radiology congresses in 2010-2012. *Diagn Interv Radiol* 2015;21:322-6.
13. Canadian Association of General Surgeons. CSRF — history and past winners. Available: www.cags-accg.ca/index.php?page=114 (accessed 2016 May 15).
14. Society of Vascular Surgery. Clinical Research Seed Grant Recipients. Available: <https://vascular.org/career-tools-training/awards-and-scholarships/clinical-research-seed-grants/clinical-research-seed> (accessed 2016 May 15).
15. Ehlers VJ. The importance of publishing health-related research findings. *Professional Nursing Today* 2011;15:4-5.
16. Altoijry A, Mamdani M, Al-Omran M. Trends in abdominal aortic aneurysm repair in the era of endovascular technology in Ontario. *J Vasc Surg* 2011;53:227-8.
17. Canadian Society for Vascular Surgery. Cook Research Award. Available: www.canadianvascular.ca/resources/Documents/TOR%20Cook%20Research%20Award%202016.pdf (accessed 2016 June 30).
18. Canadian Society for Vascular Surgery. Gore Research Award. Available: www.canadianvascular.ca/resources/Documents/TOR%20Gore%20Research%20Award%202016.pdf (accessed 2016 June 30).
19. Canadian Society for Vascular Surgery. John L. Provan Educational Award. Available: www.canadianvascular.ca/resources/Documents/TOR%20John%20L.%20Provan%20Educational%20Award%202016.pdf (accessed 2016 June 30).

REPRINTS

We have partnered with Sheridan Press!

To purchase commercial article reprints and e-prints or to request a quote, please contact

Hope Robinson

Sheridan Content Sales Specialist

800-635-7181 ext. 8065

Hope.robinson@sheridan.com