

From abstract to publication: What makes the grade?

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ABSTRACT

Objectives: To determine the proportion of abstracts published in the Canadian Journal of Hospital Pharmacy (CJHP) that become full-length papers in professional journals and to identify the determinant(s) of whether or not an abstract is published as a full paper.

Methods: Our data base consisted of all abstracts published in CJHP from 1992 through 1996. We determined the publication status of associated full papers from questionnaire responses, a Medline search, and an author index search of CJHP.

Results: Of 363 abstracts, 89 (25%) became full-length papers. Thirty-six (40%) of these papers appeared in CJHP. With the exception of 1992 when the publication rate was 82%, overall publication rates from year to year were similar and ranged between 20 to 26%. Award winning abstracts were published more frequently than non-award winners at a rate of 49% vs. 21%, respectively ($p < 0.0001$). However, the publication rate of awards authored by residents (44%) was not significantly different than that of non-resident projects (46%; $p = 1.000$). Likewise, single author papers had a lower, but not significantly lower, publication rate (19%) than did multiple author papers (27%; $p = 0.1091$).

Conclusions: Only one-quarter of abstracts published in CJHP from 1992 through 1996 have been published as full-length papers. The only significant determinant of whether or not an abstract became a full paper was its status as an award winning abstract in that these were more likely to be published in full form than were non-award winning abstracts.

Key Words: abstract, manuscript, poster, publication

RÉSUMÉ

Objectifs : Déterminer la proportion de résumés publiés dans le Journal canadien de la pharmacie hospitalière (JCPH) dont l'article correspondant dans sa version intégrale fera l'objet d'une parution dans un magazine professionnel, et identifier le ou les déterminants qui font qu'un résumé fera ou non l'objet d'une publication de l'article correspondant dans sa version intégrale.

Méthodes : Nous avons utilisé notre base de données contenant tous les résumés publiés dans le JCPH entre 1992 et 1996 inclusivement. Nous avons déterminé l'état des projets de publication associés aux manuscrits intégraux, à partir des réponses aux questionnaires, d'une recherche dans Medicine, et d'une recherche indexée par auteur dans le JCPH.

Résultats : Des 363 résumés, 89 (25 %) ont fait l'objet d'une publication de l'article correspondant dans sa version intégrale, dont 36 (40 %) dans le JCPH. À l'exception de

1992, année où le taux de publication était de 82 %, le taux de publication global d'une année à l'autre était semblable et variait de 20 à 26 %. Les résumés primés ont été publiés plus fréquemment que ceux qui ne l'étaient pas, pour un taux de publication de 49 % c. à 21 %, respectivement ($p < 0,0001$). Cependant, le taux de publication des résumés primés écrits par des résidents (44 %) n'était pas significativement différent du taux des résumés écrits par des non résidents (48 %; $p = 1,000$). De façon semblable, les articles à auteur unique avaient un taux de publication inférieur (19 %), quoique non significatif, aux articles à auteurs multiples (27 %; $p = 0,1091$).

Conclusions : Seulement le quart des résumés publiés dans le JCPH de 1992 à 1996 inclusivement ont fait l'objet d'une publication de l'article correspondant dans sa version intégrale. Le seul déterminant significatif qui fait qu'un résumé fera ou non l'objet d'une publication de l'article correspondant dans sa version intégrale était le fait qu'il avait été primé. En effet les résumés primés avaient plus de chance de faire l'objet d'une publication de l'article correspondant dans sa version intégrale.

Mots clés : affiche, publication, résumé

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INTRODUCTION

In recent years, the number of posters presented at CSHP meetings, especially at the Professional Practice Conference (PPC), has risen dramatically. However, this increase in abstracts has not been paralleled by a proportionate increase in manuscript submissions to CJHP. Thus, the purpose of this project was to char-

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acterize and to determine the proportion of abstracts published in CJHP that ultimately became published as full-length papers in professional journals. Furthermore, we sought to identify the factors which increase the likelihood that an abstract would become published as a full paper.

METHODS

Our data base consisted of all abstracts of posters, oral contributed papers, and award winning projects published in CJHP in 1992 through 1996. These abstracts were identified through the author index of each volume of CJHP during this 5-year time period. For each abstract, a single author was identified as the contact. To minimize the number of questionnaires, any author whose name appeared on more than one abstract was designated as the contact individual for all abstracts in which his/her name appeared.

A survey was conducted utilizing mail (postal or electronic), fax, or telephone. The contact individuals were given the authors, year, and title of their respective abstract(s) and asked to indicate whether the abstract(s) had been published in full form. If so, they were to state the journal name, volume, year, and page numbers of the full-length paper. If not, they were asked to denote whether the abstract(s) had been submitted as full manuscripts but not published. All contact individuals were informed that their responses would remain anonymous in that we would not disclose to anyone whether their specific abstract had been published in full form. Although the questionnaire did not ask specifically whether the project was a residency project, we re-contacted authors of award winning abstracts to obtain this information.

For those individuals who either did not respond to a second (i.e., duplicate) questionnaire or whose current address was unknown, we determined whether or not their abstract(s) resulted in a full-length manuscript by first searching the author index of each issue of CJHP from 1992 through present. Next, we performed a Medline (1992 through March 1998) search of authors in attempts to locate any other published papers.

From the period of January 1, 1992 until December 31, 1997 the total number of papers published in CJHP, including CJHP Articles, Pharmacy Practice papers, Case Reports, and Drug Information (DI) Notes, were counted using the index page in each of the 36 issues. This time period (1992-1997) is 1 year longer than the 5-year abstract tracking period, to allow additional time for the publication process.

Tabulated data consisted of number (and percentage) of abstracts that were published in full form; papers published in CJHP vs. other journals; and abstracts for which manuscripts were submitted but not published. In or-

der to identify the determinant(s) of publication, we compared the publication rate for abstracts of award-winning projects vs. non-award (or "regular") ones, abstracts of award-winning projects authored by residents vs. non-resident award-winning projects, and single-author vs. multiple-author abstracts. Status as resident vs. non-resident project was confirmed through a listing provided by CSHP or by contacting the authors again directly. Statistical analyses consisted of Fisher's Exact Test (for dichotomous data) and linear regression (for evaluating publication trends over time). The 5% level was used as the cut-off for statistical significance.

RESULTS

We distributed questionnaires regarding 363 abstracts and received responses regarding all except 36 abstracts (10%). Information from all 363 abstracts was included in the final analysis, because we assumed that if published, all articles could be identified through Medline searching or via the author indexes of CJHP.

Table I identifies the year (1992-1996) of presentation of each of the 363 abstracts and indicates the number of these that were published or submitted in full form. In 1992, the 11 abstracts that were published were all award-winning abstracts and the publication rate was 82%. Beginning in 1993, abstracts from the PPC were published in the April issue and Annual Meeting abstracts were published in the October issue. From 1993 to 1996, there was no significant trend in the proportion of abstracts that were eventually published as full papers (see Table I; $r^2 = -0.7040$; $p = >0.1$). Between 1993 and 1996, the proportion of abstracts published as full manuscripts ranged between 20% (in 1994) to 26% (in 1995). However, the increasing number of

Table I. Publication rate by year of abstract presentation

Year	1992	1993	1994	1995 ¹	1996	Total
Number of abstracts	11	56	84	105	107	363
Published	9	13	17	27	23	89
Submitted	0	2	3	7	6	18
% Published	82	23	20	26	22	25

¹ One 1995 award-winning project was also published as a poster abstract in 1994 and the full paper was published in 1996. The abstract is listed as a 1994 poster and is counted in 1995 abstract totals.

Table II. Year of publication of full papers

Year of publication	1992	1993	1994	1995	1996	1997	1998	Total
CJHP Articles	0	1	6	4	8 ¹	6	1	26
Pharmacy Practice	1	1	0	0	3	1	0	6
Case Reports	0	0	0	0	4	0	0	4
DI Notes	0	0	0	0	0	0	0	0
Total of publications in CJHP	1	2	6	4	15 ¹	7	1	36
Publications in other journals	1	3	9	15	14 ¹	9	2	53
Total publications in CJHP²								
CJHP Articles	17	17	16	20	17	15	–	102
Pharmacy Practice	4	5	7	16	6	7	–	45
Case Reports	4	7	5	3	9	7	–	35
DI Notes	11	0	5	5	6	3	–	30

¹ One abstract was split into 2 papers, 1 published in CJHP, another in a second journal.

² Total publications 1992-1997, not including DI Notes=182

Table III. Publication rate by award, of awards by resident vs. non-resident, and by number of authors

Category	Award	Non-award	Award-winning resident	Award-winning non-resident	Single-author	Multiple-author
Total number	57	306	16	41	104	259
Published	28	61	7	19	20	69
Submitted	5	13	0	5	5	12
% Published	49	20	44	46	19	27
p value		0.0001		1.000		0.1091

abstracts was accompanied by a significant increase in the number of papers published each year (see Table I; $r^2 = 0.9105$; $p = 0.0309$).

Altogether, 89 (25%) of the abstracts became full-length papers. Of these papers, 36 (40%) appeared in

CJHP. Of these 36 papers, 26 appeared as CJHP Articles, 6 as Pharmacy Practice papers, and 4 as Case Reports. No poster was published as a DI Note. (See Table II). During the period from January 1, 1992 to December 31, 1997, a total of 182 papers (not including 30 DI Notes) were published in CJHP. (See Table II) Therefore, approximately 20% of the papers (not including DI Notes) that appeared in CJHP during this time frame were presented as poster or oral presentations at CSHP meetings. It was also apparent that during 1996 and 1997, half of the major articles published in CJHP were initially presented as posters.

The remaining 53 (60%) abstracts that were published as full papers appeared in the following journals: *Am J Health-Syst (Hosp) Pharm*; *Ann Pharmacother*; *Ann Royal Coll Phys Surg Can*; *Antimicrob Agents Chemother*; *Arch Dermatol*; *Arch Dis Childhood*; *Arch Intern Med*; *Br J Dermatol*; *Can J Cardiol*; *Can J Inf Dis*; *Can J Resp Care*; *Can Nurse*; *Chest*; *Childbirth Nurse Int Group*; *Clin Infect Dis*; *Clin Pharmacol Ther*; *Hosp Form*; *Hosp Pharm*; *Int J Pharm Practice*; *Leuk Lymphoma*; *J Child Adolesc Psychopharm*; *J Clin Psychopharmacol*; *Nuclear Med Commun*; *Neurology and Teratology*; *Pain*; *Pediatr Child Health*; *Pharmacy Practice*; *Pharmacoeconomics*; *Support Care Cancer*; and *Transplantation*. Besides the published papers, a total of 18 manuscripts had been submitted but not published (or were in submission but not yet published).

Table II identifies the year of publication of each of the 89 published papers. The form of publication (CJHP Article, Pharmacy Practice paper or Case Report) is identified for papers published in CJHP.

Table III depicts publication rate by award vs. non-award, by resident award-winning projects vs. non-resident projects, and by number of authors (single vs. multiple). Award-winning abstracts were published more frequently than non-award winners at a rate of 49% vs. 21%, respectively ($p = 0.0001$). The publication rate of awards authored by residents (44%) was not significantly different than that of non-resident projects (46%; $p = 1.000$). Likewise, single author papers had a lower, but not significantly lower, publication rate (19%) than did multiple author papers (28%; $p = 0.1091$).

DISCUSSION

To our knowledge, this is the first article of its kind to track abstracts (presented in any pharmacy forum) to publication as full-length papers. A Medline search (from 1966 to March 1998) using combinations of the search terms, "abstract", "poster", "manuscript", and "publication" yielded no relevant articles on this particular topic. Two recent publications^{1,2} tracked the progress and publication outcome of abstracts submitted for presentation at the 1991 Society of Academic Emergency

Medicine (SAEM) meeting and also cited 5 previous reports in the medical literature that assessed the fate of abstracts submitted to or presented at various cardiology,³ anesthesia,⁴ pediatrics,⁵ oncology,⁶ and ophthalmology⁷ meetings. Regarding the SAEM meeting findings, the best predictors of publication as a full paper were acceptance as an abstract at the meeting and a large study sample size.¹ Studies with positive findings were preferentially accepted both as meeting abstracts and as full papers.¹ Of the 179 abstracts accepted for presentation, 111 (62%) were published in full form. Of 276 randomly selected cardiology abstracts presented at three national meetings, 137 (49.6%) were published in full form.³ Publication rates were similar for abstracts presented at anesthesia (40.3 to 43.6%)⁴ and pediatric (approximately 50%)⁵ meetings, and higher for those presented at oncology (78%)⁶ and ophthalmology (51 to 66%)⁷ meetings. Results from the oncology abstracts suggest that those which reported positive results were more likely to lead to publication as a full paper.⁶ For the ophthalmology abstracts, publication as a full paper was weakly associated with significant results and larger sample sizes.⁷

The results of our study show that only 25% of all abstracts published in CJHP from 1992 through 1996 have gone on to be published as a full-length paper. With the exception of 1992, however, the increasing number of abstracts presented at CJHP meetings was accompanied by a significant increase in the number of full papers published in each year. The number of abstracts increased substantially between 1992 and 1993. As a consequence, in subsequent years, the percentages of abstracts that became published as full papers were much lower than in 1992, perhaps because all abstracts published in 1992 were for award winning projects.

Our results also demonstrate that the only significant determinant of whether or not an abstract became a full paper was its status as an award-winning abstract. Specifically, award-winning abstracts were more likely to be published in full form than were non-award-winning ones ($p = 0.0001$). This is not unexpected, given that in order to submit a project for a CSHP award, it needs to be in publishable form. What is more surprising is that only 45% of the award-winning abstracts became full papers. One might expect the publication rate to approach 100% when the paper is already in publishable form prior to award submission. The very fact that the abstract wins an award should provide encouragement to the author(s) that the project is meritorious and thus, worthy of publication in full form. However, we recognize that in some cases, even an award-winning project may not be suitable for publication as a full paper, due to the nature of the material. Some of these projects may be highly specific for a particular institution and there-

fore, are either not applicable or not of interest to a broader audience. Others may be heavily oriented toward audiovisual content such as computer programs or patient teaching programs (i.e., videotapes). Other projects may be geared toward the development of manuals for which the description of the preparation of the material might not provide enough content for a full manuscript. Finally, some projects may be appropriate as residency projects but are of insufficient scope to qualify for a full-length publication.

We speculated that award-winning abstracts authored by residents would have a significantly lower publication rate compared to those which were not residency projects.⁸ This was not the case as the rate of publication of resident and non-resident awards is within 5%. However, this analysis was heavily constrained by sample size and the publication rate of residents would have had to be less than 12.5% or greater than 75% to be significantly different. Differences this large are extremely unlikely. Even when the submitted but not published manuscripts are included in the statistical analysis, the publication rate of resident award-winning abstracts is not significantly lower than that of non-resident award winners ($p=1.000$). The publication rate of non-award-winning projects was not evaluated with respect to residency project status.

We also theorized that single author papers may have a lower publication rate than multiple author papers. Two main reasons that might facilitate multiple author papers included: 1) distribution of work among more individuals in writing the final manuscript; and 2) each individual feeling a greater responsibility to the group than to just himself/herself. Again, however, our results showed a lower rate among single author papers that was not statistically significant when compared to that of multiple author ones. This evaluation had the power to detect an 11% difference in the publication rate.

We found that 40% of the abstracts that became full-length papers were published in CJHP. This was not unexpected because CJHP is the official journal of CSHP. However, CJHP does not claim the first right to publish the results of presentations at CSHP meetings. Another interesting finding occurred when we counted the actual number of papers in CJHP from 1992 through 1997 and found that about 20% of CJHP's manuscripts come from poster or oral presentations at CSHP meetings.

Some limitations of our study deserve mention. For the 35 non-responders, our Medline and CJHP searches would not be able to identify those manuscripts in submission nor those journals not covered by Medline. Furthermore, the overall publication rate, particularly for the later years, may actually turn out to be higher than presented in this article. Although 75% of papers were published within 1 year of presentation, some took as

long as 3 years to become published. Therefore, some abstracts for 1996, while not currently published in full form, could be published in the future. When evaluating the time to publication, it is important to be aware of the time it typically takes. The average time from submission to publication of manuscripts in CJHP is about 11 months.⁹ This is very similar to the time to publication of peer-reviewed papers in other medical journals.⁹ However, this implies that the majority of poster presenters (75%), if they intend to publish, prepare the submission around the time that the paper is being presented. This would appear to be an important step in the publication process, dealing with the substance of the submission while it is still fresh. One further limitation of our study was that we did not specifically inquire about why articles were not published. Future studies are warranted to discern both the positive and negative motivators for publication. Information on how and why authors select particular journals, such as CJHP, to submit their manuscripts also would be helpful.

The reasons for the low publication rate of 25% are unknown. In the medical literature, the publication rate is higher.¹⁻⁷ Results of a retrospective analysis of clinical research projects¹⁰ also indicated that studies with the following factors were associated with a greater likelihood of publication: statistically significant results; high ratings by the investigator of the importance of the study results; and larger sample sizes.¹⁰ One or more of these factors may explain why 75% of the abstracts in our survey were not published in full form. Perhaps the reason that our publication rate is lower than that reported in the medical literature is because their meetings were focused on research; whereas, CSHP meetings are oriented toward both practice and research. Another reason for the low publication rate from CSHP meetings may be the number of presenters who practice pharmacy and do not have an academic appointment. Traditionally, the "publish or perish" caveat applies mainly in academia.^{11,12}

Furthermore, pharmacists whose major activities are not in research or teaching have fewer resources and less time to engage in writing and publication as compared with their academic counterparts. As a potential consequence, many findings remain unpublished, innovation is suppressed,¹³ and the pharmacy and scientific community loses out on important information. ☒

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