

# Fate of poster abstracts presented at the 2009 American College of Surgeons clinical congress

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**Background:** The American College of Surgeons (ACS) holds an annual clinical congress which provides the opportunity to present innovative research to academic and community surgeons from around the globe. The purpose of this study was to evaluate the publication rate of poster abstracts presented at the 2009 American College of Surgeons clinical congress to assess the factors influencing publication and determine the impact factor effect of these journals.

**Methods:** All posters presented at the 2009 ACS were included in the study. A Pubmed-Medline search was performed to identify a matching journal article. Topics, country of origin, study type, study center and publication year were tabulated. Journals and impact factors of publication were noted.

**Results:** Of the 333 poster abstracts presented, 62 (18.6%) were published as full-text articles. Two studies published well in advance of the meeting were removed. Sixty percent of the published studies were from The United States. The average time to publication was 16.8 months. Eighty five percent of the studies were conducted in academic institutions. The average impact factor was 2.88. The median impact factor for studies originating from the United States was 3.3 (0.71-4.5). The median impact factor for international studies was 2.38 (0-7.22). This observation did not reach statistical significance. Thirteen percent of these manuscripts were published in the Journal of the American College of Surgeons (the official journal of the meeting). There were several abstract characteristics found to be associated with a higher publication rate. A higher rate was found for abstracts for randomized clinical trials, basic science studies, and university programs. The rates did not differ between author specialties.

**Conclusion:** The publication rate for abstracts presented at the 2009 ACS clinical congress was lower than rates from other fields of medicine. Factors associated with failure to publish were non-randomized trials, non-university affiliation and single center studies. Encouraging authors to submit their presentations for full-text publication might improve the rate of publication. Authors should be wary of accepting poster abstracts as dogma; authors should refrain from citing them in publications especially if they are from outside the United States.

publication rate | surgical education | surgical research

Original research is traditionally brought to the attention of the scientific community by presentation at annual meetings and subsequent publication in scientific journals (1-40). Abstract presentations at large meetings provide a forum for the communication and discussion of new results prior to full publication. Presented abstracts summarize current research and usually do not contain details of the study. Although some journals publish the abstracts of society meetings, these are only a brief summary of the studies (25). Presenting abstracts at national meetings allows researchers to share their scientific discoveries with a large audience. This should lead them to submit their findings as full-length manuscripts to peer reviewed journals for publication. Unfortunately, not all researchers follow through with this process. This failure to publish abstract data in full-length articles limits the dissemination of knowledge, the opportunity for more rigorous peer review of the findings, and ultimately

could indicate the need to improve society meetings and their related specialties.

Publication in a peer-reviewed journal has been accepted as the endpoint of a research study. The selection of presented studies at a scientific meeting is based on a review of submitted abstracts, but those abstracts are usually no more than incomplete summaries. Subsequent publication may be delayed by the time required for complete manuscript preparation, extensive analysis of results, detailed reviewing process and revision in response to reviews. Published reports indexed in databases, such as PubMed, provide wide-spread dissemination of results and represent the most important avenue by which many researchers attain new information (21, 24-26). For this reason, the publication of abstracts in peer-reviewed journals is important.

After a review of the literature covering meetings from 2000-2009, publication rates of meeting abstracts have been reviewed for different medical specialties, such as orthopedics, urology, anesthesia, surgery, pediatrics, oncology, emergency medicine, radiology, and ophthalmology. The reported rate of publication of meeting abstracts as full-text articles ranged between 11% and 78% (1-40).

In this study, we examined 333 posters presented at the 2009 American College of Surgeons Clinical Congress. Oral abstracts were not included in order to be homogeneous. We hypothesize that certain attributes of an abstract such as randomized trials, university affiliation and single center studies can predict whether or not the abstract will be published. We analyzed the rate at which poster abstracts were published as full text manuscripts, the time to publication, factors affecting the publication and the impact factor of journals that published these articles.

The ACS Clinical Congress is the premier educational event in the field of basic science and clinical research in surgery. It is the largest international surgical meeting, typically having more than 10,000 attendees from across the globe. It offers the widest range of educational opportunities, providing surgical professionals with a learning environment designed to address their professional practice gaps through a variety of learning formats that encourage the exchange of new scientific concepts, emerging technologies, and medical advances. Attendees engage in interactive discussions, case presentations, workshops and other activities designed to improve competence and both professional and patient outcomes (28).

## Materials and Methods

**Study Materials.** Poster abstracts presented at the 2009 American College of Surgeons 95th Annual Clinical Congress held in Chicago,

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Illinois, USA were selected from the published program. This guaranteed a minimum 4-year follow-up period to allow adequate time for the publication of full-length articles. (1-12).

**Abstract Data.** Each poster was categorized as follows: the year of presentation, the presentation category, the type of study (prospective randomized study, retrospective clinical study, case report, or basic science study), study center (university or non-university) and the location of the authors (i.e. USA, Japan, China, Canada). We were unable to tell which studies (if any) were industry funded.

**Full-Length Manuscript Publication Search Strategy.** PubMed (last accessed on April 14, 2014) was used exclusively to search for publications on the basis of abstracts. The Advanced Search Builder within PubMed was used for each poster. In the Builder, search fields for author's name (e.g., Smith, J), date range including the year before the abstract presentation to the date of the search (ex. if the abstract was presented at the ACS meeting in 2009, the range was 2008-2014), and the abstract title were completed. Each potential candidate manuscript was reviewed (the author list, title, abstract, and disclosure of prior presentation of included work if available). When it was unclear whether an article was indeed based on the abstract of interest, the senior author of the present work (J.O.) made the final decision.

Once a peer-reviewed article of interest was identified, the year of publication and the journal's name were recorded. The 5-year impact factor of each journal was identified using Journal Citation Reports (20).

**Statistical Analysis.** A Chi-square analysis was utilized to test homogeneity between the two cohorts (published and un-published). In addition, An ANOVA was used to analyze the relationship between "impact factor" and other variables (type of study, university study and study center) in the published manuscript cohort.

## Results

**Poster-to-Publication Rate.** A total of 333 poster abstracts were presented, 62 (18.6%) of which were published as full-text articles. There were two studies which were published well in advance of the meeting were removed. Thirty Six (60%) of the published studies were from United States. The average time to publication was 16.8 months. Fifty-one out of sixty studies (85%) were conducted in academic institutions. The average impact factor was 2.88. The median impact factor for studies originating from the United States was 3.3 (0.71-4.5), while that for international studies was 2.38 (0-7.22), however, the difference was not statistically significant ( $p=0.102$ ). Eight (13.3%) manuscripts were published in the Journal of the American College of Surgeons (the official journal of the society).

Table 1. List of journals and poster abstracts that were accepted for full publication

| Journal                                  | Number accepted for full publication* |
|--|---------------------------------------|
| Journal of the American College Surgeons | 8                                     |
| American Journal of Surgery              | 6                                     |
| Surgical Endoscopy                       | 4                                     |
| Annals of Surgical Oncology              | 3                                     |
| Diseases of the Colon & Rectum           | 3                                     |
| British Journal of Surgery               | 2                                     |
| Journal of Surgical Research             | 2                                     |
| Military Medicine                        | 2                                     |
| Obesity Surgery                          | 2                                     |
| Other (30 journals)                      | 30                                    |

\*333 were submitted as Abstracts to the ACS

Six (10%) of all accepted abstracts were published in the American Journal of Surgery (AJS). The JACS and AJS were their top two journals in which accepted abstracts were published; a partial list of journals in which the accepted manuscripts were published, is found in Table 1.

The USA had the highest successful publication rate (60%) in comparison to the other countries. Additionally, 84.3% of all unpublished and 13.95% of all published poster abstracts were single center studies ( $p = 0.2075$ ). Forty One percent of unpublished abstracts and 13% of published abstracts were from university medical centers ( $p < .001$ ). The mean "impact factor" for multi-institutional studies and single center studies was 3.87 and 2.83 respectively. The mean impact factor for university studies and non-university center studies was 3.66 and 2.77. The mean impact factor for type of study (Basic science, Case Report, Case Series, Prospective and Retrospective) was 3.27, 3.34, 0.57, 2.23, 2.37 and 3.16 respectively. An ANOVA was used to analyze the relationship between "impact factor" and other variables (type of study, university study and study center) in the published manuscript cohort; however, there was no statistically significant relationship between impact factor and type of study, university/non-university and Multi/Single center study and the published manuscript cohort ( $p = 0.3338, 0.2095$  and  $0.3977$  respectively).

## Discussion

There were 333 poster abstracts presented at the 2009 ACS meeting, 19% were published as full-length articles within the minimum 4-year follow-up period. This rate is comparable to other reported rates (1-40). There were several abstract characteristics found to be associated with a higher publication rate. These include randomized controlled clinical trials, multi-center studies and basic science studies. These findings have been supported by similar studies (1-40).

The full-length manuscript publication rate of meeting abstracts not only illustrates the quality of research conducted by an institution's investigators but also portrays the activity and reputation of a particular scientific meeting and its society members. ul Haq and Gill(13) analyzed the presentation-to-publication conversion rate in peer reviewed indexed journals of a British Orthopedic Association meeting and proposed a more rigorous abstract selection process to ensure that material could withstand peer review and have an improved chance of final publication. By striving to improve the quality of abstracts accepted for presentation at any scientific meeting, one may facilitate enhanced discussion among peers, and this could lead to improved research and better meetings overall.

As described by Hopewell et al. (9), another factor which may influence the rate of publication is the country of origin (35, 39). Our results demonstrated that 58% of manuscripts were published in English. This difference did not reach statistical significance ( $p = 0.15$ ). Hence, we cannot ascertain whether language in which the articles were published, impacted publication rate.

Only 13% of abstracts from the 2009 American Transplant Congress (ATC) were published as full text manuscripts in PubMed-indexed journals. The strongest predictor of publication was found to be basic science and prospective studies that originate from university programs. The publication rate differed according to the meeting topics, the country of origin, university affiliation and the number of study centers (39). Furthermore, Hackett et al. (40) evaluated all abstracts presented at the International Liver Transplantation Society Meetings from 2004-2008. The full-length manuscript publication rate was 39%, which was comparable to the rates for other meetings. A higher rate was found for abstracts for randomized clinical trials, basic science studies, and oral presentations and for abstracts from authors from non-English speaking countries. The rates did not differ among author specialties.

Our total number of abstracts may be the third reason for the low publication rate. Selection procedures and acceptance rates differ be-

tween meetings. Abstracts presented at smaller meetings were more likely to be published (35-40). At smaller meetings, the abstract submission may be more competitive, the peer-review process may be more stringent, and as a result the presented work may be more likely to be published (39,40).

A survey showed that abstract authors' most common reason for not submitting full length manuscripts for publication was an alleged lack of time and/or low priority (1). The latter may explain why the authors of poster presentations have lower rates of publication than authors of oral presentations and others (1-10, 21-29). Some authors may believe their work was considered less important than the work of podium presenters. This belief has been soundly challenged by Varghese et al. (8) who demonstrated that a significant proportion (45%) of abstracts rejected by the 2003-2005 Pediatric Orthopedic Society of North America meetings were subsequently published as full-length articles in peer reviewed journals.

Our study is comprehensive and includes all poster abstracts presented at the 2009 ACS meeting. Oral abstracts were not included in order to be homogeneous. It is a stark exception in comparison with similar studies conducted on this topic. One study published in the *European Heart Journal* examined only 10% of the abstracts (5). In the present study, we included the 2009 meeting as the last and most recent meeting to ensure a follow-up period of at least 4 years. This follow-up period is supported by Greenberg et al. (1) who showed that 97% of abstracts expanded into full length articles were published within 40 months. Indeed, we found that 90% of the ACS abstracts expanded into full-length manuscripts were published within 46 months.

Large society meetings such as the ACS meeting where researchers from multiple disciplines share a common interest, and a simple comparison of the abstract-to publication rates of leading national societies for each subspecialty may not necessarily lead to a fair comparison because of the various numbers of accepted abstracts and different selection criteria. In this work, we analyzed more than 2000 abstracts, which included a reasonable number of abstracts from subspecialties less represented at the ACS meeting. We found no significant differences in the abstract-to-publication rates among specialties at the ACS meetings.

Overall, 13% of all accepted abstracts were published in *The Journal of the American College of Surgeons (JACS)*, which is the official Journal of the ACS conference. The JACS is a monthly journal publishing peer-reviewed original contributions on all aspects of surgery. These contributions include, but are not limited to, original clinical studies, review articles, and experimental investigations with clear clinical relevance. In general, case reports are not considered for publication. As the official scientific journal of the American College of Surgeons, JACS has the goal of providing its readership the highest quality rapid retrieval of information relevant to surgeons.

In addition to the JACS, six (10%) manuscripts were published in the *American Journal of Surgery*. The *American Journal of Surgery* is a peer-reviewed journal designed for the general surgeon who performs abdominal, cancer, vascular, head and neck, breast, colorectal, and other forms of surgery. *AJS* is the official journal of 7 major surgical societies and publishes their official papers as well as independently submitted clinical studies, editorials, reviews, brief reports, correspondence and book reviews.

Our study is not without its limitations. First, the minimum 4-year-follow-up period (1, 3, 18, 21-38) may still not have been long enough to identify all published articles because the time from abstract presentation to full-length manuscript publication ranged from 1 to 85.9 months. We still believe that the inclusion of abstracts presented at the 2009 ACS meetings provides a reasonable picture because the longest follow-up period was 108 months, and the publication rate reached a plateau approximately 70 months after presentation. Second, some articles might have been missed during our search. One issue is that we relied on a single search engine PubMed is the most comprehensive search engine for medical literature. Pubmed was the standard search engine used by authors of similar studies when evaluating abstract publication rates (1-40). The other issue is that the first authors's last names and affiliations along with some keywords were used for the searches. We accept the critique that this strategy may not necessarily be totally reliable. However, we believe that our method gave us a reasonable chance to identify the published manuscripts. Finally, the authors of this manuscript only reviewed poster abstracts. While the publication rate for the meeting may have been higher if oral abstracts were reviewed, we chose to only review poster abstracts by design.

In conclusion, the strongest predictor of publication was found to be studies related to basic science and prospective trials, which originated from university programs. The difference in publication rate was statistically significant when compared to other types of studies from both university and non-university centers. Multi-centered studies were also related to the impact factor of journals. Overall, 19% of abstracts presented at the ACS were published in PubMed-indexed journals. Eight percent of the manuscripts published as full text were published by *The Journal of the American College of Surgeons*, which serves as official journal of the ACS. A very small percentage of abstracts are actually published as full text publication for reasons that are not entirely clear. Possibly, the most effective strategy to improve the rates of publication would be a more stringent selection process for abstracts at a meeting. Also, medical societies should play a role in encouraging researchers to complete and submit their abstracts for full-text publication. Furthermore, based on this 18% publication rate of these abstracts, (the gold standard for the dissemination of scientific information) the data presented in posters must be examined with an extremely jaundiced eye.

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