The fate of abstracts presented at annual meetings of the Society for Cardiothoracic Surgery in Great Britain and Ireland from 1993 to 2007

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Summary

Although the presentation of original research to learned societies is valuable, the target should be publication in a peer-reviewed journal. Therefore, the strength of a meeting may be assessed by the rate of the subsequent publication of papers from the presented abstracts. We conducted an analysis of abstracts presented at consecutive annual meetings of the Society for Cardiothoracic Surgery (SCTS) in Great Britain and Ireland over a 15-year period. Abstract books and other documentation from the 1993–2007 meetings were reviewed; abstracts from other major Cardiothoracic Surgery meetings held in 2007 were also reviewed. Medline was searched to identify the peer-reviewed publications arising from each work presented. For abstracts presented at SCTS in 2003–07, the factors potentially associated with publication were analysed by logistic regression. If no publications were identified, authors were contacted through a standardized email questionnaire to ascertain its status and reasons for non-publication. Over the 15-year period, 909 abstracts were presented at the SCTS meetings. The rate of publication rose from ~30% in the mid-1990s to consistently >60% from recent meetings, with a high of 81.3% from 2006. However, in comparison with other Cardiothoracic Surgery meetings in 2007, the chance of subsequent publication from SCTS (66.7%) was lower than from the European Association for Cardio-Thoracic Surgery (75.0%), the American Association for Thoracic Surgery (83.9%) and The Society of Thoracic Surgeons (72.5%) meetings. For abstracts presented at the last five SCTS meetings, publication was most commonly in a specialty journal (56.3%) and the median time for publication was 15 months (range 24 to 63 months) with 14 papers published prior to presentation at the meeting. On regression analysis, the only factor associated with publication was the study design comparing randomized trials and systematic reviews with other types of study (P < 0.01). Of the 90 unpublished abstracts, 48 (53.3%) authors replied to an email questionnaire revealing that 41 (85.4%) were never submitted for publication. The most common reasons given were low priority (29.6%) and low likelihood of acceptance (24.1%). In recent years, the annual meeting of the Society has become a forum for the presentation of high-quality research that usually withstands peer-review, most commonly in a specialty journal. The rate of publication has increased to consistently >60%, although those that remain unpublished are generally never submitted. This compares favourably with national meetings of other surgical societies, although it is lower than other major cardiothoracic meetings which have an affiliated journal. At a time when it has been suggested that medical research in the UK is in decline, cardiothoracic surgery appears to be thriving.

Keywords: Abstract • Peer review • Publication • Scientific meeting

INTRODUCTION

Meetings of learned surgical societies provide a forum for continuing medical education and the exchange of ideas, in addition to networking and socializing. Most of the programmes are dedicated to the presentation of original research and audit. These oral presentations or posters have an important role in supporting the academic productivity, scientific discovery and the career development of trainees and young investigators. The meeting of the Society for Cardiothoracic Surgery (SCTS) in Great Britain and Ireland is held annually in the Spring and is the highlight of the national calendar, inviting eminent international speakers and welcoming abstracts from around the world; regularly attracting >400 delegates, it is now one of the largest Cardiothoracic Surgery meetings in Europe.

Although presentation of abstracts to learned societies is valuable, the target of original research should be publication in a peer-reviewed journal. The strength of a meeting may therefore be assessed by the rate of subsequent publication. A recent Cochrane review on the fate of abstracts presented at meetings across all medical specialties found a mean publication rate of 44.5% [1]. We conducted an analysis of abstracts presented at
the annual meetings of the SCTS over a 15-year period to assess the rate of publication over time, factors associated with success and reasons for non-publication.

MATERIALS AND METHODS

Abstract books, conference reports and business meeting minutes from the Society’s annual meetings between 1993 and 2007 were reviewed to assess the number of abstracts submitted and details of those accepted including the study design, subjects (human or animal) and measured outcomes (clinical or experimental). Abstract listings for the annual meetings of the European Association for Cardio-Thoracic Surgery (EACTS), the American Association for Thoracic Surgery (AATS) and The Society of Thoracic Surgeons (STS) in 2007 were also reviewed. Medline was searched to identify peer-reviewed publications arising from each presented abstract, using the names of individual authors as successive search terms. Each article was assessed by two or more reviewers to confirm that it contained or was directly related to the same piece of work described in the abstract. Similarly, if a publication could not be identified, a second reviewer conducted an independent search. For SCTS abstracts, Spearman’s test was used to correlate the chance of acceptance for each meeting with the subsequent chance of publication.

Abstracts from the five most recent SCTS meetings (Edinburgh 2003, Guernsey 2004, London 2005, Dublin 2006 and Manchester 2007) were reviewed in greater detail. The following factors potentially associated with success in publication were assessed: type of presentation (oral or interactive/digital poster), origin (Great Britain and Ireland or foreign), sub-speciality interest (cardiac, thoracic, congenital, transplantation and technical/miscellaneous), projection (prospective or retrospective), study design, subjects and whether the abstract won a prize at the meeting. The analysis was performed using SPSS (version 17, SPSS Inc., Chicago, IL, USA) for logistic regression with significance set at the 0.05 level. If published, the journal and month of publication were noted; if no publications directly relating to the presented abstract were identified on Medline, authors were contacted through a standardized email questionnaire to ascertain its current status and reasons for non-publication.

RESULTS

Over the 15-year period (1993-2007), a total of 909 abstracts were presented in oral or poster format at annual meetings of the SCTS. The number selected for presentation at each meeting peaked at 81 in 1998 then declined to 48 in 2002-03 with a subsequent rise to 78 in 2007. Meanwhile, over the last seven years, the number of submitted abstracts has fluctuated between a low of 211 in 2001 and a high of 290 in 2004 with no apparent trend in the proportion accepted for presentation. The chance of acceptance of an abstract for the meeting did also not correlate with the subsequent chance of publication once accepted ($R = -0.02$, $P = 0.97$); corresponding data are not available prior to 2001.

There was a steady rise in the rate of publication from $\sim 30\%$ in the mid-1990s to consistently $>60\%$ from recent meetings (Fig. 1). This coincided with an improvement in the design of the studies presented, with the number of randomized trials or systematic reviews rising from $<10\%$ of abstracts during the mid-1990s to continually $>20\%$ in later years, peaking at $37\%$ in 2004 (Fig. 2). However, there were no significant trends in the proportion of experimental studies or the use of animal subjects. In comparison with other Cardiothoracic Surgery meetings in 2007, the chance of subsequent publication from SCTS (66.7%) was lower than that from EACTS (75.0%), AATS (83.9%) and STS (72.5%) meetings (Fig. 3).

For the five most recent SCTS meetings in 2003-07, 1297 abstracts were submitted and 284 (21.9%) were selected as 172 (61%) oral and 110 (39%) interactive/digital poster presentations with two abstracts withdrawn before presentation. Of those presented, 192 (68.1%) have been published or were in press, ranging from 64.5% in 2003 to 81.3% in 2006 (Fig. 1). The proportion of abstracts originating from outside of the British Isles ranged from 7 to 19%, mostly from Europe (17, 49%) and North America (13, 37%). Abstracts and publications arose from all...
regional training programmes throughout Great Britain and Ireland; those with 15 or more abstracts over the five years of the study are shown in Table 1. Adult cardiac surgery was the most common clinical category (120, 42.6%) followed by thoracic surgery (53, 18.8%), congenital surgery (20, 7.1%) and transplantation (16, 5.7%). Seventy-three (25.9%) abstracts were classified as technical/miscellaneous, with only 35 (12.4%) studies involving animals. Prospective studies (164, 58.2%) were more common than retrospective studies (118, 41.8%). However, on logistic regression, the only factor associated with publication was the number of abstracts that were rejected for presentation, with the odds of publication increasing by 1.08 for each additional abstract rejected. This association remained significant even after adjusting for other factors, including the number of authors, the number of pages submitted, and the number of other papers submitted.

Subsequent papers have appeared in 59 peer-reviewed journals: 108 (56.3%) in cardiothoracic surgery journals, 41 (21.4%) in cardiopulmonary medicine journals, 11 (5.7%) in basic science journals, 7 (3.6%) in general medical journals and 25 (13.0%) in other journals (Table 2). The median time to publication was 15 months (range 24 to 63 months) with 14 papers mischievously published prior to the date of their meeting, contravening abstract submission regulations (Fig. 4). Of 90 unpublished abstracts, 48 (53.3%) authors replied to an email questionnaire. No papers were currently under consideration, 7 (14.6%) had been previously submitted and rejected and 41 (85.4%) were never submitted. The most common reasons given were low priority (29.6%) and low likelihood of acceptance (24.1%) followed by study ongoing and difficulties with co-authors, including leaving the department (both 14.8%).

**DISCUSSION**

This study is the first to assess the longitudinal trend in publications arising from abstracts presented at an annual national surgical meeting. The period ending in 2007 was selected to allow for a sufficient time for presented work to be published by the time of analysis. It has been shown that, following academic meetings, ~95% of resulting papers are published within the following four years [2] and this was supported by our findings. By contacting authors directly, we were also able to include recently accepted articles that were still in press. Only a few authors who responded to our questionnaire stated that their study was ongoing or expected to submit papers in the future.

This study demonstrates a sustained increase in the rate of publication from <30% to consistently >60% during the 15 years of our study, although the cause is likely to be multi-factorial. There was a significant increase in the proportion of abstracts reporting randomized trials or systematic reviews, suggesting an improvement in the quality of cardiothoracic research submitted to the meeting. In recent years, there has also been a proliferation of biomedical journals, increasing potential targets and the overall number of articles published. However, the selection of abstracts does not appear to have become more rigorous over time as the percentage accepted for presentation fluctuated and was not correlated with subsequent publication. While data on publication of abstracts that were rejected were not available, abstract acceptance has previously been shown to be strongly associated with full publication [2].

In comparison with other major international Cardiothoracic Surgery meetings in 2007, the rate of subsequent publication was lower than for EACTS, AATS and STS. However, unlike the SCTS, these meetings have affiliated peer-reviewed journals which require submission of a manuscript at the time of presentation. Strict rules on non-submission mean that effectively all abstracts are converted into papers and submitted for review, thereby increasing the likelihood of publication. Indeed, of those subsequently published, the majority were accepted by the journal affiliated to the meeting: 78.8% from EACTS to the European Journal of Cardio-Thoracic Surgery or Interactive CardioVascular and Thoracic Surgery; 87.2% from AATS to the Journal of Thoracic and Cardiovascular Surgery and 81.1% from
Surgery and of Thoracic and Cardiovascular Surgery

One-in-journals: published in one of the four leading international Cardiothoracic the SCTS have appeared in 59 different biomedical journals, all
Furthermore, the periods elapsed between meetings and litera-
be true; a follow-up study on plastic surgery found a slight fall in
increased in recent years. However, this cannot be assumed to
may be a time-related phenomenon as it is unknown whether
the publication rates for many of these meetings have also
the rate of plastic surgery publications over the period of the
paper looking at more than three meetings did not show a trend
81%) are the highest reported for such meetings, although direct
presented at other national surgical conferences in Great Britain
with those from similar societies in other specialities? A literature
most common reason cited for non-publication to be low prior-
with the SCTS may therefore be misleading as we found the
acknowledgement: none declared.

Table 3: Publication rates of abstracts from other national surgical meetings in Great Britain and Ireland

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Meeting(s)</th>
<th>% Published</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2007</td>
<td>29.5</td>
</tr>
<tr>
<td>Colorectal surgery (ACPGBI) [6]</td>
<td>2001</td>
<td>24.3</td>
</tr>
<tr>
<td>General surgery (ASGBI) [6]</td>
<td>2001</td>
<td>34.6</td>
</tr>
<tr>
<td>Transplantation (BTS) [6]</td>
<td>2001</td>
<td>35.6</td>
</tr>
<tr>
<td>Emergency medicine (BAEM/FAEN) [7]</td>
<td>2001–02</td>
<td>30.7</td>
</tr>
<tr>
<td>Urology (BAUS) [8]</td>
<td>2001–02</td>
<td>42</td>
</tr>
<tr>
<td>Vascular surgery (VSGBI) [9]</td>
<td>2001–02</td>
<td>59.4</td>
</tr>
<tr>
<td>Oral and maxillofacial (BAOMS) [10]</td>
<td>2002–06</td>
<td>23.6</td>
</tr>
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</table>

STS to the Annals of Thoracic Surgery (Fig. 3). Direct comparison with the SCTS may therefore be misleading as we found the most common reason cited for non-publication to be low priority for completion of a manuscript.

But how do abstracts presented at SCTS meetings compare with those from similar societies in other specialities? A literature search identified numerous reports on the fate of abstracts presented at other national surgical conferences in Great Britain and Ireland (Table 3) [3–10]. Our findings for recent years (64–81%) are the highest reported for such meetings, although direct comparison may not be valid for several reasons. First, our study is a longitudinal assessment of trends, whereas most other studies were a snapshot of one or two meetings. The only other paper looking at more than three meetings did not show a trend in the rate of plastic surgery publications over the period of the study 1995–99 [3]. Most of the reports identified relate to an era when the SCTS rate was considerably lower than at present. This may be a time-related phenomenon as it is unknown whether the publication rates for many of these meetings have also increased in recent years. However, this cannot be assumed to be true; a follow-up study on plastic surgery found a slight fall in the rate of publications over the last decade [4] and similarly, the publication rates for the British Society of Gastroenterology have steadily declined from 58% in 1994 to 31% in 2002 [11]. Furthermore, the periods elapsed between meetings and literature searches in these reports were variable and so the number of resulting publications may have been underestimated.

We found that studies presented at the 2003–07 meetings of the SCTS have appeared in 59 different biomedical journals, all but one of which are indexed on Medline. Most papers were published in one of the four leading international Cardiothoracic journals: European Journal of Cardio-Thoracic Surgery, The Journal of Thoracic and Cardiovascular Surgery, The Annals of Thoracic Surgery and Interactive CardioVascular and Thoracic Surgery. One-in-five were published in cardiopulmonary medicine journals, most commonly the high-impact journal Circulation. Only 5% of papers featured in dedicated basic science journals, reflecting the clinical focus of the meeting and perhaps, the cardiothoracic research community.

It was disappointing to discover from respondents to our email questionnaire that >85% of papers that remain unpublished have never been submitted. These abstracts had withstood peer-review for the meeting but have not been given the opportunity to reach a wider audience. The successful abstracts appeared in a wide range of clinical or scientific journals, suggesting a broad range of potential targets for submission; despite this, none of these were tested by most of those remaining unpublished. The most common reason given was low priority among the competing pressures of clinical practice. While similar findings have been reported by others [12, 13], this raises ethical concerns regarding the dissemination of research outcomes, particularly, if the studies had utilized prospective patient or animal participation [14]. In addition, as the meeting abstracts are not currently publicly available using electronic literature search engines, non-publication may lead to the unnecessary repetition of studies by others with additional time, cost and resource implications.

A recent report from the Royal College of Surgeons of England highlights the decline of academic surgery in universities, the disengagement of research from surgical training programmes and the lack of networks and infrastructure within surgical specialties [15]. This was illustrated by the observation that the Medical Research Council and National Institute for Health Research funded £1.53 bn (£1.71 bn, $2.45 bn) of research in 2008–09 but only £2.5 m (1.7%) went to surgical research; a similar picture has been described in the USA [16]. The results of our study suggest that many cardiothoracic surgeons retain an active research interest and while abstracts often lead to publications in specialist journals, a significant number (23, 12.0%) reach out beyond the specialty into high-impact clinical or basic science journals. However, during the latter period of the study, competition for UK national training appointments in cardiothoracic surgery was intense and the majority of those appointed had already obtained a higher research degree. It is yet to be seen how the reformation of clinical and academic training, through Modernising Medical Careers and the UK Clinical Research Collaboration [17], will affect the quality or quantity of surgical research.

In conclusion, over recent years, the annual meeting of the SCTS has become a forum for the presentation of high-quality research that usually withstands peer-review, most commonly in a speciality journal. The rate of publication has increased to consistently >60% and compares favourably with national meetings of other surgical societies. At a time when it has been suggested that medical research in the UK is in decline [11, 15], cardiothoracic surgery appears to be thriving.

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REFERENCES