Through the looking glass: evaluating the dissemination of research in cardiology

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This editorial refers to ‘From abstract to impact in cardiovascular research: factors predicting publication and citation’†, by S. Winnik et al., on page 3034

In many ways, organizing any scientific conference in medicine is the same. Dates are announced, location chosen, and a call for research abstracts is made. Often, large numbers are submitted for consideration, each structured similarly—Introduction, Methods, Results, Conclusions—limited to 400 or 500 words. And for every meeting, the goal is to choose the very highest quality, most promising research for presentation to conference attendees. For the best research, an oral plenary presentation may be invited; for high quality work deemed to be slightly less innovative or important, oral presentations in smaller venues or even posters within an exhibit hall may instead be offered. Others are simply rejected. Seemingly, this approach has served the scientific community well for years as a means to identify and communicate new and impactful research to clinicians and scientists.

However, scientifically evaluating these abstracts poses several challenges. First, abstract reviewers are given limited instructions and simply asked to score submissions on a scale from 1 to 10, potentially making assessments more variable. Secondly, reviewers are asked to evaluate many submissions over a short period of time. With such time constraints, reviewers may rush evaluations and use criteria other than scientific merit and quality, such as investigators’ reputations or affiliated institutions when this information is available.¹ Thirdly, reviewers are responsible for broad categories of submissions, rather than specific topics, in which they have less subject expertise. Finally, and most importantly, abstracts—brief summaries of the full research project—contain a limited amount of information. Few methodological details are available, the rigour of the scientific approach and study limitations are less obvious, and detailed results are unavailable.

How can the medical community be certain that high quality and important research is being selected for presentation at our scientific conferences? As the volume of research continues to grow exponentially worldwide, requiring more efficient systems for evaluating research, this issue has only grown in importance. Yet perhaps even more critical, with the rise in biomedical publication and the ease with which findings can be disseminated through alternative venues in an electronic age, does this role matter for scientific conferences?

Identifying high quality research abstracts

Research quality and importance are signified by an impact on science, but the ultimate impact is generally unknown for many years and difficult to assess. Publication of abstracts as full articles signifies that minimum thresholds of quality and importance have been exceeded, where higher quality science is published in higher impact journals. However, it is worth noting that when Prasad and colleagues reviewed New England Journal of Medicine papers examining various medical therapies, 13% contradicted previously reported findings, including studies in other high impact journals.² Citations may provide a more enduring marker of scientific quality. Yet when Ioannidis examined 49 studies that had been cited >1000 times, only half had been replicated; the remainder were contradicted by subsequent research or the magnitude of the findings were determined to be smaller.³

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Winnik and colleagues have now admirably attempted to investigate whether scientific conferences are identifying high quality research by evaluating predictors of abstract acceptance, eventual publication, and scientific impact, as measured by citation rate, among all scientific abstracts submitted to the 2006 European Society of Cardiology Congress (ESCC).  

Examining the European Society of Cardiology Congress

In 2006, >10 000 research abstracts were submitted to the ESCC, each of which was scored on a scale from 1 (poor quality) to 10 (high quality) by at least three, but no more than eight, peer reviewers. Winnik randomly selected 1002 and determined whether each had been published 5 years after the meeting by searching PubMed and Google. Among those abstracts that were published, 2 year citation rates were calculated from the time of publication. The main analyses tested associations between abstract characteristics, such as research type, study design, and enrolment, and ESCC acceptance, eventual publication, and ≥ 10 citations over 2 years. Nearly 40% of submitted abstracts were accepted for either oral or poster presentation. Winnik found that abstracts describing basic science research were more likely to be accepted than clinical science research abstracts. Moreover, among clinical science research abstracts, trial enrolment of ≥100 patients and use of a prospective study design, either randomized or otherwise, were both associated with higher rates of acceptance.

Did the European Society of Cardiology Congress choose wisely?

Winnik determined that among all submitted abstracts, <30% were eventually published within the 5 years following the ESCC, 38% of accepted abstracts and 24% of rejected abstracts. Previous meta-analyses estimated that publication rates among accepted abstracts approximate 30% after 2 years, 45% after 6 years, and exceed 50% after 9 years, with lower rates among rejected abstracts. Moreover, the ESCC did appear to choose wisely. Higher average peer reviewer ratings, and thus initial acceptance by the ESCC, were associated with higher rates of acceptance.

Important considerations and Limitations

Winnik’s work updates previous studies, which predominantly assessed research abstracts submitted to scientific conferences in the 1980s and 1990s. Much has changed in both science and publication over the past 15 years, both globally and in the USA. More individuals are engaged in biomedical research today and more studies are being conducted. In addition, there has been tremendous growth in the medical journal industry, including development of open-access and web-only platforms. Seventy-five trials and 11 systematic reviews are published daily, without evidence that a plateau in growth has been reached. One might have expected higher publication rates today. However, Winnik found slightly lower publication rates among accepted abstracts, 38% as opposed to 45%, perhaps indicating that greater numbers are submitted to scientific conferences today but not prepared and submitted for full publication, because of either poor methodological rigour, lack of time, or differing priorities. Alternatively, investigators may simply have become less successful at publishing their work.

Unfortunately, Winnik did not determine whether abstracts that had been submitted to the 2006 ESCC were ever subsequently submitted to journals for consideration as full publications. We cannot be certain whether abstract reviewers were adept at identifying high quality and important research, their evaluations confirmed by eventual publication and citation, or whether investigators were discouraged after abstract rejection and thereafter less likely to pursue publication, although the former is more likely. Nearly 25% of rejected abstracts and 40% of accepted abstracts were eventually published, suggesting both were being submitted for publication. In addition, average peer reviewer ratings correlated with eventual publication, confirming abstract reviewers’ assessments.

Does the identification of high quality research abstracts matter?

Left undetermined is the future role for scientific conferences in identifying high quality and important research. The ultimate value of promoting scientific discourse through conferences is essentially unknown, and serious concerns have been raised, including criticisms that the multitude of conferences requiring abstracts to fill poster halls promotes mediocre curriculum vita building and that conferences are venues for industry influence, as illustrated by exhibit halls overflowing with promotions that attendees are often required to walk through in order to reach the scientific posters.

Moreover, scientific conferences may be an imperfect and inefficient means to disseminate high quality research in contemporary times. While attendance for some conferences exceeds 10 000 individuals, most are far smaller, limiting the impact of any disseminated research. Moreover, such dissemination is often impermanent, with infrequent access to detailed research presentations, such as audiotape, accompanying slides, or even copies of posters. Rarely are proceedings papers published in concert with the conference. This is in no way meant to diminish the other important roles that scientific conferences play in research, such as teaching, networking, and in-person workshops. Many of these aspects are unlikely to be supplanted in the near future.

Nevertheless, scientific progress requires that all research be fully disseminated and archived, including both expected and unexpected, significant and insignificant findings. Between 25% and 50% of completed clinical trials are not disseminated via the medical literature and the timeliness with which most research is published is slow. With the development of clinical trial result reporting registries, such as ClinicalTrials.gov, the research community will
increasingly have access to findings from unpublished trials. However, these registries do not include observational studies and non-clinical research—areas where controversial and unexpected findings may be even less likely to be published.

If scientific conferences are to remain in the position of identifying and communicating new and impactful research to clinicians and scientists, to inform science and practice, simple steps forward are needed. First, all research abstracts submitted to scientific conferences should be posted in a single, publicly available, searchable internet database, akin to Medline, regardless of abstract acceptance. The responsibility for posting should lie with conference organizers, but investigators should be required to provide hyperlinks to clinical trial registries, grant funding, and full articles when published. Perhaps abstract reviewers’ scores should also be included. Secondly, scientific conferences should begin considering abstracts that have been presented at other meetings. If the research is of sufficient quality and importance, and has not yet been published, it deserves widespread dissemination and discussion. Thirdly, scientific conferences should continue to adapt towards providing greater online presences that encourage worldwide participation.

Winnik et al. have demonstrated the ability of scientific conferences such as the ESCC to judge research, but meetings are principally organized to disseminate and share research. That 70% of research abstracts submitted to the 2006 ESCC remain unpublished 5 years later is conspicuous. This is an unacceptable standard for scientific discourse.

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