Letter to the Editor

Eventual full-text publication of research abstracts presented at an allergy/immunology meeting

To the Editor:

An important measure of the quality of a scientific meeting of any medical professional organization is the determination of the publication fate of the research abstracts presented at the meeting.[1,2] The standard method of assessing this objectively is to investigate the abstract/publication ratio; that is, to determine the percentage of the original research abstracts presented that are subsequently published as full-text articles in peer-reviewed journals. Where studied, the abstract/publication ratios for research presented at meetings of medical specialty or subspecialty organizations range widely, from 11% to 78%.[1-8] In some areas, such as pediatrics and related subspecialties, this outcome is measured at regular intervals and provides a useful benchmark.[2]

To our knowledge, abstract/publication ratios have not been previously reported from an allergy/immunology meeting. This measure is important because if the research does not get published in a full-text article, it cannot be readily located using current search methods, and it therefore remains relatively inaccessible to the scientific community and to practicing physicians. In addition, its methodologic quality might be difficult to evaluate because of the limited amount of information that can be summarized in an abstract.[2,4]

We hypothesized that more than 50% of the research abstracts presented at an American Academy of Allergy, Asthma and Immunology (AAAAI) Annual Meeting would eventually be published as full-text articles in peer-reviewed journals. In a pilot study this hypothesis was tested by sampling 115 abstracts (10% of the 1150 abstracts) presented at the 2000 AAAAI Annual Meeting. The sample was constructed by using the random-start method. Two of the randomly selected abstracts had been withdrawn before the meeting and never presented, and we therefore report on 113 abstracts. Sample size was based on the calculation that if 50% of a sample of 100 abstracts were later published in full, the margin of error would be 10%. All abstracts presented at this meeting had been peer reviewed before being accepted for presentation and publication in a supplement to the AAAAI's *Journal of Allergy and Clinical Immunology*.[9]

In 2005, using Medline, we searched for a full-text publication by title and authors of each original research abstract in the sample. If a full-text publication was not identified, a variety of other search engines were used, including Embase, Google, and Answers, and the search was broadened to include a combination of abstract key words and author names.[2,3,5] If these strategies failed to identify an article, the authors were contacted personally by E-mail on up to 6 occasions and asked to provide information about full-text publication of their abstract.[2] They were advised that any information we received would be reported anonymously by group and that no author or abstract would be named individually. The Fisher exact test was used for comparisons. Citation impact factors were based on data published in 2004.

Of the total 113 abstracts in the random sample, 73 (65%) were later published as full-text articles in a peer-reviewed journal (Table I). For 21% (24/113) of the abstracts, confirmation was obtained from the authors that their work had not been published in full subsequent to the 2000 AAAAI Annual Meeting. For 14% (16/113) of the abstracts, no full-text articles were identified by searching, and replies were not received from any of the authors, despite repeated attempts at contacting them; therefore it was assumed that the work had not been published in full.

The 73 full-text articles appeared in a total of 40 different journals. Seventy-one (97.3%) of 73 of the articles were published in an English-language journal. There were no duplicate publications. Forty-four (60.0%) of 73 of all the abstracts that were later published as full-text articles appeared in allergy/immunology journals (Table I). Twenty-six (35.6%) of 73 of all abstracts eventually published as full-text articles appeared in journals that ranked number 1 or number 2 in their subject category. Thirteen were published in *The Journal of Allergy and Clinical Immunology* and 4 in *Allergy* (the top-ranked journals in the Allergy category). Three were published in the *American Journal of Respiratory and Critical Care Medicine* and 1 in *Thorax* (the top-ranked journals in the Respiratory System category). One was published in *FASEB Journal* (ranked number 2 in the Biology category), 1 in *Nature Medicine* (the top-ranked journal in the Medicine, Research, and Experimental category), 1 in the *American Journal of Pathology* (the top-ranked journal in the Pathology category), and 1 in *Pediatrics* (the top-ranked journal in the Pediatrics category).

Fifty (68.5%) of 73 of the abstracts that were later published as full-text articles appeared as such within 2 years of presentation at the AAAAI meeting, including 2 that appeared in the months immediately preceding the meeting, and 87.7% (64/73) appeared within 3 years (Table I). The 5-year time frame selected for the analysis was based on the likelihood that research remaining unpublished in full-text form 5 years after being presented might never get published at all.[3] Although abstract authors who failed to publish subsequently were asked to describe the reasons for this, many did not provide the requested information.

When the research abstract titles were compared with the titles of their respective full-text publications, there was no change or minimal change (maximum 2 words) in 30.1% (22/73) and a more substantial change in 61.7% (45/73). In 8.2% (6/73) a completely different title was used, and the abstract of the full-text publication was compared line by line with the abstract of the research presented at the meeting to be certain that they reflected

TABLE I. Full-text publication of results initially presented in abstracts

		Ratio	Lower 95% CI	Upper 95% CI
Confirmed as published	73/113	0.646	0.558	0.734
Confirmed as unpublished	24/113	0.212	0.137	0.288
Probably unpublished	16/113	0.142	0.077	0.206
Published in allergy/immunology journal	44/73	0.603	0.490	0.715
Published in high-impact journal*	26/73	0.356	0.246	0.466
Published within 2 y	50/73	0.685	0.578	0.791
Published within 3 y	64/73	0.877	0.801	0.952
High-profile oral (podium) sessions	16/18	0.889	0.744	1.034
High-profile poster symposium	9/10	0.9	0.715	1.086
General poster sessions	48/85	0.565	0.459	0.670

*The citation impact factor measures the frequency with which the average article in a journal has been cited in a particular year or other time period and is one of several quantitative tools for evaluating, ranking, categorizing, and comparing journals.

the same study. Authorship of the abstract and the full-text article was identical in 34.2% (25/73); however, in 65.8% (48/73) authors had been added, dropped, or both.

At the 2000 AAAAI Annual Meeting, research abstracts receiving high scores at the time they were accepted for presentation were programmed in either oral (podium) sessions or in poster symposia, and the abstract/publication ratios for these types of sessions were excellent: 88.9% (16/18) and 90% (9/10), respectively (Table I). In contrast, 56.5% (48/85) of the abstracts presented in general poster sessions were eventually published as full-text articles ($P < .001$).

Thirty-six (49.3%) of 73 of the published full-text articles represented studies performed in individuals with allergic or immunologic disease or in healthy volunteers, 32 (43.8%) of 73 represented studies performed *in vitro* or in animal models, and 5 (6.9%) of 73 represented epidemiology studies and surveys.

The abstract/publication ratio of 65% that we identified is higher than that reported by many specialties and subspecialties; indeed, overall, half of the research presented at meetings of medical professional organizations never gets published in full.[1-8] Like some other biomedical organizations, we found that most articles eventually published in full appeared within 2 or 3 years of presentation[1,2,5,6] and that presentation in a high-profile oral (podium) session or a featured poster session was associated with an increased likelihood of full-text publication.[2] Of course, the type of session in which research presentations are scheduled might also be influenced by practical programming issues, such as the limited numbers of slots available in podium sessions or poster symposia, as well as by the quality of the research.

Investigations such as this have several important implications with regard to the credence that should be given to abstracts presented at biomedical meetings,[4] considering the fact that even in specialty/subspecialty organizations with the highest abstract/publication ratios, 25% to 35% of the research presented never gets published in full-text form.[1,2,6] Investigators, journal reviewers, editors, and practicing physicians should perhaps be cautious about citing abstracts that remain unpublished many years after presentation of the research and consequently become part of the so-called gray literature, with limited distribution and accessibility.[3] In addition, media coverage of research abstracts presented at meetings of medical professional organizations should be interpreted in the context that some of the research will never be published in full-text form, and its quality might therefore never be adequately vetted.[10]

This is the first AAAAI Annual Meeting, and likely the first allergy/immunology meeting, for which the research abstract/publication ratio has been objectively evaluated. The results compare favorably with those published by other medical specialty and subspecialty organizations. Despite this, there is room for improvement. In subsequent investigations of the abstract/full-text publication ratio at allergy/immunology meetings, additional emphasis should be placed on systematic collection of the reasons for failure to publish in full-text form, which might suggest opportunities for mentoring.

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