PHARMACOEPIDEMIOLOGY AND DRUG SAFETY 2002; **11**: 105–111
Published online 20 March 2002 in Wiley InterScience (www.interscience.wiley.com). **DOI**: 10.1002/pds.687

ORIGINAL REPORT

Fate of abstracts presented at five International Conferences on Pharmacoepidemiology (ICPE): 1995–1999

P. Stolk, A. C. G. Egberts PhD* and H. G. M. Leufkens PhD

Department of Pharmacoepidemiology and Pharmacotherapy, Utrecht Institute for Pharmaceutical Sciences, Utrecht, The Netherlands

SUMMARY

Background Meetings are an important way of exchanging scientific information, but full diffusion of new information can only be achieved when results are published in scientific journals.

Purpose (1) To determine the publication frequency of accepted abstracts for the yearly international conferences on pharmacoepidemiology (ICPE) and to examine predicting variables; (2) if published, to determine impact differences between 'oral' and 'poster' abstracts and to determine type and nature of publishing journals.

Methods Abstracts accepted for ICPE 1995–1999, published in the official conference supplement of *Pharmacoepidemiology and Drug Safety*, were included. Publication status for the information contained in each abstract was evaluated through MEDLINE and IPA searches. Impact factors of publishing journals were retrieved and journals were included in one of five groups.

Results Overall, one out of three abstracts resulted in a publication in the peer-reviewed journals studied. Abstracts from North America were more often presented orally than abstracts from Europe, but had lower publication chances. 'Oral' abstracts were more likely to be published than 'poster' abstracts; abstracts with a strong methodological content had a lower publication frequency. Most of the published abstracts were found in pharmacology and pharmacy journals (33%) and journals on specific clinical topics (30%).

Conclusions Only one out of three papers presented at ICPE ends up in established peer-reviewed journals. Although the publication characteristics for ICPE are not very different from other conferences, there are certain questions that warrant further investigation. Copyright © 2002 John Wiley & Sons, Ltd.

KEY WORDS — pharmacoepidemiology; science; journal; publication; abstract; impact factor

INTRODUCTION

International conferences are one of the most important ways of communicating recent developments in a certain field of science. On such meetings new findings are presented in the form of oral presentations and in poster sessions based upon submitted peer-reviewed abstracts. However, the true importance of a study or finding can only be evaluated when it is published in a peer-reviewed journal. The scientific information disclosed in such a journal article is more widely available and usable than the contents of a conference abstract. For example: the use of conference abstracts as citations in research publications is frowned upon by many researchers and most search engines do not index conference abstracts.[1] Therefore it is important to determine the extent into which conference abstracts of meetings result in publications in peer-reviewed journals, especially since it is the only quantifiable output of a medical conference.

Over the years, numerous studies have been performed on the publication frequency of abstracts submitted to meetings; a good overview of these is

*Correspondence to: Professor Dr A. C. G. Egberts, Utrecht Institute for Pharmaceutical Sciences (UIPS), Department of Pharmacoepidemiology and Pharmacotherapy, PO Box 80082, 3508 TB Utrecht, The Netherlands. Tel: +31-30-253 73 24. Fax: +31-30-253 91 66
E-mail: A.C.G.Egberts@pharm.uu.nl

Received 26 November 2001
Accepted 18 December 2001

given by Byerly *et al*.[2] Few, however, elaborate further on specific characteristics of an abstract, the way it was presented on the conference and its fate as publication in peer-reviewed journals.

We examined four characteristics of abstracts that could be of importance to the outcome of interest: publication of the study to which the abstract refers. First of all, whether the accepted abstracts were presented in the form of an oral presentation or in a poster session. It is often perceived that abstracts that qualify for an oral presentation are the fruits of better or more interesting research. A second factor of influence might be the origin (geographical, institute, and the like) of the abstract. Thirdly, whether the abstract, and thus the study it refers to, has a strong methodological content. Finally, the year of the conference can be of importance, since there may be large differences between the meetings.

In addition, in case a journal publication resulted from an abstract, we determined the time lag between the submission deadline of the abstracts and their final publication. Furthermore, we were interested in the impact factor of the publishing journal, as calculated by the Institute for Scientific Information (ISI). This impact factor has in recent years become, deservedly or not, one of the major quantitative measures for the quality of a journal.[3–9]

We studied the above-mentioned research questions using data from 5 years (1995–1999) of the International Conference on Pharmacoepidemiology (ICPE) organized by the International Society for Pharmacoepidemiology (ISPE). The objective of this conference, as stated by ISPE for their 2001 conference, is: 'to provide a forum for the exchange of information among researchers, medical care practitioners, health care administrators, the pharmaceutical industry, regulatory agencies, and other stakeholders on pharmacoepidemiological approaches to studying the efficacy and safety of pharmaceuticals'.[10]

METHODS

Study dataset

Abstracts and official programmes of five ISPE conferences (1995, 1996, 1997, 1998 and 1999) were obtained. Only those abstracts that were published in the conference supplement of *Pharmacoepidemiology and Drug Safety* were included, i.e. 'late breaker' abstracts were excluded. Abstracts that were presented in the form of a workshop or in a symposium were also excluded since these generally are not reports of full-study data.

Abstract characteristics

For each abstract the following characteristics were determined.

Type of presentation. Oral presentation or a presentation in a poster session on ICPE. Classification was based upon the official programmes of the conferences.

Year. The year of the conference for which the abstract was submitted.

Region of origin. Abstracts were divided in three geographic groups: North America, Europe, and rest of the world/interregional cooperation. The seat of the institution to which the authors of the abstract were connected determined the geographic region. If this resulted in more than two countries from different regions the abstract was assigned to the rest of the world/interregional cooperation group.

Methodological content. Abstracts were classified for whether or not they had a strong emphasis on research methodology.

Outcomes

Publication of an abstract in the form of a related article was evaluated by a search query in the MEDLINE and International Pharmaceutical Abstracts (IPA) datafiles. Searches were performed on the name of the first author of the abstract. If this returned no results, searches were performed with one or a combination of the co-author names. Search results were assessed for equivalence with the abstract. Criteria in judging whether the abstract was indeed published as a journal article were for example: research question, sample size and contributing authors. If several abstracts resulted in the same publication, it was only counted once for the purposes of this study. All search queries were performed during March 2001.

For submitted ICPE abstracts for which study results where published in a MEDLINE or IPA indexed journal, the following characteristics of the publication were of interest.

Publication delay. The time in months that passed between the submission of the abstract (February 1 of the year in which the relevant conference was held) and the date of issue of the publishing journal.

Journal impact factor. The impact factors have been retrieved for all publishing journals from the *Journal*

Citations Report 1999 (JCR). Journals for which no impact factor was reported in the *Journal Citations Reports* were classified as *missing*; most of the times this referred to small, non-English journals and thus not of great international scientific significance. Journal impact factors are computed by the Institute for Scientific Information (ISI) on the basis of the citations of articles in the *Science Citations Index* (SSI) and the *Social Science Citations Index* (SSCI). It can be seen as the frequency with which the 'average article' in a journal has been cited in a particular year. The impact factor of a journal j in year t is defined as the ratio (a)/(b) of: (a) the total number of citations received by all articles published in this journal in the preceding 2 years from all journals included in the databases of ISI and (b) the total number of articles in that same journal j during the same time window. In addition to retrieving impact factors the JCR was also used to divide the journals into different classes. The JCR divides journals in 26 different groups. For our purposes we created on the basis of these groups five broad classes: (A) Pharmacology and Pharmacy, (B) Medicine: General and Internal and (C) Public, Environmental and Occupational Health which are three classes that are also used in the JCR, (D) Specific Clinical topics is a collection of all kinds of specific journal categories in JCR (e.g. Gynecology and Peripheral Vascular Disease). Those journals that were not included in the JCR, those with a *missing* impact factor, were included in a class that contained comparable journals. Journals for which no class could be found, e.g. the subject of the journal could not be discerned due to a foreign language unknown to the authors, were classified as (E) Unknown.

Data analysis

The publication patterns per year were analysed using Kaplan–Meier survival analysis. Cox regression was used for analyses to study the association between abstract characteristics and publication probability. Results were considered statistically significant if $p < 0.05$.

RESULTS

General characteristics of the included abstracts regarding presentation type, methodology and region of origin content are shown in Table 1. The number of accepted abstracts from North America (NA) and Europe tends to rise or fall depending on which continent the meeting is held, but remains quite constant overall. The number of abstracts from the rest of the world/interregional cooperation (RE) has increased slightly over the period studied.

Overall, of 1216 presented abstracts, 319 (26.2%) were found to be published in an indexed journal. Data for each year is presented in Table 1. When reviewing these results, reckon with the influence of the limited follow-up time of the later conferences on the publication frequency. Figure 1 shows that after approximately 3.5 years of follow-up the maximal publication frequency is reached. All curves in this figure show the same pattern, except for the curve of

Table 1. Characteristics and publication status of the abstracts ICPE 95–99

	1995 Montreal $n=174$ n (%)	1996 Amsterdam $n=218$ n (%)	1997 Orlando $n=240$ n (%)	1998* Berlin $n=315$ n (%)	1999 Boston $n=269$ n (%)	All years $n=1216$ n (%)
Type of presentation						
Oral	49 (28.2)	40 (18.3)	63 (26.2)	52 (16.5)	45 (16.7)	249 (20.5)
Poster	125 (71.8)	178 81.7)	177 (73.8)	263 (83.5)	224 (83.3)	967 (79.5)
Region of origin						
NA	75 (43.1)	59 (27.1)	92 (38.3)	95 (30.1)	87 (32.3)	408 (33.6)
E	72 (41.4)	122 (55.9)	108 (45.0)	165 (52.4)	129 (48.0)	596 (49.0)
Rest	27 (15.5)	37 (17.0)	40 (16.7)	55 (17.5)	53 (19.7)	212 (17.4)
Methodological content						
Yes	43 (24.7)	72 (33.0)	62 (25.8)	63 (20.0)	44 (16.4)	247 (23.4)
No	131 (75.3)	146 (67.0)	178 (74.2)	252 (80.0)	225 (83.6)	969 (76.6)
Published						
Yes	52 (29.9)	67 (30.7)	73 (30.4)	70 (22.2)	57 (21.2)	319 (26.2)
No	122 (70.1)	151 (69.3)	167 (69.6)	245 (77.8)	212 (78.8)	897 (73.8)

*1998 increase in number of abstracts partially caused by joint ICPE-EURODURG session.
NA, North America; E, Europe; RE, rest of the world and interregional cooperation.

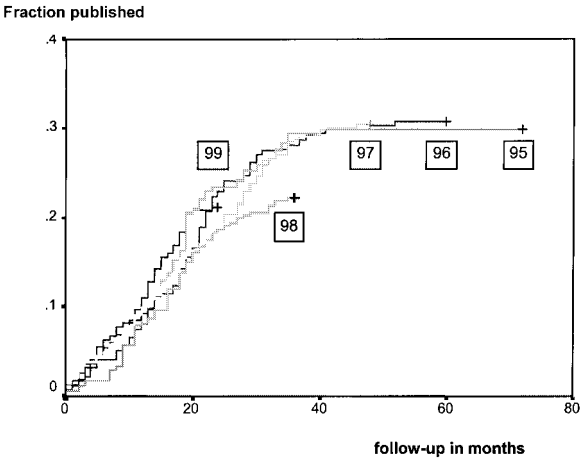

Figure 1. Publication frequency per conference (ICPE 95–99)

1998 which appears to result in a lower publication rate.

An overview of the most important determinants and their influence on the publication of an abstract is shown in Table 2. Abstracts presented as an oral communication have a significantly higher publication chance than those presented as a poster (RR_{adj} 1.67; 95% CI: 1.30–2.15). European abstracts have a higher chance of being published compared with North American abstracts (RR_{adj} 1.36; 95% CI: 1.06–1.74). The region of origin of the abstract also proved to be statistically significantly associated with the type of presentation. With respect to oral presentations, abstracts from North America are more often presented orally than either abstracts from Europe (OR: 2.22; 95% CI: 1.67–3.03) or the rest of the world (OR: 2.86; 95% CI: 1.82–4.55). Methodological content is negatively associated with the chances of publication of an abstract (RR_{adj} 0.41; 95% CI: 030–0.58).

Table 2. Determinants of publication frequency

Determinant of publication	Univariate: RR (95% CI)	Multivariate: RR (95% CI)
Type of presentation		
Poster	1 (ref)	1 (ref)
Oral	1.76 (1.39–2.23)	1.67 (1.30–2.13)
Region of origin		
North America	1 (ref)	1 (ref)
Europe	1.32 (1.03–1.68)	1.36 (1.06–1.74)
Rest of the world	0.64 (0.44–0.95)	0.65 (0.44–0.97)
Methodological content		
No	1 (ref)	1 (ref)
Yes	0.42 (0.30–0.58)	0.41 (0.30–0.58)
Year		
1995 (Montreal)	1 (ref)	1 (ref)
1996 (Amsterdam)	1.06 (0.74–1.52)	1.13 (0.79–1.63)
1997 (Orlando)	1.03 (0.72–1.48)	1.03 (0.72–1.47)
1998 (Berlin)	0.78 (0.54–1.12)	0.76 (0.53–1.10)
1999 (Boston)	0.98 (0.67–1.43)	0.97 (0.66–1.43)

*Adjusted for all other determinants.

Table 3 depicts the different classes of journals in which articles are published; 'pharmacology and pharmacy'journals and journals with specific clinical topics account for more than half of the publications. Table 4 shows the names of journals that published four or more articles resulting from ICPE abstracts in the years studied; *Pharmacoepidemiology and Drug Safety* is the official journal of ISPE.

Figure 2 shows the difference between the impact factor of publications arising from oral presentations and poster presentations; although there is a wide range the median impact factor (2.1) of publications of abstracts that were presented as an oral communication at ICPE was higher than those presented as a poster (3.2).

DISCUSSION

One of the outcomes of this study that stands out most, is the percentage of submitted abstracts of which the contents are published in peer-reviewed journals. Only one out of three papers presented at ICPEs ends up in established peer-reviewed journals. When one compares the publication percentage of ICPE with that of other conferences (summarized in the article of Byerly *et al.*[2]), ICPE has a mediocre score. Is this disturbing? For some part it probably is; of the large number of abstracts submitted, only a relatively small percentage finds its way into publications accessible to the scientific community, hampering diffusion of pharmacoepidemiologic knowledge. The question that should be addressed in the future, is: what happens to the rest of the papers that are presented at ICPE?

Also the publication delay seems to be quite long; the median publication delay is about 20 months. However, this seems to be within normal range when it is compared with the median and average delays reported by Byerly *et al.*[2] The median publication delay reported in that review ranges from 9 to 23 months.

An interesting result in the evaluation of the oral presentations is the fact that in most years abstracts originating from Europe have a lower chance for selection as an oral presentation, but they seem more successful in generating publications. The phenomenon seems to be irrespective of the geographic location of the conference. Scientists are influenced

Table 3. Classes of publishing journals

Category	No. of published abstracts ($n = 319$	% of total publications	Example of journals in category
Pharmacology and pharmacy	106	33.3	*Eur J Clin Pharmacol*, *J Pharm Ther*
Specific clinical topics	97	30.4	*Stroke*, *Hypertension*, *Int J Cancer*
Medicine, general and internal	69	21.6	*JAMA, Neth J Med, Brit Med J*
Public, environmental and occupational health	45	14.1	*Epidemiology, Public Health Rep*
Unknown	2	0.6	*Farmaceutski Glasnik, Ugeskr Laeger*

Table 4. Journals that published four or more ICPE abstracts

Journal name	Number of publications ($n = 319$)	% of all publications	Impact factor (1999)	JCR subject category
Eur J Clin Pharmacol	26	8.2	1.771	Pharmacology and pharmacy
Br J Clin Pharmacol	21	6.6	2.545	Pharmacology and pharmacy
J Clin Epidemiol	15	4.7	2.062	Public, environ. and occup health
Brit Med J	14	4.4	5.143	Gen. and intern. med
Arch Intern Med	13	4.1	6.705	Gen. and intern. med
Pharmacoepidem D S	10	3.1	0.848	Pharmacology and pharmacy
Epidemiology	9	2.8	3.377	Public, environ. and occup health
The Lancet	8	2.5	10.197	Gen. and intern. med
Am J Epidemiol	6	1.9	3.978	Public, environ. and occup health
Br J Gen Pract	6	1.9	1.549	Gen. and intern. med
Pharmacoeconomics	6	1.9	1.367	Pharmacology and pharmacy
J Clin Pharm Ther	4	1.2	0.409	Pharmacology and pharmacy
JAMA	4	1.2	11.435	Gen. and intern. med
Aliment Pharmacol Ther	4	1.2	3.057	Pharmacology and pharmacy
Clin Drug Invest	4	1.2	0.651	Pharmacology and pharmacy
J Am Geriatr Soc	4	1.2	2.865	Geriatrics and gerontology

Journal names are abbreviated.

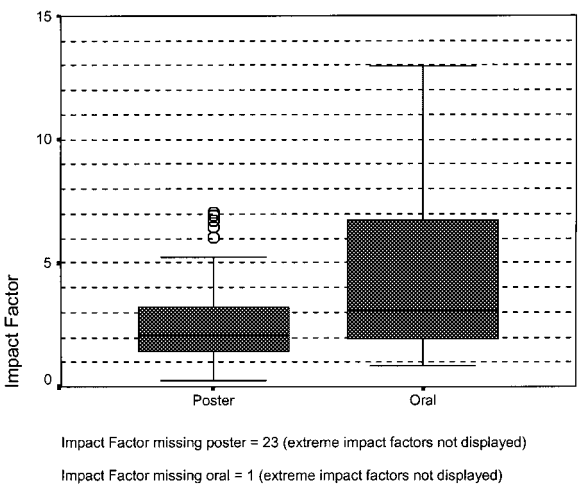

Figure 2. Boxplot representing the impact factors of the journals publishing studies related to ICPE

by the result of the review by the programme committee, for example: a rejection of the abstract of the study may make scientists pessimistic about the chances of their work being published, as was described by Weber.[11]

Another important goal of this study was to test the hypothesis that oral presentations were more likely to result in journal publications than those abstracts that were part of a poster session. To put it in another way: are oral presentations simply the result of better-written abstracts (and better research) and is there only a small difference with poster presentations regarding the importance of the study, its quality and publishability? Or do oral presentations have a greater chance of being published and, when this happens, in journals with a higher impact factor? The latter proved to be the case: on average orally presented abstracts have a higher chance of resulting in publications and their contents are published in higher

impact factor journals than poster presentations. Our results for the publication deflated, since sometimes researchers who submit abstracts, choose not to present orally (e.g. none of the researchers are able to visit the conference), though it is rated high enough for this by the programme committee; i.e. there are 'oral' abstracts in the 'poster' group. So, future studies should look into the rating results of programme committees instead of using the assumption that oral presentation at a conference is the measure for an appreciated abstract.

As is shown by this analysis, the publications resulting from ICPE abstracts appear for the most part in pharmacology and pharmacy journals and journals with specific clinical topics. Only 14.1% are published in journals with a purely epidemiological content. This reveals the broad scope of the topics of journals in which pharmacoepidemiology abstracts are published. The strong clustering of publication around a few journals like the *European Journal of Clinical Pharmacology* and the *British Journal of Clinical Pharmacology* confirms the strong link between clinical pharmacology and pharmacoepidemiology.

Between 1995 and 1999 the number of abstracts studied has increased from 174 in 1995 to 269 in the 1999 conference, with little influence of the average fraction of published abstracts. The exception here is 1998, when a large number of abstracts was submitted but resulted in a relatively few being published. Whether this is a random fluke or had something to do with a joint ISPE/EURODURG session or if there is another reason is something the authors cannot say on the basis of this data. The trend, however, is toward conferences with more abstracts, with no accompanying decrease in the fraction of published abstracts. Which is, off course, a good sign.

This study has some limitations that are of importance to those wanting to interpret our results. First of all, we only used two major indexing databases: MEDLINE and IPA; EMBASE is obviously the large database that is missing here. Though some publications might be missed, in our opinion this error is small and the majority of the international journals has been covered. The choice of databases also does not include most of the 'local' scientific journals of many countries that publish articles in their national language. Likewise, an unknown fraction of published ICPE research is missed, but for evaluation purposes these articles can be excluded with good reason. However, disrespectful for the quality of these individual papers it may be, since the rise of English as the 'lingua franca' of biomedical research it is almost impossible for a non-English article to receive the attention it may or may not deserve in the scientific community. In addition to this, not all the contents of a conference is covered, since some abstracts are left out (e.g. workshops) and others were unavailable (late breakers). It can be argued that no discrimination was made between different types of publications (short reports, letters, full articles etc.). In this study all publications were deemed equal.

Finally, it could also be argued that this analysis has a weakness in the fact, that the impact factors of 1999 have been used instead of the impact factor of the journal for the year in which the relevant article has been published. This is because the impact factor can vary between years by as much as as $+/-40\%$ for smaller journals and $+/-15\%$ for larger journals.[12] With this in mind, a general qualitative statement, with certain reservations, can still be made. In addition, the impact factor of a journal does not necessarily reflect the impact of the individual paper published in that journal.

Concluding, measuring the output of a conference by the number of publications resulting from it, is of course but one approach of measuring the success of such a meeting. A conference also provides a platform on which scientists from all over the world can exchange ideas and inspire one another, and this may be just as important. However, the quality of the non-social part of the conference is for a large part determined by the quality of the research presented there, and good research should be published, as is the common opinion. Nowadays, with more attention being paid to the measurement and quantification of scientific output of universities, researchers and journals (for example by Journal Impact Factors), international conferences cannot be left out of this process and appropriate methods should be developed for measuring the effect of these meetings.

CONCLUSIONS

Although the publication characteristics for ICPE are not very different from other conferences, there are certain questions that warrant further investigation. Perhaps the most important one: what happens to those studies of which an abstract was submitted to ICPE but no relating journal publication could be found? Next to that some other questions can be asked, for example: what is the cause of the underrepresentation of European abstracts in the oral sessions at ICPE? Answering these questions could lead to further improvement of ICPE and its function as a balanced forum where topical issues on drug effectiveness, safety, outcomes and other aspects of

prescription drugs and their effects can be discussed and reflected upon.

REFERENCES

1. Kelly JA. Scientific meeting abstracts: significance, access, and trends. *Bull Med Libr Assoc* 1998; **86**: 68–75.
2. Byerly WG, Rheney C, Connelly JF, Verzino KC. Publication rates of abstracts from two pharmacy meetings. *Ann Pharmacother* 2000; **34**: 1123–1127.
3. Porta M. The bibliographic 'Impact factor' of the Institute for Scientific Information: how relevant is it really for public health journals? *J Epidemiol Commun Health* 1996; **50**: 606–610.
4. Schoonbaert DRG. Impact takes precedence over interest (letter). *Nature* 1998; **391**: 222.
5. Stegmann J. How to evaluate journal impact factors (letter). *Nature* 1997; **390**: 550.
6. Gowrishankar J, Divakar P. Sprucing up one's impact factor (letter). *Nature* 1999; **401**: 321–322.
7. Baylis M, Gravenor M, Kao R. Sprucing up one's impact factor (letter). *Nature* 1999; **401**: 322.
8. Opthof T. Sense and nonsense about the impact factor. *Cardiovasc Res* 1997; **33**: 1–7.
9. Kleijnen JPC, Van Groenendaal W. Measuring the quality of publications: new methodology and case study. *Informat Proc Manag* 2000; **36**: 551–570.
10. ISPE. http://www.pharmacoepi.org/meetings/17thconf/index.html. [Accessed 24 September 2001].
11. Weber EJ, Callaham ML, Wears RL, Barton C, Young G. Unpublished research from a medical specialty meeting. *JAMA* 1998; **280**: 257–259.
12. Amin MM. Impact factors: use and abuse. *Perspect Publish* 2000; **1**: 1–6.

