

Case Report ■

The Use of Electronic Mail in Biomedical Communication

RICHARD COSTELLO, MD, MRCPI, ANTHONY SHAW, MD, ROZ CHEETHAM, ROBERT J. MOOTS, MD, PhD

Abstract **Objectives:** To determine whether there are statistically significant differences in the content of electronic mail (e-mail) and conventional mail sent to authors of papers published in medical journals.

Design: Prospective study by postal questionnaire. Over two one-month periods, corresponding authors of papers published in medical journals were asked to record details of the correspondence prompted by their publications.

Measurements: Conventional and e-mail correspondence received. Reprint requests. Content of correspondence. Quality of correspondence.

Results: Eighty-two of 96 authors replied. Fifty received e-mail (mean, 5.7 ± 8.8 e-mails per author) and 72 received conventional mail (15.5 ± 32.8 letters per author) ($p < 0.05$). Seventy percent of e-mails and only 53% of correspondence sent by conventional mail ($p < 0.05$) referred to the content of the paper.

Conclusions: Publication in general medical journals stimulates more conventional than electronic mail. However, the content of e-mail may be of greater scientific relevance. Electronic mail can be encouraged without fear of diminishing the quality of the communications received.

■ JAMIA. 2000;7:103-105.

Effective and easy communication among researchers is essential for the optimal pursuit of biomedical research. Such interactions are particularly important following the publication of research articles. For example, there may be discussion of details of the content of a study, with exchange of reagents, or requests for reprints of the manuscript. While the former may clearly promote developments in research, the latter are not so relevant today, because of ready access to photocopiers and Web-based publications. The recent expansion in information technology, with increasing access to electronic communication, has prompted

many leading biomedical journals to publish both the electronic (e-mail) and the surface (conventional) mail addresses of corresponding authors.¹

Communication by e-mail, in general, is often quite different from communication by conventional means.² It is, therefore, possible that there are qualitative differences between the content of e-mails received by corresponding authors and the content of correspondence received by conventional mail. On the one hand, it could be speculated that the publication of e-mail addresses encourages useful communication with authors, because the correspondence is not intrusive and is delivered directly to the authors. On the other hand, the relative informality of e-mail makes some users unwilling to use it. Finally, we have observed anecdotally that some authors are reluctant to include their e-mail addresses in a manuscript for fear of receiving poor quality or irrelevant correspondence by that means.

To address these questions, we undertook a prospective study to investigate the use and content of con-

Affiliation of the authors: University of Liverpool, Liverpool, United Kingdom.

Correspondence and reprints: Richard Costello, MD, MRCPI, Department of Medicine, University of Liverpool, University Hospital Aintree, Liverpool L9 7AL, United Kingdom; e-mail: (rcostell@liv.ac.uk).

Received for publication: 6/17/99; accepted for publication: 7/27/99.

ventional and e-mail correspondence sent to corresponding authors after the publication of manuscripts in leading medical journals. The results of this study suggest not only that e-mail is a widely used means of communicating with manuscript authors but also that the content of e-mail is more relevant to research than is the content of correspondence received by conventional means.

Methods

The quality and quantity of both electronic and conventional mail directed to corresponding authors publishing in three leading general medical journals (*The Lancet*, *Journal of the American Medical Association*, and *British Medical Journal*) were assessed prospectively.

Consecutive original research articles published over two one-month periods (Nov 1997 and Feb 1998) were studied. Immediately after publication, the corresponding authors were sent letters requesting that a record of all correspondence concerning their papers be kept. Three months later, the corresponding authors were sent a postal questionnaire asking them to detail the number of e-mails and conventional letters they received. If they had received correspondence concerning their article, they were asked to record whether the correspondence discussed the content of their paper (and, if so, which component). The authors were asked to keep a record of the number of reprint requests they received, whether they received correspondence suggesting future collaboration or requesting reagents used in the study, and the route by which each of these was received. They were also asked whether they found the correspondence by each of the two routes useful and whether there were qualitative differences in the content of the two forms of correspondence. Finally, authors were invited to comment on their own use of e-mail for communication with other biomedical researchers.

Statistical Analysis

Comparisons of the proportions of correspondences were calculated using chi-squared analysis, and comparisons of the numbers of correspondences received by the two groups were compared using an unpaired Student *t*-test. Values are expressed as mean plus or minus standard deviation.

Results

Replies were received from 82 (85 percent) of 96 authors; only one reminder was sent to the nonresponding authors. The results of this study refer to the 82 responses that were returned.

Seventy-five of the 82 authors received a total of 1,181 (range, 1 to 250) conventional correspondences concerning their articles; the remaining seven had no correspondence. Fifty (91 percent) of the 55 authors who included their e-mail addresses received a total of 326 (range, 1 to 50) correspondences by that route (Table 1). However, 1,039 conventional correspondences (88 percent) were simply reprint requests. In contrast, only 72 e-mail correspondences (22 percent) were reprint requests ($p < 0.01$). The majority, 35 (70 percent) of 50, of the e-mail correspondences referred to content of the published paper. Although each section of articles was referred to in the e-mail correspondences, the Results section was most frequently mentioned in them. In contrast, only 38 (50 percent) of 75 conventional correspondences referred to specific sections of the articles (comparing e-mail content to conventional mail content, $p = 0.05$). Both media were used equally often to request materials or reagents used in a study or to suggest potential future collaboration. Those authors who rated the quality of correspondence stated that the e-mail correspondence was both of a higher standard and more relevant than the conventional correspondence.

Although it was the journals' policy to publish the e-mail addresses of corresponding authors, if they were supplied, only 55 corresponding authors (67 per-

Table 1 ■

The Number and Content of the Two Types of Correspondence Received by the Authors

	E-mail	Conventional Mail
Numbers of authors replying	55	82
Numbers of authors receiving correspondence	50	72
Mean number of correspondences received	5.7 ± 8.8	15.5 ± 32.8*
Number (%) of authors receiving comments on the content of the paper	35 (70)	38 (53)*
Number (%) of authors receiving comments on the methods of the paper	11 (22)	15 (21)
Number (%) of authors receiving comments on the results of the paper	26 (52)	25 (35)*
Number (%) of authors receiving comments on the discussion of the paper	20 (40)	24 (33)

NOTE: There was significantly more conventional mail than e-mail but a significantly greater proportion of the e-mails were comments on the content of the paper.

* $p < 0.05$.

cent) actually included their e-mail addresses. Of the 27 who did not include their e-mail addresses, ten (37 percent) actually had e-mail addresses, but chose not to publish them. Almost all the authors used e-mail regularly to communicate with other biomedical researchers.

Discussion

E-mail is widely available for use by the academic community. This is underscored by the fact that 85 percent of authors in this study had e-mail addresses and 70 percent stated that they regularly used e-mail to communicate with other researchers.

The most remarkable finding in this study, however, was that e-mail communications appeared to be more relevant and of higher quality than conventional correspondences. The vast majority of conventional correspondences were requests for reprints; some authors received more than 100 such requests during the study period. In contrast, only a small proportion of the e-mail correspondences were requests for reprints. When reprint requests were excluded, authors received as many e-mail as conventional correspondences. The content of the e-mails often concerned some aspect of the content of the article, in particular the Results section. This is of more relevance to the propagation and criticism of research than are requests for reprints.

This study deliberately focused on communications stimulated by publications in one type of biomedical journal, the general clinical journal, because such journals are read by clinical as well as basic science researchers. These results may, therefore, not be directly applicable to more specialized journals. Although it is possible that recall bias affected the responses of corresponding authors, this is unlikely to have changed the results of the study, because such potential bias would affect both forms of communication equally.

The ease of transmission and lack of intrusion of e-mail compared with, for example, the telephone has led to a belief that e-mail correspondence may be of lower quality and relevance than conventional mail.¹ Our observations suggest that this is not true and that e-mail is a useful and valuable means of communicating with corresponding authors on their research. We conclude that e-mail communication in biomedical research should continue to be encouraged and that authors reluctant to provide e-mail addresses can be reassured that this powerful tool can enhance the quality of their communications.

References ■

1. Crossan L, Delamothe T. The new order [letter]. *BMJ*. 1998; 316:1406.
2. Branger PJ, Duisterhout JS. Communication in health care. *Methods Inf Med*. 1995;34:244-52.