BRIEF COMMUNICATIONS

Incorrect citations: a comparison of library literature with medical literature

By Susan P. Benning, M.S.L.S.
Circulation Librarian

Susan C. Speer, M.S.L.S.
Audiovisuals and Informatics Librarian

Health Sciences Library
East Carolina University
Greenville, North Carolina 27858-4354

INTRODUCTION

The problem of incorrect citations in journal articles often has been reported in medical and science literature [1-5]. An online search of Library Literature and MEDLINE reveals that librarians frequently report frustration in trying to help clients find materials by using incomplete and incorrect published references [6-7]. The authors, however, could not locate any study in the library literature that investigates whether librarians, as authors, editors, and publishers, are more accurate in citing their references than other professionals. This study examines the accuracy of references in the library literature and compares this record to that of references in medical literature.

METHOD

The authors examined all 555 references found in the articles in the final 1989 issues of Library Trends, Bulletin of the Medical Library Association, and Library Resources and Technical Services. A single issue for each title was chosen to match the procedure used in the studies of medical literature that were chosen for comparison. The Bulletin was selected because it is the major journal for medical librarianship. The particular issue chosen contained a total of nearly 150 references. The other two titles were chosen because they were research journals and included a similar number of citations per issue.

The references were copied, citations containing Ibid. or op. cit. were deleted, and each remaining citation was examined for completeness and accuracy. For 91% of the citations, a hard copy of the item was obtained for verification. When no hard copy was available, an appropriate index was used to verify references to journal articles (1% of the citations), and the OCLC database record was used to verify books and other items (8% of the citations). A total of thirty references could be neither obtained nor located in any index for verification. Included in these refer-ences were speeches, press releases, computer software and software manuals, some unpublished documents, brochures, and "in press" items. None of these items was included in the analysis.

For each reference, the authors recorded errors in information, omission of information, a description of the error or omission, and an evaluation (minor or major) of the error or omission. The editorial policies of the three journals and The Chicago Manual of Style [8] were considered in determining completeness of the reference. These policies had the greatest impact on two aspects of the citations: issue information on journal articles and pagination information for both journal articles and book chapters. An error or omission was judged to be major if it "prevented immediate identification of the source of the reference [9]." For example, omission of both the year and volume for a journal article, an incorrect journal title, or completely incorrect pagination were classified as major errors. All other errors or omissions were considered minor.

RESULTS

Of the 555 references found in the three journals, 525 (94%) were included in the analysis. Of these, 71% (372) were completely correct. Table 1 presents the breakdown of references from each of the journals. A minor error occurred in 27% (141) of the references, while a major error occurred in 2% (11).

The percentage of incorrect citations varied considerably among the three journals. While 33% of the references from Library Resources and Technical Services and 35% of the references from Library Trends were incorrect, only 15% of the references from the Bulletin were incorrect. The most common errors occurred in author names (46 instances). These errors included the omission of middle initials and spelling mistakes. Errors in article titles (35 instances) and pagination (34 instances) were almost as frequent.

DISCUSSION AND SUMMARY

The results were compared with the findings of reference accuracy studies done with medical journals. In each of these studies [10-12], a random sample of fifty citations from each of twelve medical journals was examined for errors. The results were similar to those for the library literature (Table 2). Of the 600 references taken from the medical journals, 72% were completely correct, while 28% contained at least one major or minor error. As with the library results, the percentage of incorrect citations varied considerably from journal to journal. For example, the New England Journal of Medicine had an 8% error rate [13], while Surgery, Gynecology and Obstetrics had a 52% error rate [14]. Also, as with the library references, the most

Table 1
Citation errors in library literature

Journal title	Citation errors			
	Minor (%)	Major (%)	None (%)	Total errors (%)
Bulletin of the Medical Library Association	20	2	120	22 (15)
Library Resources and Technical Services	34	3	77	37 (32)
Library Trends	87	6	175	93 (35)
Total	141 (27)	11 (2)	372 (71)	152 (29)

common errors in the medical journal references were minor errors in author name or article title [15–17].

The key difference between the medical literature and the library literature occurred in the number of major and minor errors. Of the references examined from the medical journals [18–20], 21% had a minor error, while 7% had a major error. In the library literature, 27% of the references had a minor error, while 2% had a major error. The difference between the ratios of minor to major errors in medical versus library literature was statistically significant, using Chi-square analysis ($P > .0000112$).

The results of this study indicate that librarians, as authors, editors, and publishers, are not more accurate in citing references than medical professionals. The errors made by librarians, however, are more likely to be minor than are those in medical literature. This difference is important when trying to locate the item cited. While minor citation errors can be an annoyance or an inconvenience, major errors result in time-consuming efforts or even complete failure to locate the item.

The studies reported in both the medical and library literature devoted considerable attention to the responsibility for incorrect citations—i.e., does it fall to the publisher or the author? Some of the studies [21–23] assert that the primary responsibility rests with the author of the article. However, Goodrich and Roland have noted that the distinction is moot, in that both publishers and authors "should have vested interests in ensuring optimal accuracy" of citations [24].

Of the three library journals and twelve medical journals, only six address the question of citation verification in the instructions to authors. All six journals (two library journals and four medical journals) tell the author to verify citations prior to submitting the paper. A cursory examination of the correlation between verification policies and citation error rates did not support the hypothesis that instructing authors to verify citations lowers citation error rates.

Instructing the author to verify citations or stating that the author is responsible for the accuracy of the citations does not ensure verification. Because veri-

Table 2
Citation errors in medical literature

Journal title	Citation Errors			
	Minor	Major	None	Total errors (%)
American Journal of Epidemiology‡	11	3	36	14 (28)
American Journal of Public Health‡	13	1	36	14 (28)
American Journal of Surgery†	11	5	34	16 (32)
British Journal of Hospital Medicine*	7	6	37	13 (26)
British Journal of Surgery*	14	9	27	23 (46)
British Medical Journal*	10	3	37	13 (26)
Clinical Radiology*	3	3	44	6 (12)
Lancet*	8	4	38	12 (24)
Medical Care‡	17	1	32	18 (36)
New England Journal of Medicine*	3	1	46	4 (8)
Surgery†	8	4	38	12 (24)
Surgery, Gynecology and Obstetrics†	22	4	24	26 (52)
Total	127 (21%)	44 (7%)	429 (72%)	171 (28)

* de Lacey.
† Evans.
‡ Eichorn.

fication can be time-consuming and expensive, a publisher may choose not to instruct authors to verify references prior to submitting a paper and instead adopt mechanisms to ensure verification for only those papers accepted for publication. The authors recommend a more thorough study of the correlation between such policies and citation error rates, using a variety of journals with different verification policies.

A way to accomplish this would be to conduct a survey of major medical and library journal editors to determine their mechanisms for ensuring accurate citations. Each journal's policy could be classified in one of four categories: (1) does not address citation accuracy; (2) places the burden of verification on the author; (3) shoulders complete responsibility for verification; or (4) requires the author to verify and checks the author's work. Another study should be done to compare the accuracy of references from journals for each category.

The authors believe that results from these studies will support the hypothesis that more stringent citation verification policies for articles that are accepted for publication will reduce citation error rates. If this hypothesis is validated, librarians should then encourage publishers to adopt stringent citation verification policies.

REFERENCES

1. GOODRICH JE, ROLAND CG. Accuracy of published medical reference citations. J Tech Writ Commun 1977;7(1):15–9.
2. POYER RK. Inaccurate references in significant journals of science. Bull Med Libr Assoc 1979 Oct;67(4):396–8.
3. EICHORN P, YANKAUER A. Do authors check their references? a survey of accuracy of references in three public health journals. Am J Public Health 1987 Aug;77(8):1011–2.
4. DE LACEY G, RECORD C, WADE J. How accurate are quotations and references in medical journals? Br Med J [Clin Res] 1985 Sep 28;291(6499):884–6.
5. EVANS JT, NADJARI HI, BURCHELL SA. Quotational and reference accuracy in surgical journals: a continuing peer review problem. JAMA 1990 Mar 9;263(10):1353–4.
6. POYER, op. cit.
7. BROADUS, RN. An investigation of the validity of bibliographic citations. Am Soc Inf Sci J 1983 Mar;34(2):132–5.
8. The Chicago manual of style. 13th ed. Chicago: University of Chicago Press, 1982.
9. DE LACEY, op. cit.
10. EICHORN, op. cit.
11. DE LACEY, op cit.
12. EVANS, op. cit.
13. DE LACEY, op. cit.
14. EVANS, op. cit.
15. EICHORN, op. cit.
16. DE LACY, op. cit.
17. EVANS, op. cit.
18. EICHORN, op. cit.
19. DE LACEY, op. cit.
20. EVANS, op. cit.
21. POYER, op. cit.
22. EICHORN, op. cit.
23. DE LACEY, op. cit.
24. GOODRICH, op. cit.

How hyper are we? A look at hypermedia management in academic health sciences libraries

By Lori Widzinski, M.L.S., M.S.
Head, Media Resources Center

Health Sciences Library
State University of New York at Buffalo
Abbott Hall
Buffalo, New York 14214

The term *hypermedia* is becoming increasingly common in instructional institutions. This form of computer-assisted instruction (CAI) allows the user to connect concepts through an associative method of learning [1]. As explained in a recent article, "a hypertext system allows users to link information together, thereby creating trails through associated materials. Hypermedia is similar to hypertext, but instead of linking just text, users can link to other media such as graphics, video, spreadsheets, animations, and voice" [2].

Interactive hypermedia programs are being developed and used in health sciences schools nationwide. HyperPath, a program developed in Cornell University Medical School's department of pathology, combines text from lecture notes with still and microphotographs to form an instructional tool for preclinical medical education [3]. Another program, Interactive Medical Record (IMR), by Dr. Edward K. Shultz, weaves together information from the clinical patient record in a combination of text, sound, graphics, animation, and video images [4]. As hypermedia programs are developed and begin to play a larger role in health sciences course work, libraries serving these schools will be under pressure to respond to this new format.

THE SURVEY

To determine the extent to which academic health sciences libraries are supporting hypermedia applications, an informal survey was conducted in the winter of 1991. The survey was designed primarily to gather information for planning purposes for the Media Resources Center, Health Sciences Library (HSL),